CRITICAL ECOSYSTEM PARTNERSHIP FUND

ECOSYSTEM PROFILE

EAST MELANESIAN ISLANDS BIODIVERSITY HOTSPOT

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EXECUTIVE SUMMARY

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

A fundamental purpose of CEPF is to engage civil society, such as community groups, nongovernmental organizations (NGOs), academic institutions and private enterprises, in biodiversity conservation in the hotspots. To guarantee their success, these efforts must complement existing strategies and programs of national governments and other conservation funders. To this end, CEPF promotes working alliances among diverse groups, combining unique capacities and reducing duplication of efforts for a comprehensive, coordinated approach to conservation. One way in which CEPF does this is through preparation of "ecosystem profiles"—shared strategies, developed in consultation with local stakeholders, which articulate a five-year investment strategy informed by a detailed situational analysis.

This document is the ecosystem profile for the East Melanesian Islands Hotspot, which includes the island nations of Vanuatu and the Solomon Islands and the islands region of Papua New Guinea (PNG), which includes the provinces of Manus, New Ireland, East New Britain and West New Britain plus the Autonomous Region of Bougainville. The East Melanesian Islands qualify as a hotspot due to their high levels of plant and animal endemism and accelerating levels of habitat loss, caused chiefly by widespread commercial logging and mining, expansion of subsistence and plantation agriculture, population increase, and the impacts of climate change and variability. The East Melanesian Islands Hotspot holds exceptional cultural and linguistic diversity. Vanuatu, for example, has 108 living languages: more per unit area than any other country. Because many languages are spoken by only a few hundred people, they are disappearing, leading to a rapid erosion of traditional knowledge and practice. This is highly significant in a region where most land and resources are under customary ownership, and local people are true stewards of biodiversity.

Ecosystem profiling process

The ecosystem profile for the East Melanesian Islands Hotspot was developed through a process of consultation and desk study led by the University of the South Pacific in partnership with the University of PNG and CI's Pacific Islands Program. Initial research and analysis at the regional level provided draft biodiversity and thematic (or contextual) priorities, which were subsequently reviewed by experts within the hotspot. The year-long consultation process involved an expert roundtable meeting and nine stakeholder consultation workshops, and engaged more than 150 stakeholders from local communities, CSOs, government institutions and donor agencies.

The ecosystem profile presents an overview of the East Melanesian Islands in terms of their biodiversity conservation importance, and socioeconomic, policy and civil society contexts. It defines a suite of measurable conservation outcomes, at species, site and corridor (or landscape) scales, as the scientific basis for determining CEPF's geographic and thematic niche for investment. The conservation outcomes for the East Melanesian Islands Hotspot are framed by a situational analysis, which includes an assessment of the predicted impacts of climate change in the region, as well as reviews of the policy, socio-economic and civil society contexts for biodiversity conservation. It also includes an assessment of patterns and trends in current conservation investment, which captures lessons learned from past investments in the hotspot, as well as an overview of threats and drivers of biodiversity loss.

The conservation outcomes and situational analysis provide the justification for a niche and investment strategy for CEPF in the hotspot. The investment strategy comprises a set of strategic funding opportunities, termed strategic directions, broken down into investment priorities outlining the types of activities that will be eligible for CEPF funding. Civil society actors may propose projects that will help implement the strategy by fitting into at least one of the strategic directions. The ecosystem profile does not include specific project concepts, as civil society groups will develop these as part of their applications for CEPF grant funding.

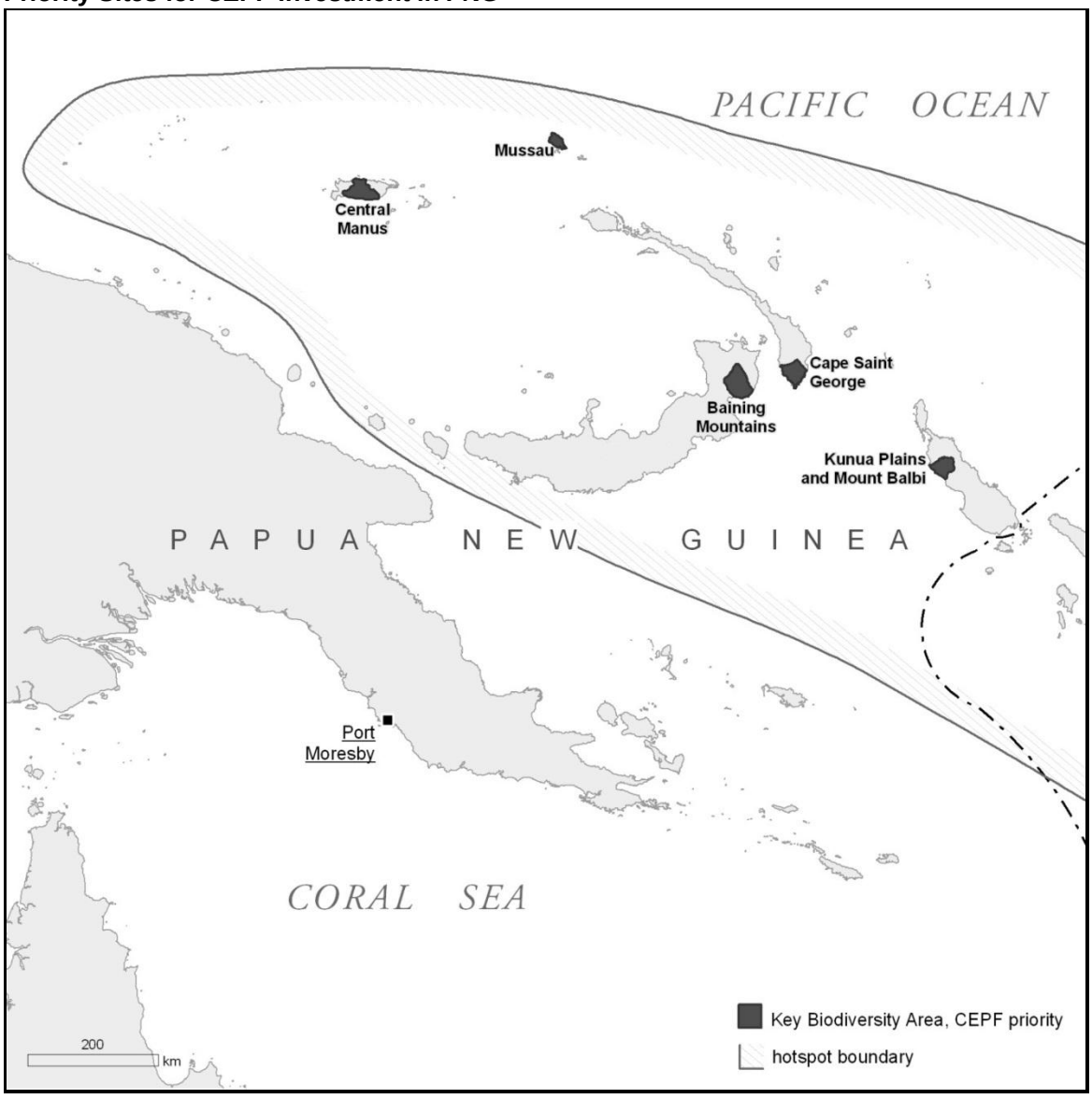
CEPF Niche and Investment Strategy

The purpose of the investment niche is to define where CEPF investment can make the greatest and most sustained contribution to the conservation of globally important biodiversity in the East Melanesian Islands Hotspot, within the context of other investments by governments, donors and civil society. To this end, the CEPF niche was defined in three dimensions: geographic; taxonomic; and thematic.

The geographic niche for CEPF investment in the East Melanesian Islands Hotspot is defined in terms of priority sites. These were selected from among the full list of Key Biodiversity Areas (KBAs) in the hotspot based on an initial biological prioritization, followed by the application of expert opinion to identify sites where CEPF investment could be expected to have the greatest impact. The list of priority sites contains 20 KBAs, comprising five in PNG, nine in the Solomon Islands and six in Vanuatu, and covering a total area of 1.5 million hectares. While the priority sites are principally terrestrial conservation priorities, 11 of them contain significant areas of marine habitat, creating opportunities for ridge-to-reef conservation.

The taxonomic niche for CEPF investment in the hotspot is provided by priority species, selected by stakeholders following standard criteria. The purpose of selecting priority species was to enable investments in species-focused conservation action to be directed at those globally threatened species whose conservation needs cannot adequately be addressed by habitat protection alone. Of the full list of 308 globally threatened species in the hotspot, 48 were selected as priorities for CEPF investment, comprising 20 mammals, 11 birds, five reptiles, two amphibians and 10 plants.

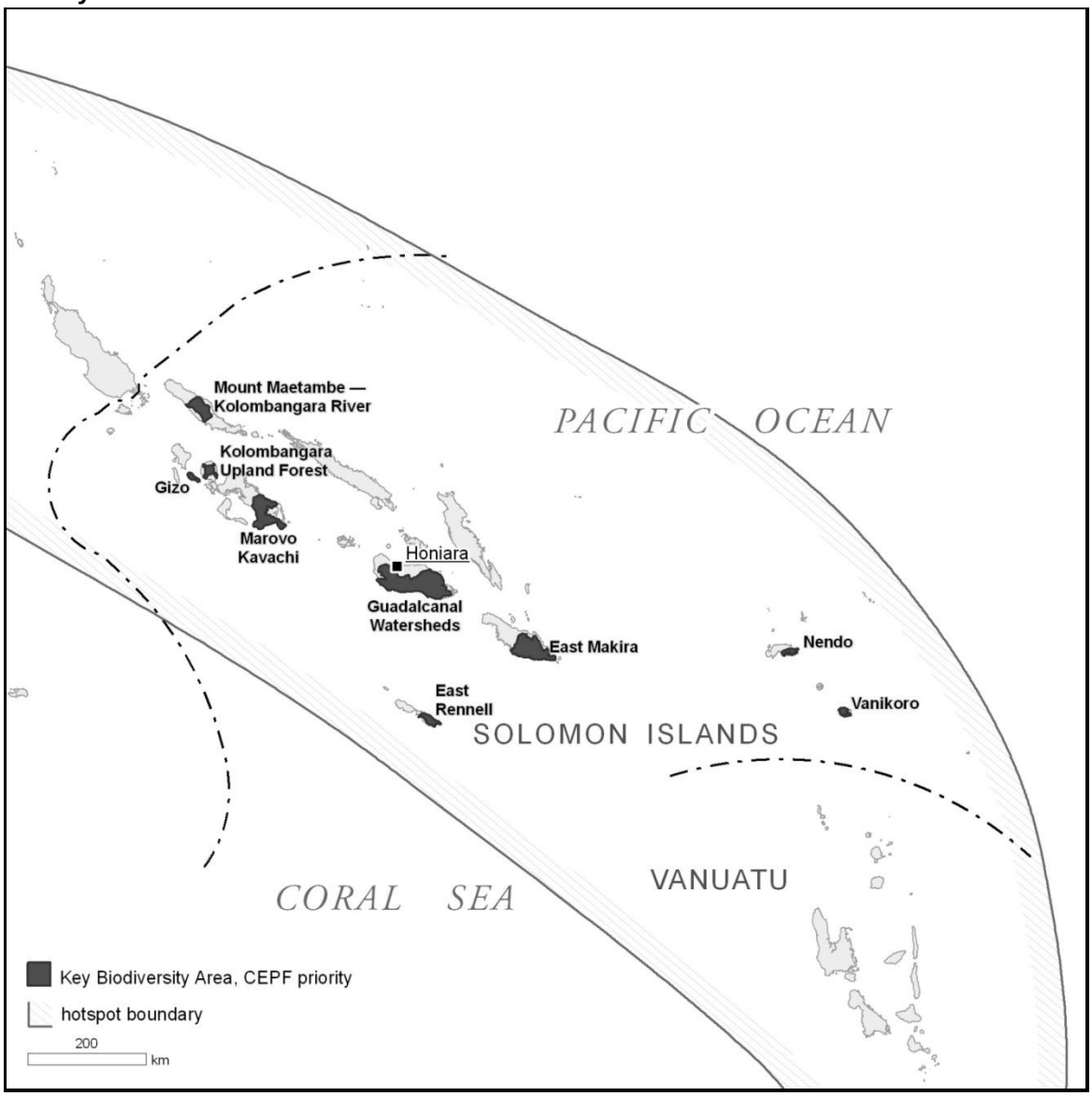
Priority Sites for CEPF Investment in PNG



The thematic niche for CEPF investment in the hotspot was defined through an extensive process of stakeholder consultation, supported by a detailed analysis of gaps and trends in conservation investment in the hotspot. The CEPF niche recognizes local communities and their organizations as the ultimate custodians of the biodiversity of the East Melanesian Islands Hotspot, with support from national and international NGOs, universities and private companies, and within an enabling regulatory and institutional context established by national, provincial and local government. The complementary capacities of different sections of civil society will be leveraged in support of local communities by catalyzing partnerships. Through these partnerships, communities and civil society organizations at different levels will jointly explore the conservation status of priority species and sites, develop a common understanding of their values and the threats facing them, drawing on traditional ecological knowledge as well as western science, and develop and implement conservation actions that are led by and relevant to

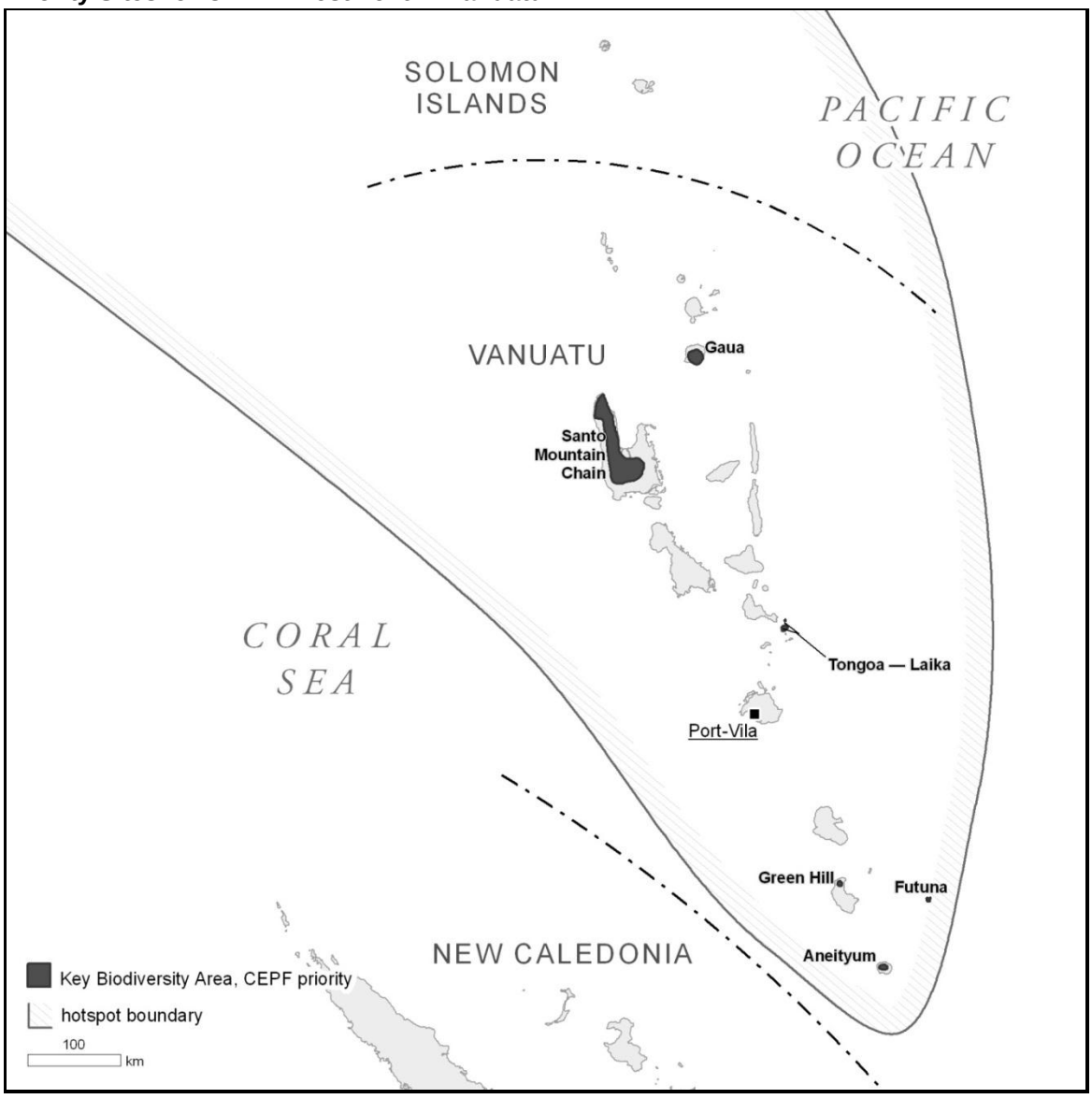
local communities. To respond to threats originating outside of the community, such as commercial logging and plantations, civil society will be supported to integrate biodiversity conservation into local land-use and development planning.

Priority Sites for CEPF Investment in the Solomon Islands



Drawing on lessons learned from past conservation programs in the region, conservation interventions will be developed gradually, to allow sufficient time for trust and understanding to be built among partners, for capacity and knowledge to be transferred, and for long-term funding to be identified and secured. Central to the sustainability strategy of the CEPF investment program in the East Melanesian Islands Hotspot will be an explicit focus on capacity building for local and national civil society through partnerships, networks and mentoring. To allow sufficient time for effective partnerships, enduring capacity and sustained on-the-ground results to be achieved, an investment period of eight years (rather than the usual five) is proposed.

Priority Sites for CEPF Investment in Vanuatu



The following table presents an eight-year investment strategy for CEPF in the East Melanesian Islands Hotspot, aimed at engaging civil society in the conservation of globally significant biodiversity. The strategy comprises 15 investment priorities, grouped into five strategic directions. The strategic directions define the major thrusts of expected CEPF investment in the hotspot, while the investment priorities outline the particular types of activities that will be eligible for support. It is anticipated that the first two years of the strategy would be dedicated to capacity building, development of relationships between civil society organizations and local communities, and testing of approaches, enabling effective roll-out of the full investment program during the remaining six years.

CEPF Strategic Directions and Investment Priorities in the East Melanesian Islands Hotspot

Strategic Directions	Investment Priorities
1. Empower local communities to protect and manage globally significant biodiversity at priority Key Biodiversity Areas under-served by current conservation efforts	1.1 Conduct baseline surveys of priority sites that build government-civil society partnerships and bridge political boundaries
	1.2 Raise awareness about the values of biodiversity and the nature of threats and drivers among local communities at priority sites
	1.3 Support local communities to design and implement locally relevant conservation actions that respond to major threats at priority sites
	1.4 Demonstrate conservation incentives (ecotourism, payments for ecosystem services, conservation agreements, etc.) at priority sites
2. Integrate biodiversity conservation into local land-use and development planning	2.1 Conduct participatory ownership and tenure mapping of resources within customary lands at priority sites
	2.2 Provide legal training and support to communities for effective enforcement of environmental protection regulations
	2.3 Explore partnerships with private companies to promote sustainable development through better environmental and social practices in key natural resource sectors
3. Safeguard priority globally threatened species by addressing major threats and information gaps	3.1 Conduct research on six globally threatened species for which there is a need for greatly improved information on their status and distribution
	3.2 Develop, implement and monitor species recovery plans for species most at risk, where their status and distribution are known
	3.3 Introduce science-based harvest management of priority species important to local food security
4. Increase local, national and regional capacity to conserve biodiversity through catalyzing civil society partnerships	4.1 Strengthen the capacity of local and national civil society organizations in financial management, project management and organizational governance
	4.2 Provide core support for the development of civil society organizations into national and regional conservation leaders
	4.3 Strengthen civil society capacity in conservation management, science and leadership through short-term training courses at domestic academic institutions
5. Provide strategic leadership and effective coordination of conservation investment through a Regional Implementation Team	5.1 Operationalize and coordinate CEPF's grant-making processes and procedures to ensure effective implementation of the investment strategy throughout the hotspot
	5.2 Build a broad constituency of civil society groups working across institutional and political boundaries towards achieving the shared conservation goals described in the ecosystem profile

Conclusion

In terms of species richness and, especially, endemism, the East Melanesian Islands are one of the most biologically important regions on the planet. In addition, the mainly rural population relies heavily on biodiversity for food security and livelihoods. Customary land ownership and resource tenure are constitutionally guaranteed but boundaries are often in dispute. Rural populations have long been isolated by barriers of geography and language, resulting in a high level of self-reliance but also cultural differences among groups. Threats to biodiversity have increased in recent decades through expansion of subsistence agriculture and commercial plantations and the growth of the logging and mining industries. The underlying drivers of these threats include population growth, urbanization and migration patterns, economic growth and increasing consumption.

Over the last two decades, the countries in the hotspot have developed NBSAPs and other conservation strategies, and INGOs have established programs there. Significant investment in conservation has been made over this period but it has not always delivered the expected results or left a legacy in terms of local capacity and appreciation of conservation objectives. Nevertheless, domestic civil society organizations focusing on biodiversity conservation have begun to emerge in all three countries. In addition, local communities, sometimes with outside support and sometimes independently, have responded to the conservation issues facing them with a range of strategies, often founded on traditional customs and governance arrangements. The conservation approach that has shown greatest promise in recent years has been community-managed conservation areas, especially locally managed marine areas; although this requires significant capacity to be built among both community-based organizations and the groups that give them technical support, as well as clear communication and monitoring, to ensure that these areas deliver on the overlapping but different goals of communities and conservation organizations. Moreover, there is a need to integrate the goals of conservation areas into plans and policies of other sectors, so that they are not undermined by incompatible developments.

In this context, there are significant opportunities for CEPF to support biodiversity conservation in ways that deliver significant, meaningful benefits to local communities. However, this will require an engagement longer than the typical five-year investment period, a commitment to capacity building at multiple levels, and a readiness to align global biodiversity priorities with local cultural and development priorities.

To develop its strategy to deliver a program of investment along these lines, CEPF commissioned a year-long consultative process, which involved an expert roundtable meeting and nine stakeholder consultation workshops, and engaged more than 150 stakeholders from local communities, CSOs, government institutions and donor agencies. The process resulted in a common conservation vision for the hotspot and an eight-year investment strategy for CEPF. This strategy comprises 15 investment priorities, grouped under five strategic directions. The successful implementation of this strategy will require time, persistence and, above all, a commitment to genuine and lasting partnership. The cooperation and common vision that has been witnessed through the ecosystem profiling process inspires confidence that such success will be achieved.

1. INTRODUCTION

Founded in 2000, the Critical Ecosystem Partnership Fund (CEPF) is designed to ensure civil society is engaged in biodiversity conservation. It is a joint initiative of l'Agence Française de Développement, Conservation International (CI), the European Commission, the Global Environment Facility (GEF), the Government of Japan, the John D. and Catherine T. MacArthur Foundation, and the World Bank. CI, as one of the founding partners, administers the global program through the CEPF Secretariat.

CEPF is unique among funding mechanisms in that it focuses on biological areas rather than political boundaries and examines conservation threats on a landscape-scale basis. A fundamental purpose of CEPF is to ensure that civil society is engaged in efforts to conserve biodiversity in the hotspots, and to this end, CEPF provides civil society with an agile and flexible funding mechanism complementing funding currently available to government agencies.

CEPF promotes working alliances among community-based organizations (CBOs), 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 targets transboundary cooperation for areas of rich biological value that straddle national borders or in areas where a regional approach may be more effective than a national approach.

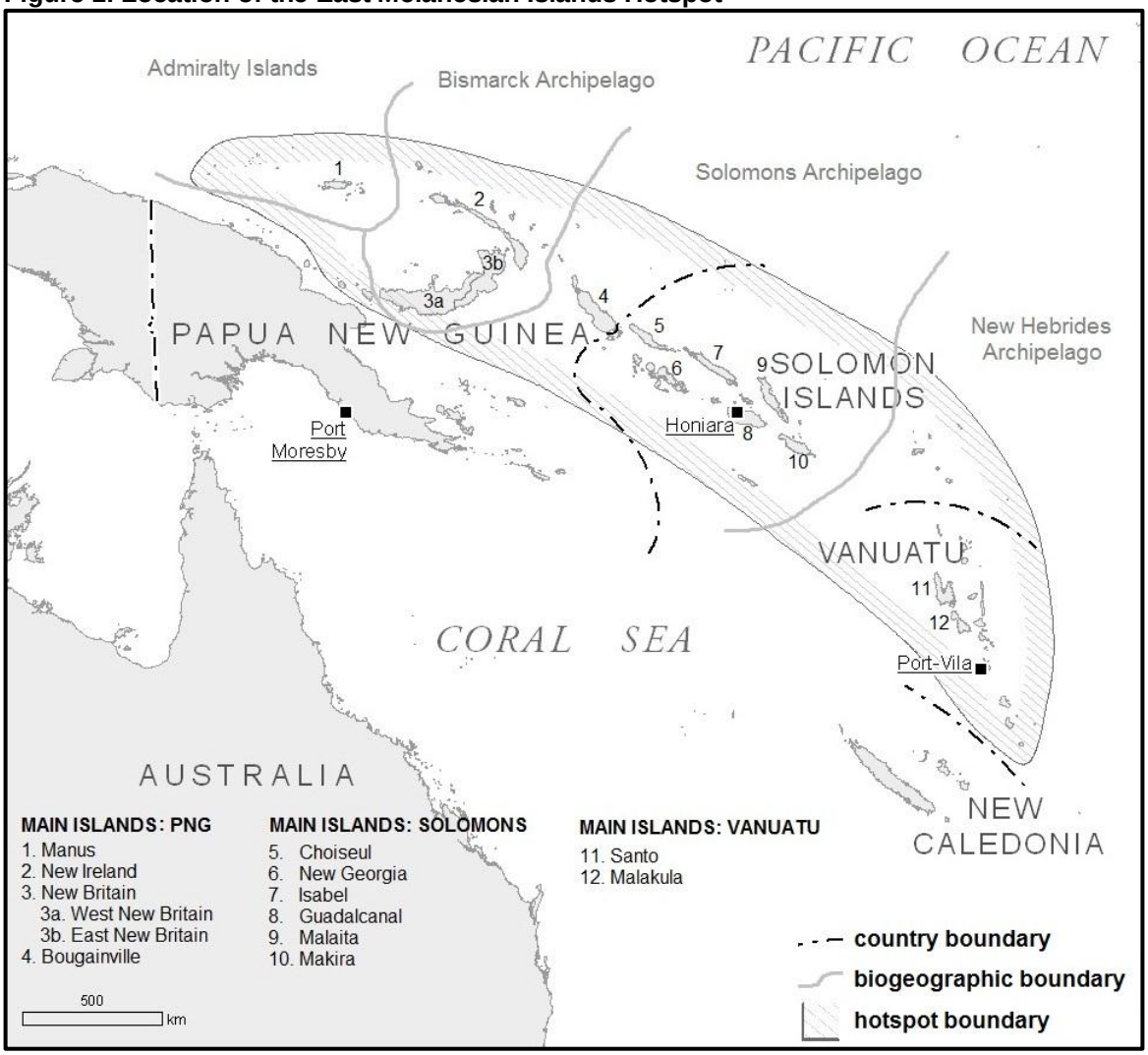
In 2011, CEPF began exploring an investment program in the East Melanesian Islands Hotspot, comprising the island nations of Vanuatu and the Solomon Islands and the islands region of Papua New Guinea (PNG), which includes the provinces of Manus, New Ireland, East New Britain and West New Britain plus the Autonomous Region of Bougainville (Figure 1). The East Melanesian Islands Hotspot holds exceptional cultural and linguistic diversity. Vanuatu, for example, has 108 living languages (Lewis 2009), more per unit area than any other country. The Solomon Islands, with 74 languages, are only slightly less diverse. Because many languages are spoken by only a few hundred people, they are dying out or mixing into pidgin-Austronesian creoles, leading to a rapid erosion of traditional knowledge and practice. This is highly significant in a region where most land and resources are under customary ownership, and local people are true stewards of biodiversity.

The East Melanesian Islands qualify as a hotspot due to their high levels of endemism and accelerating levels of habitat loss, caused chiefly by widespread commercial logging and mining, expansion of subsistence and plantation agriculture, population increase, and the impacts of climate change and variability.

The hotspot is one of the most geographically complex areas on the earth. Isolation and adaptive radiation have led to very high levels of endemism, both within the hotspot as a whole and on single islands. Because most of the islands have never been in land contact with New Guinea, their fauna and flora are a mix of recent long-distance immigrants and indigenous lineages derived from ancient Pacific-Gondwanaland species. Thus, the

hotspot contains classic examples of relatively recent adaptive radiation typical of oceanic islands, such as the white-eyes (family Zosteropidae) and monarch flycatchers (family Monarchidae), but also carries some odd colonizers from times past, such as the Solomon Islands skink (*Corucia zebrata*), whose closest living relatives are the blue-tongued skinks (genus *Tiliqua*) of Australia, New Guinea and Indonesia. The East Melanesian Islands Hotspot also has affinities with Fiji (included as part of the Polynesia-Micronesia Hotspot), such as the *Platymantis* frogs, ancient monkey-faced bats of the genus *Pteralopex*, and *Nesoclopeus* rails.

Figure 1. Location of the East Melanesian Islands Hotspot



Notable endemic species include the majestic Solomons sea eagle (*Haliaeetus sanfordi*) and many species of flying-fox. The East Melanesian Islands also harbor a diverse and unique group of flora and fauna including: 3,000 endemic vascular plants species, 41 endemic mammals, 148 endemic birds, 54 endemic reptiles, 45 endemic amphibians and 3 endemic freshwater fishes. The hotspot is a terrestrial conservation priority, and habitats include coastal vegetation, mangrove forests, freshwater swamp forests, lowland rainforests, seasonally dry forests and grasslands, and montane rainforests.

Nevertheless, the East Melanesian Islands Hotspot lies partly within the Coral Triangle (The Coral Triangle Initiative 2012). The ecosystems of the Coral Triangle support 75 percent of known coral species, with an estimated 3,000 species of reef fishes, and are considered one of the major centers of coral evolution. Thus, the geographic scope of the hotspot is considered to include nearshore marine habitats, such as coral reefs and seagrass beds, but to exclude offshore marine habitats.

Prior to investing in a region, CEPF commissions the preparation of an ecosystem profile, through a participatory process. The purpose of this document 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 and other relevant information. This information is then used to identify the niche where CEPF investment can provide the greatest incremental value for conservation. Consultations with diverse governmental and nongovernmental stakeholders are an integral part of the process, with the aim of creating a shared strategy from the outset. A CEPF investment strategy is an integral part of each ecosystem profile. The ecosystem profile is also designed to enable other donors and programs to effectively target their efforts and thus complement CEPF investments.

Once the profile is approved by the CEPF Donor Council and a regional implementation team (a locally based organization that will provide strategic leadership for the program) has been appointed, civil society organizations can propose projects and actions that fall within the identified strategic directions. The ecosystem profile does not define the specific activities that prospective implementers may propose but outlines the strategy and investment priorities that will guide those activities. Applicants for CEPF funding are required to prepare proposals for the proposed activities and the performance indicators that will be used to monitor project success.

2. BACKGROUND

This ecosystem profile and five-year investment strategy for the East Melanesian Islands Hotspot has been developed by CEPF and the profiling team, led by the University of the South Pacific (USP) in partnership with the University of PNG (UPNG) and CI's Pacific Islands Program. Initial research and analysis at the regional level provided draft biodiversity and thematic (or contextual) priorities that were subsequently reviewed by experts within the hotspot.

The CEPF profiling process incorporated regional stakeholder expertise through national workshops. Preparation of the ecosystem profile began formally when the profiling team launched the effort at the Pacific Islands Roundtable on Nature Conservation in Suva, Fiji on July 27, 2011. In December 2011, the first consultation meeting (a technical workshop to define conservation outcomes for the hotspot) took place on Motupore Island, PNG. This meeting brought together 15 stakeholders from the three countries in the hotspot plus two external experts. This was followed up by three national launch events, covering PNG, the Solomon Islands and Vanuatu, over the following months.

In keeping with the participatory, bottom-up approach to strategy development followed by CEPF, a series of eight provincial workshops followed, from January to May 2012, to elicit input from representatives of provincial and local government, NGOs, CBOs, media organizations and communities. In PNG, 69 stakeholders participated in meetings held in Lorengau (Manus), Kavieng (New Ireland), Kimbe (West New Britain) and Buka (Bougainville). For the Solomon Islands, 31 people participated in consultations were held in Honiara city and Gizo (Western province). In Vanuatu, 34 people attended meetings held in Port Vila, Luganvile (Santo) and Lenakel (Tanna). Finally, a three-day regional stakeholder workshop was held in Honiara in May 2012, which brought together 24 representatives of government departments, domestic and international civil society and local communities to review draft outputs from the profiling process and consider conservation strategies from a regional perspective.

This ecosystem 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 niche 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 consolidated). As conservation in the field succeeds in achieving these targets, they translate into 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 targeted to where they can most effectively engage civil society in the conservation of globally important biodiversity, taking into account investments by governments and other donors, and in ways that allow success to be monitored and measured.

The conservation outcomes for the East Melanesian Islands Hotspot are framed by a situational analysis, which draws on the findings of specially commissioned thematic studies, reviewed and verified through the stakeholder consultations. The analysis includes an assessment of the predicted impacts of climate change in the region with specific emphasis on adaptation and mitigation opportunities, as well as reviews of the policy, socio-economic and civil society contexts for biodiversity conservation. It also includes an assessment of patterns and trends in current conservation investment, which captures lessons learned from past investments in biodiversity conservation in the hotspot, as well as an overview of threats and drivers of biodiversity loss in the hotspot.

Finally, the results of the stakeholder consultations and the thematic studies are synthesized to define a niche and investment strategy for CEPF in the hotspot. This comprises a set of investment priorities, grouped into broad strategic directions.

3. BIOLOGICAL IMPORTANCE OF THE HOTSPOT

3.1 Geography

The East Melanesian Islands Hotspot lies northeast and east of the island of New Guinea and includes the Bismarck and Admiralty Islands, the Solomon Islands, and the islands of

Vanuatu. Politically, this includes the islands region of PNG, and all of the Solomon Islands and Vanuatu (Figure 1). In total, the hotspot includes some 1,600 islands, encompassing a land area of nearly 100,000 km².

The region is one of the most geographically complex areas on Earth, with a diverse range of islands of varying age and development. The two main islands of the Bismarck Archipelago, New Ireland and New Britain, are mountainous, with peaks exceeding 2,000 meters in elevation. Several of the smaller islands in the archipelago are recent volcanoes, some of which are still active. Bougainville, the largest island in the Solomon chain, has several high massifs (some volcanic), including Mount Balbi, which, at 2,685 meters above sea level, is the highest point in the hotspot (Australian Bureau of Meteorology 2011).

The East Melanesian Islands Hotspot is composed of four main island arcs: the Admiralty Islands; the Bismarck Archipelago; the Solomons Archipelago; and the New Hebrides Archipelago. The geological and tectonic history of these arcs underpins the patterns in ecosystems, habitats, species diversity and endemism observed today.

The islands of the hotspot have lower levels of alpha diversity than the mainland of New Guinea but, due to island speciation, have high beta diversity. Understanding island biogeography is, therefore, critical for understanding the biological importance of the hotspot. The limited geographical range of most of the island endemic species predisposes them to extinction when habitats are rapidly modified through human activities or ecosystems are altered through the introduction of exotic species.

Not only do species have importance at the global scale due to endemism and the threatened status of many species but also in the patterns and processes that have underpinned the development of theories of evolutionary biology. Moreover, the natural environment still has extremely high local importance to the people of the islands, due to its role in their traditional practices and cultural identity.

3.2 Geology

The geological history of the region underpins the current island formations and biodiversity patterns. The initial arc volcanism and island-building of the hotspot began in an area northeast of the Australian craton. This initial arc development included a broad continuous line of island-building from what is now the Huon Peninsula of mainland PNG, through to the Fiji plateau (Yan and Kroenke 1993), which has gradually migrated south. Islands have appeared and subsided, and sea levels have risen and fallen, so the current islands we see in the hotspot today are but the present state of a dynamic and continuously changing array of above-sea land masses along the migrating arcs.

Young volcanic islands are composed of purely igneous rocks, while older islands, which have subsided and then been uplifted subsequently, have a composite geology, with limestone overlaying the original igneous rock, and sometimes with metamorphic rocks where plate tectonic pressure and heat have exerted an influence. The oldest rocks in the

hotspot are Cretaceous lavas (Packham 1973) under limestone in the "central" geological province of the Solomons Archipelago, with the rocks being oldest to the east of this arc, especially around Guadalcanal. Nonetheless, the modern island arcs of the Solomons, Bismarcks and Admiralties have been consistently above sea level since the Eocene epoch (40 million years ago), allowing a long time for the evolution of unique biotas. As well as the complex series of old igneous, sedimentary and metamorphic rocks, the central geological province of the Solomons Archipelago is also characterized by mineral-rich ultramafic intrusions along the arc (Hackman 1973). The oldest rocks of the New Hebrides arc, which extend from Nendö through the Torres Islands to Santo and Malakula, are of the younger pre-mid Miocene Epoch (Mallick 1973). As with the old rocks of Admiralties, Bismarcks and Solomons, the older islands of the New Hebrides arc have a significant layer of limestone overlaying an igneous basement.

Young volcanic islands are present in the western Solomons and in the New Hebrides arc from Aneityum to Tinakula. Recent volcanoes also intrude through old islands, such as in Bougainville and New Britain. Some examples of active volcanism in the hotspot are the Tuluman Islands, formed in Manus province by a rhyolitic eruption in 1953-57, the active Tavurvur volcano in East New Britain, which buried Rabaul town in 1994, and the active Yasur volcano on the island of Tanna in southern Vanuatu. The submarine Kavachi volcano in Western province of the Solomon Islands breaks the surface every few years to appear as a new island, only to sink beneath the waves again once activity subsides.

Earthquakes are also associated with tectonic plate movements, which lift and sink land, as the sunken coral island of Tego in Makira Ulawa province testifies. Tsunamis are often associated with earthquakes, such as the 2007 earthquake in the western Solomons, which triggered a tsunami that killed 52 people. The East Melanesian Islands Hotspot is just as much a geological hotspot as a biodiversity hotspot, and the geology of the hotspot (the age, height, size and substrates of the islands) has a strong bearing on the patterns of biodiversity observed today.

The islands of the East Melanesian Islands Hotspot can be classified according to their size, form and geology, and according to their position on tectonic plates (Nunn 1998). The islands are almost all plate-boundary islands in proximity to subduction zones and associated deep sea trenches, although the outlying islands of Rennell and Bellona in the Solomon Islands are intraplate landforms. A sample of islands is given in Table 1 to describe the variety of island types found within the hotspot. The tabulation highlights that the largest islands all have composite geology and lie along the plate boundary but that there is no such uniformity in geology and form for smaller islands.

The larger, higher islands of composite geology found along the plate boundary also generally coincide with being the oldest of the arcs. If distance from source regions is added in, then the island biogeographic prediction of the species diversity of the islands (Whittaker 1998) becomes relatively simple: highest in the Bismarcks, falling off through the Solomons and lastly Vanuatu. This is borne out by biological data, with the main anomaly being New Ireland, which has relatively low diversity and endemism for its size

and position (Beehler *et al.* 2001, Mayr and Diamond 2001). This is most likely due to a geologically recent re-emergence above sea level following a period of submersion.

Table 1. Classification of Selected Islands in the East Melanesian Islands Hotspot

Geology	Intraplate Islands	Plate Boundary Islands
Volcanic	Tikopia (5 km²) Anuta (0.37 km²)	Tanna (555 km²) Vangunu (509 km²) Ambae (402 km²) Vanua Lava (334 km²) Vanikoro (173 km²) Kolombangara (117 km²) Gatokae (93 km²) Savo (30 km²) Tinakula (10 km²)
Limestone	Rennell (660 km²) Bellona (17 km²)	Tetepare (118 km²)
Composite		New Britain (35,145 km²) Bougainville (9,318 km²) New Ireland (7,405 km²) Guadalcanal (5,353 km²) Santo (3,956 km²) Malaita (3,836 km²) Isabel (3,665 km²) Makira (3,191 km²) Choiseul (2,971 km²) Malakula (2,041 km²) New Georgia (2,037 km²) Manus (1,940 km²) Vella Lavella (629 km²) Nendö (505 km²) Gela (386 km²)
Atoll	Ontong Java (12 km²)	Green Islands

3.3 Climate

The East Melanesian Islands have a predominantly hot, humid, tropical climate, with year-round rainfall. There are two main seasons: a wet season, influenced by the northwest monsoon, between December and May; and a dry season, influenced by trade-winds from the southeast. Some parts of the hotspot experience a second, brief, dry season during January and February.

The southern islands of Vanuatu experience greater seasonality than the rest of the hotspot, with cooler temperatures and lower rainfall during the dry season, although temperatures never fall below 17°C. The southern part of the hotspot also has the greatest incidence of tropical cyclones, although most storms pass to the south of Vanuatu, and not all storms that hit the islands are strong ones.

Climate charts (Table 2 and Figures 2 to 4) generated with data from the World Meteorological Organization (2011) show marked variation in rainfall within the overall pattern of monsoonal wet season versus trade-wind dry season, and a latitudinal trend in temperature, with cooler temperatures during the May to October period in the more southern islands of Vanuatu (Port Vila and Tanna stations).

Table 2. Weather Stations Used to Generate Climate Graphs

Station	Kavieng, PNG	Rabaul, PNG	Auki, Solomons	Vanua Lava, Vanuatu	Port Vila, Vanuatu	Tanna, Vanuatu
Color Code						
Data Period	1975-2007	1974-1994	1962-1990	1971-2008	1961-1990	1998-2008
Longitude (°E)	150.80	152.18	160.70	167.54	168.30	169.27
Latitude (°S)	2.57	4.20	8.77	13.85	17.75	19.53

Figure 2. Average Monthly Rainfall (millimeters)

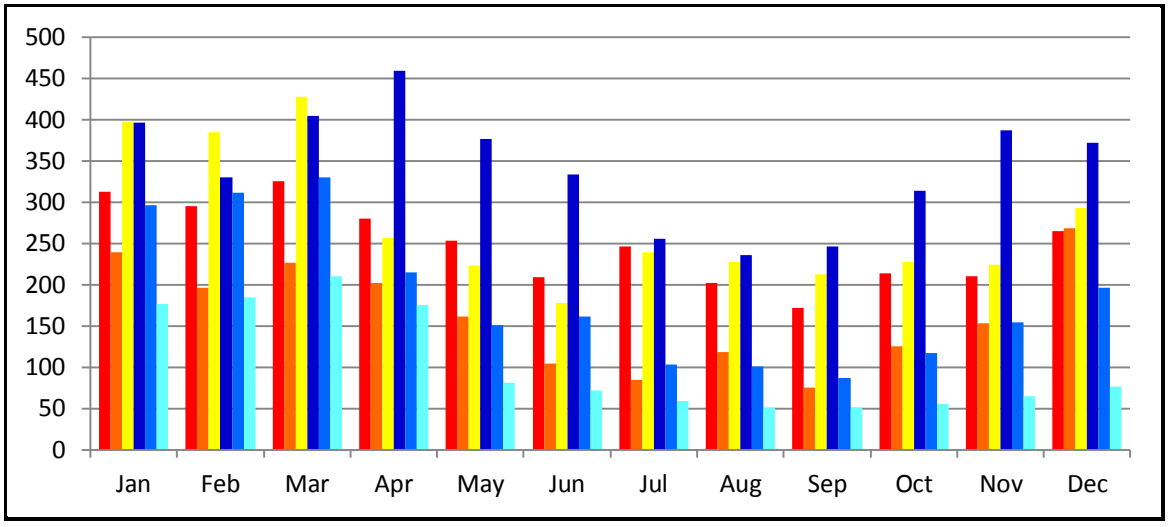


Figure 3. Combined Average Monthly Rainfall (millimeters)

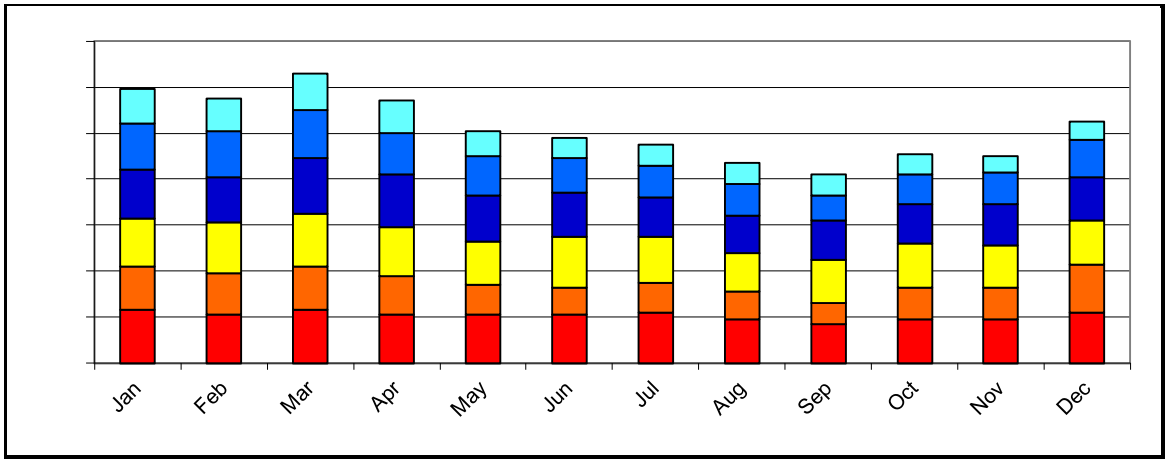
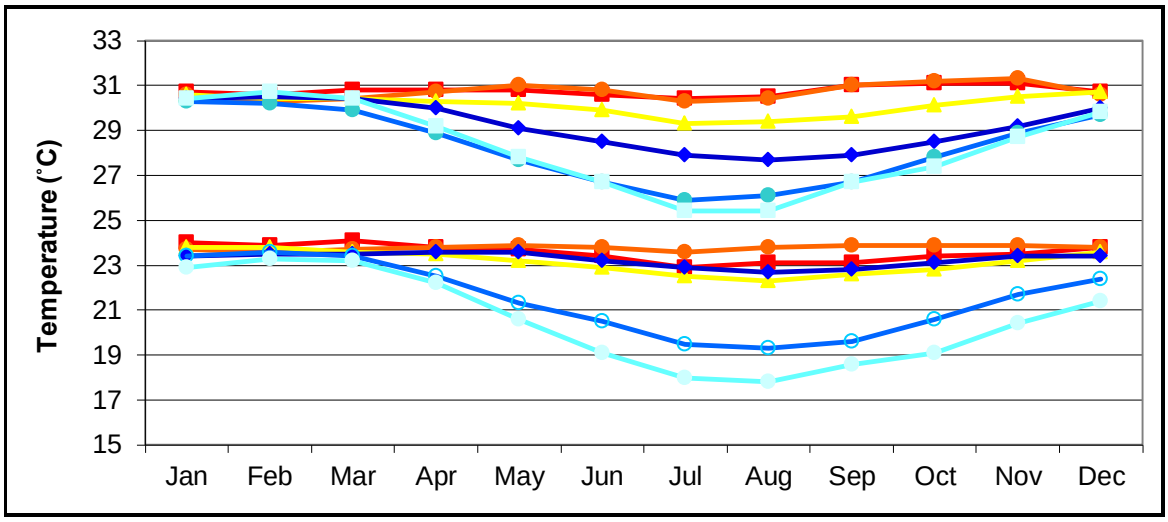


Figure 4. Average Monthly Maximum and Minimum Temperatures



A significant factor in climate patterns from year to year is the El Niño/Southern Oscillation (ENSO) cycle. During an El Niño year, the East Melanesian Islands are subjected to drought conditions and cooler sea temperatures, whereas during a La Niña year higher than normal rainfall and warmer sea temperatures (and therefore higher likelihood of tropical cyclones) are experienced. The intensity of ENSO cycles and frequency of cyclones may increase with climate change, although the relevant models are unclear at this stage (Leisz *et al.* 2009).

3.4 Ecoregions, Habitats and Ecosystems

The East Melanesian Islands Hotspot contains six Endemic Bird Areas defined by BirdLife International (Stattersfield *et al.* 1998; Table 3). These coincide closely with the five terrestrial ecoregions of the hotspot defined by the World Wide Fund for Nature (WWF) (Olson *et al.* 2001; Table 4). The only difference is that the Endemic Bird Areas distinguish two smaller island groups (St Matthias in PNG, and Rennell and Bellona in Solomon Islands) as unique ecosystems based on bird endemism, whereas the WWF ecoregions distinguish between montane and lowland ecosystems in the Bismarck Archipelago (New Britain and New Ireland).

In addition to the main habitats described in Table 4, all terrestrial ecoregions (apart from the New Britain-New Ireland Montane Rainforests, for obvious reasons) also contain freshwater swamps, mangroves and coastal strand vegetation, which form a transitional zone between the terrestrial forests (mainly lowland rainforest) and nearshore marine habitats, such as coral reefs and seagrass beds. Continua of natural habitat extend from mountain ridge to reef, albeit fragmented by agricultural conversion and logging in many places. These “ridge-to-reef” ecosystems are notable for their resilience to the effects of climate change, and for delivering a wide range of ecosystem services to human communities. As well as being connected by animal species, such as fishes and birds that move between habitats, they are also linked by river systems that facilitate nutrient flow.

Table 3. Endemic Bird Areas in the East Melanesian Islands Hotspot

EBA Name	Priority	Restricted-range Species	Key Habitats	Main Threats
Admiralty Islands	High	13	Lowland rain forest	Limited habitat loss (e.g. due to shifting cultivation)
St Matthias Islands	High	8	Lowland rain forest	Possible habitat loss
New Britain and New Ireland	High	54	Lowland and montane rain forest	Moderate habitat loss (e.g. due to oil palm, coconuts and logging)
Solomon group	Critical	78	Lowland and montane rain forest	Moderate habitat loss (e.g. due to logging, coconut plantations), introduced species
Rennell and Bellona	High	12	Lowland rain forest	Limited habitat loss (e.g. due to logging), hunting, invasive species
Vanuatu and Temotu	High	30	Lowland and montane rain forest	Moderate habitat loss (e.g. due to logging, subsistence farming, pasture), invasive species

Table 4. Ecoregions in the East Melanesian Islands Hotspot

Ecoregion	Threat Status	Notes
Admiralty Islands Lowland Rainforests	Critical / Endangered	The Admiralty Islands Lowland Rainforests contain six endemic bird species, yet the biodiversity of these islands is still poorly known. Commercial logging and conversion of forests to agriculture are the greatest threats to the ecoregion.
New Britain-New Ireland Lowland Rainforests	Critical / Endangered	Past volcanic eruptions have been tremendous in the lowlands of New Britain and New Ireland. The New Britain city of Rabaul is surrounded by six volcanoes, and in September 1994 one of these forced the abandonment of the city. The numbers of animal endemics of the New Britain-New Ireland Lowland Rain Forests are as remarkable as the volcanoes that mark the landscape. Commercial logging and conversion of forests to agriculture have altered much of the ecoregion.
New Britain-New Ireland Montane Rainforests	Critical / Endangered	Like the lowland rainforests, the montane forests of New Britain and New Ireland are rich in endemic species. However, unlike the lowlands, the karst topography of the montane forests is too steep for plantations. The montane forests therefore are relatively intact yet under increasing threat of being logged or degraded as a result of increasing populations.
Solomon Islands Rainforests	Vulnerable	The Solomon Islands Rainforests are true oceanic islands with high vertebrate endemism, including single-island endemics, restricted-range mammals, and an astounding 69 bird species found nowhere else in the world. Large lowland areas below 400 meters either have been or are under threat of logging or clearance for subsistence agriculture. Introduced cats have eliminated most native mammals on Guadalcanal.
Vanuatu Rainforests	Critical / Endangered	The Vanuatu Rainforests consist of more than eighty true oceanic islands, in two groups, at the edge of both the Australasian realm and the Pacific Basin. They contain 15 bird species and several mammal species found nowhere else in the world. Although it is faced with population pressures and regular visits by destructive cyclones, with few exceptions Vanuatu's natural heritage is nearly intact.

Source: WWF (2011b).

If the differences are taken to the closest possible match, then the montane and lowland forests of New Britain can be treated as one unit, and small outlying island groups distinguished for bird endemism (such as St Matthias and Rennell-Bellona) can be merged into the nearby larger island groups with which they have biogeographic affinities. The result is that there are four main biogeographically defined regions based on the major island groups:

- Admiralty Islands.
- Bismarck Archipelago (comprising New Britain, New Ireland and the St Matthias Group).
- Solomons Archipelago (comprising Bougainville, the main islands of the Solomons Islands and outlying Rennell and Bellona).
- New Hebrides Archipelago (comprising the Santa Cruz Islands of the Solomon Islands, and all the islands of Vanuatu).

The administrative dimension is not so straightforward, as a result of late 19th and early 20th century European influence in defining territories, which later became independent nations. Within these biogeographically incompatible national boundaries, however, there are subnational units (provinces), which allow a greater degree of administrative congruence with biogeographic zones (Figure 1 and Table 5):

Table 5. Provincial Level Administrative Units and Biogeographic Zones of the East Melanesian Islands Hotspot

Biogeographic Zone	Country	Political Unit(s)
Admiralty Islands	PNG	Manus province
Bismarck Archipelago	PNG	West New Britain, East New Britain and New Ireland provinces
Solomons Archipelago	PNG, Solomon Islands	Autonomous Region of Bougainville in PNG, and all provinces in the Solomon Islands except Temotu
New Hebrides Archipelago	Solomon Islands, Vanuatu	Temotu province in the Solomon Islands, and all provinces in Vanuatu

Within these biogeographic zones, finer scale ecosystem and habitat differentiation exists. Plant communities are used as indicators of habitat, and these are summarized in Table 6 for the four biogeographic zones of the hotspot (Mueller-Dombois and Fosberg 1998).

The original extent of terrestrial natural habitat in the East Melanesian Islands is estimated to be 99,384 km², while the current remaining cover is estimated to be only 29,815 km². This equates to a 70 percent reduction: a key statistic in qualifying the region for hotspot status. However, there is very strong evidence that nearly all of the natural vegetation in the hotspot has been modified by humans for millennia; this is of direct bearing on how conservation targets and benchmarks should be set (C. Filardi *in litt.* 2012).

Table 6. Major Habitats of the Four Biogeographic Zones of the East Melanesian Islands Hotspot, as Defined by Plant Communities

Vegetation	Admiralty Islands	Bismarck Archipelago	Solomons Archipelago	New Hebrides Archipelago
Coastal strand vegetation	Zonation begins at high water mark: herbaceous zone with creeping plants such as *Ipomoea pes-caprae*, then shrub zone with *Pemphis* and *Scaevola*, then tree zone with *Barringtonia*, *Terminalia*, *Calophyllum*, *Casuarina* and/or *Pandanus*. Significant on small uninhabited atolls and islets of the province.	As per Admiralties. This vegetation type is often disturbed by subsistence cultivation and oil palm plantations.	Similar in composition to Admiralties. Often modified for coconut plantations. Best preserved on small uninhabited islands or atoll islets.	Similar to Solomons, with frontal herb zone of *Ipomoea* and other creepers, shrub zone with *Scaevola*, and littoral forest with *Casuarina*, *Barringtonia*, *Tournefortia*, etc.
Mangrove forests	Within tidal range, small stature forest in low tide area up to tall forest in high tide area. *Avicennia*, *Sonneratia* and occasionally *Ceriops* on the seaward side to *Rhizophora* and *Bruguiera* on landward side. Widespread, but more significant areas on southern coast of Manus.	As per Admiralties. Significant mangroves in northwestern New Ireland.	Similar composition to Admiralties. Widespread throughout with extensive areas Buka-Bougainville and northwestern Isabel.	Localized and less diverse than western archipelagoes.
Freshwater swamp forest and wetlands	Not significant.	Freshwater swamp forest in northern New Britain, and freshwater lakes and swamps. Endemic *Terminalia archipelagi* in some swamp forests of New Britain and New Ireland.	Characteristic of Bougainville and a significant wetland area in west Makira. Grasses, ferns and pandans common in herbaceous wetlands. Low swampy forest with *Campnosperma*, *Terminalia*, *Metroxylon* and/or *Pandanus* found throughout the archipelago.	Not significant.

Vegetation	Admiralty Islands	Bismarck Archipelago	Solomons Archipelago	New Hebrides Archipelago
Floodplain forest	Not significant.	Two small deltoid flood plains in southern New Ireland and limited floodplains in New Britain.	Alluvial forests near river mouths and on plains, especially extensive on southern Bougainville. Dominant species include *Octomeles sumatrana*, *Vitex cofassus*, and often tall pure stands of *Terminalia brassii*. All are valuable timber species.	North-central Santo and southeastern Efate. Thickets of *Hibiscus tiliaceus* and park-like matrix of lowland tree species and grassland.
Lowland forest on well-drained soils	Main forest type, but heavily disturbed from slash and burn gardening, small-holder agriculture and timber extraction.	Most widely distributed forest type in Bismarcks, but also the most threatened due to oil palm expansion and logging. Mixed species, but main commercial species are *Pometia pinnata* and *Homalium foetidum*.	Dominant forest type throughout the archipelago. Mixed species forest, often characterized as mixed *Vitex-Pometia* tall forest. Commercially valuable species, heavily exploited forest type.	Floristically less diverse than Solomon Islands, with only two of 12 big-tree species of Solomon Islands reaching Santa Cruz. Three types of forest communities in Vanuatu recognized by stature, likely due to successional recovery from cyclone disturbance. Important trees include *Kleinhovia* and *Castanospermum*. *Agathis* forest on Vanikoro, Erromango and Aneityum.
Seasonally dry forest and grassland	Not significant.	Not significant.	Guadalcanal is only island with significant rain-shadow, but most mixed-deciduous forest here has been cleared, and habitat type is now dominated by grasslands.	Rainshadows on NW sides of islands or mountain ranges. In Santo and Malakula forest with leguminous trees *Pterocarpus*, *Intsia* and *Gyrocarpus*. Elsewhere open "gaiac" forest dominated by *Acacia* and sometimes with *Santalum*, or, where burning predominates, a seral grassland-shrub community dominated by introduced species.

Vegetation	Admiralty Islands	Bismarck Archipelago	Solomons Archipelago	New Hebrides Archipelago
Lowland forest on limestone	Limited to limestone terraces. Not significant.	Extensive Karst landscapes in New Britain and New Ireland. Vegetation communities not very different from other lowland forests. Prone to drought in El Niño conditions and this can lead to scrubby, secondary growth.	Karst areas in northwestern Bougainville. Low stature forest with *Phyllanthus*, *Dysoxylum* and *Ficus*.	Karst areas on Santo, and limestone interiors on Torres islands. While many islands have limestone terraces and interiors, often the soil is developed on a layer of volcanic ash and therefore is not specifically limestone forest.
Lowland forest on ultramafic soils	Not significant.	Not significant.	Significant areas on Choiseul, Isabel and Makira. Dominated by *Gymnostoma* and *Dacrydium*. When burnt, slow to regrow and dominated by *Gleichenia* fern thickets.	Not significant.
Submontane rain forest	Not described, but possibly on Mount Dremsel.	Extensive areas of *Nothofagus* on New Britain.	More significant on Bougainville, harder to detect further east. Indicated by *Cryptocarya*, but mixed species including *Palaquium*, *Canarium*, *Garcinia*, *Elaeocarpus*, *Syzigium*, etc.	No clear submontane zone.
Montane rainforest and scrub	Not significant.	No stunted montane cloud forest described for Bismarcks, but communities including *Metrosideros* and *Weinmannia* described from sites above 1,500 meters.	Found at low altitudes where islands or mountains are exposed to cold southeast trade-winds. Various communities, some dominated by tree ferns or bamboos, some by palms and pandans. Woody species include *Metrosideros.*	On Santo, unique communities of montane *Agathis* and *Podocarpus*. Otherwise similar to Solomon Islands with low altitude montane forest on exposed peaks or islands, and composed of *Metrosideros*, *Syzygium*, *Weinmannia*, etc.

Vegetation	Admiralty Islands	Bismarck Archipelago	Solomons Archipelago	New Hebrides Archipelago
Vegetation on recent volcanic surfaces	Not significant.	New Britain has five currently active volcanoes which have all erupted in the past decade. Pioneer species range from club-mosses and ferns to tall trees such as *Gymnostoma papuanum* and *Eucalyptus deglupta.*	Especially Mount Balbi and Mount Bagana on Bougainville. Successional phases from club-moss to grassland to tree-fern and bamboo thickets.	Especially on Tanna and Ambrym. Early succession characterized by lichens, ferns and grasses. Shrubs and *Ficus* characterize mid-succession.
Anthropogenic garden, grassland and secondary forest	Especially significant on Manus.	Dominant vegetation type in northern New Britain and central New Ireland, and widespread throughout archipelago. Gardens are a mix of root crops and fruit or nut trees. Bush-fallow results in secondary forest.	Variable and widely distributed. Bush-fallow successions include wild bananas, *Heliconia*, aroids gingers, *Caryota* palms and tree-ferns. Secondary woody species typically include *Clochidion*, *Macaranga* and *Mallotus*. Tall trees maintained from forest clearance due to their utility include *Canarium*, *Barringtonia* and *Artocarpus.*	Tree gardens as in Solomon Islands and bush-fallow are typical of subsistence agriculture, and widespread throughout Vanuatu.

Freshwater ecosystems and biological communities are very poorly studied in the East Melanesian Islands Hotspot. Large rivers are present on the larger islands but the most common freshwater habitats are steep-gradient mountain streams. Unique and rare habitats include freshwater lakes on several islands (including crater lakes on inactive volcanic islands in Vanuatu) and subterranean streams in karst areas. The karst regions of New Britain are thought to be hundreds of thousands of years old (Audra *et al.* 2011), and cave species known only from individual cave systems have been discovered, such as the freshwater crabs of Tolana Cave (Guinot 1987). Recent exploration of caves on Santo in Vanuatu have revealed four species of invertebrate confined exclusively to the caves there that were new to science (Deharveng *et al.* 2011). Atolls and coral islets generally have underground freshwater lenses due to the porosity of the rock. The island of Rennell in the Solomon Islands is unusual in having a 155 km² totally enclosed brackish freshwater lake, which is home to Rennell freshwater seasnake (*Laticauda crockeri*), a single-site endemic.

From what little is known about freshwater ecosystems and their species composition, it is clear that, compared with the mainland of New Guinea, the East Melanesian Islands Hotspot has depauperate freshwater fish communities but high diversity and endemism in freshwater invertebrates (Polhemus *et al.* 2008). All freshwater fishes in the hotspot are amphidromous (i.e. with a marine larval stage). Diversity is dominated by gobies and some endemism is known in the subfamily Sicydiinae. However, these are very small fish, which are not currently utilized by local communities or represented in indigenous taxonomies. The larger but non-endemic species like eels (*Anguilla* spp.), spot-tail bass (*Lutjanus fuscescens*), mullets (Mugilidae) and grunters (Terapontidae) are utilized for food, as are neritid snails and prawns, and reduction in their populations is of direct concern to villagers. Surveys in Vanuatu indicate there may be some endemism in freshwater crustacea (Marquet *et al.* 2002). The intense utilization of freshwater species for protein in some areas is having an impact on freshwater ecosystems but there is little to no research in this area. Also, the amphidromous life histories of freshwater species provide a clear linkage between freshwater and marine ecosystems.

Protected area coverage in the East Melanesian Islands is almost non-existent. There are only 12 formal protected areas in the hotspot, covering 895 km^2, equivalent to just one percent of the land area. Most of these are classified in the lower protection categories of the International Union for the Conservation of Nature (IUCN), which allow sustainable uses. Most of the land in the hotspot is under customary ownership, and traditional natural resource rights and practices extend into many coastal and nearshore marine areas. A growing number of community-based conservation areas have been established in recent years, as an alternative to conventional, government-managed protected areas. However, most of these areas are limited in extent, and coverage of critical ecosystems, particularly terrestrial and freshwater ones, remains low.

3.5 Coastal and Nearshore Marine Environment

The Admiralty, Bismarck and Solomons Archipelagoes are part of the Coral Triangle, a region defined by areas with more than 500 coral species and high alpha diversity of fish and marine invertebrates. Nearshore marine ecoregions in the hotspot, as defined by Spalding *et al.* (2007), are summarized in Table 7. The broad coastal and nearshore habitat types are common to all four marine ecoregions.

Table 7. Nearshore Marine Ecoregions in the East Melanesian Islands Hotspot

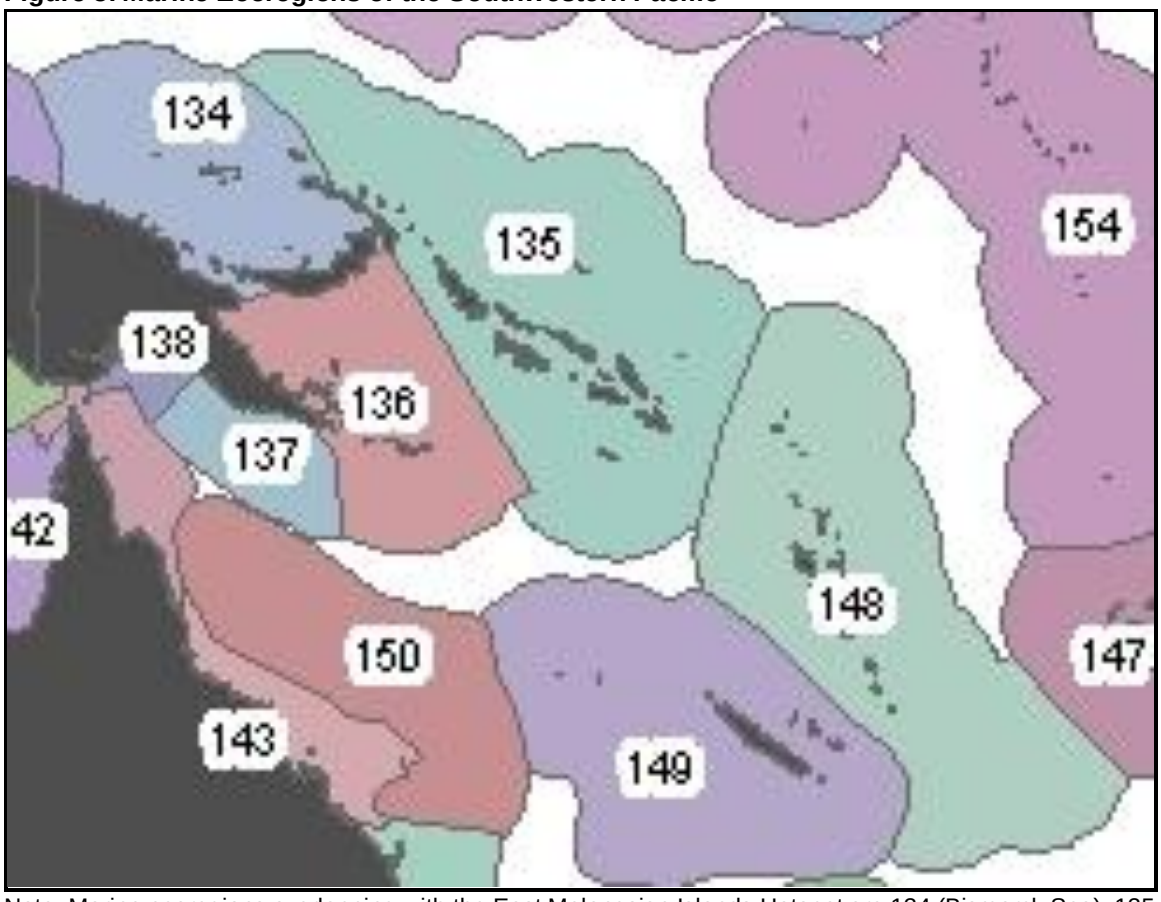
Biome	Region	Marine Ecoregion
Central Indo-Pacific	Eastern Coral Triangle	Bismarck Sea
		Solomon Sea
		Solomons Archipelago
	Tropical Southwestern Pacific	Vanuatu

Source: Spalding *et al.* (2007).

These coincide closely with the terrestrial biogeographic zones (Figure 5). However, the circulation and bathymetry of the Solomon Sea means the south coast of New Britain is part of the Solomon Sea ecoregion. Another difference is the extension of the Solomons

Archipelago marine ecoregion to include the small islands off the north of New Ireland. On the other hand, the inclusion of Temotu province in the Vanuatu marine ecoregion is paralleled in the classification of terrestrial biogeographic zones.

Figure 5. Marine Ecoregions of the Southwestern Pacific



Note: Marine ecoregions overlapping with the East Melanesian Islands Hotspot are 134 (Bismarck Sea), 135 (Solomons Archipelago), 136 (Solomon Sea) and 148 (Vanuatu).

Coral reefs are categorized as either fringing, barrier or atoll reefs. Within each of these categories there are patch reefs, where the coral reef forms patches within a matrix of sand or seagrass. Coral species generally have wide geographic ranges in the Indo-Pacific region, but many are listed as globally threatened due to reef damage and bleaching, and the predicted impacts of sea temperature and pH changes associated with climate change. Reefs support a variety of mollusks, crustaceans and fishes, which in turn provide the main source of protein for people living in coastal villages. Coral reefs are also the habitat for most of the threatened coastal fishes of the region, such as humphead wrasse (*Cheilinus undulatus*), green bumphead parrotfish (*Bolbometopon muricatum*) and hump-backed rock cod (*Cromileptes altivelis*). White sand beaches adjacent to coral reefs are important nesting sites for green turtle (*Chelonia mydas*) and hawksbill turtle (*Eretmochelys imbricata*).

Seagrass beds occur in soft-bottom areas and, like coral reefs, require clear water (low turbidity) away from sediment plumes of large rivers. Seagrass beds are the habitat of

dugong (*Dugong dugon*) which reaches the eastern limits of its distribution in Vanuatu. Dugong was formerly hunted in the hotspot but its numbers are so low now that there are few contemporary records of hunting.

Mangroves are a marine habitat and widely recognized as an important nursery for juvenile fish. They are also an important habitat for saltwater crocodile (*Crocodylus porosus*), which reaches its eastern limits in the East Melanesian Islands Hotspot, and provide coastal buffering against tropical cyclones and other extreme weather events.

Rocky shorelines occur along the coasts of islands of recent volcanic origin, or where rapid uplift or steep drop-offs preclude the development of coral reefs. The intertidal zones are frequented by people collecting gastropods and chitons for food.

River mouths and sandy beaches often form small lagoons, which are important spawning sites for amphidromous fish. The river mouths themselves are important for larval/juvenile fish exchange between marine and freshwater ecosystems, and thus are favorite sites for fishing during "whitebait" runs, with people targeting both the larval fish themselves and the large predatory fish chasing them, such as trevallies. The dark sand beaches extending from river mouths are favored nesting sites for leatherback turtles (*Dermochelys coriacea*).

Intertidal zones on coral reef flats, mangrove mudflats, rocky shores and river mouths are important habitats for migratory waders (families Charadriidae and Scolopacidae), which migrate from breeding grounds mostly in Siberia but also in Alaska, for some species, such as bristle-thighed curlew (*Numenius taitensis*). Most species recorded from the hotspot are passage migrants en route to or from "wintering" (i.e. northern hemisphere winter) grounds in New Zealand but a few are regular winter visitors, which remain in the islands through the non-breeding season, and, in some cases, the first few years of life. These include whimbrel (*Numenius phaeopus*), ruddy turnstone (*Arenaria interpres*), common sandpiper (*Actitis hypoleucos*) and Pacific golden plover (*Pluvialis fulva*).

3.6 Species Diversity and Endemism

Patterns of species diversity across the hotspot reflect classic island biogeography, where island size (generally a very coarse surrogate for diversity of habitats) and distance from continental source are key determinants of number of species. Altitudinal gradients provide opportunities for montane endemics, such as moustached kingfisher (*Actenoides bougainvillei*), the *Cettia* warblers of Bougainville and Makira, or mountain starling (*Aplonis santovestris*) of Santo, which add diversity to high island faunas that is not possible on low islands no matter how large they are. The distance, size and altitude factors do not explain why amphibians do not exist in Vanuatu but yet occur in the more distant islands of Fiji. The frog genus *Platymantis* is most diverse on the Bismarck Archipelago and the Solomon Islands but also occurs in the Philippines, northern New Guinea, Fiji and Palau: a distribution pattern best explained by contiguous island arcs from the mid-Eocene to early Miocene, as illustrated by Hall (2002), that have since either coalesced with the New Guinea mainland or shifted further apart. The New

Hebrides island arc of Vanuatu and the Santa Cruz Islands did not develop until the early-mid Miocene. Geological history is fundamental to understanding diversity patterns in this region (Green 1979, Burret *et al.* 1991).

Endemism patterns reflect taxon cycles and genetic drift. Early work on the theory of taxon cycles was developed by Wilson (1959) using pomerine ant fauna in the East Melanesian Islands Hotspot.

Stage I Expansion phase, where archipelagoes are colonized from source. Usually these are "tramp" species (Diamond 1975), which are generally fecund species with high dispersability, and unspecialized habitat preferences or tolerance to marginal habitats. These species are rarely threatened with extinction.

Stage II Independent evolution and differentiation of island species, either due to ecological release and habitat expansion followed by habitat specialization, or simply due to founder effects and genetic drift.

Stage III Contraction phase, where source or intervening island populations contract and results in an island-centered species or species-group. From this stage, the islands themselves can become sources and the island species then re-enter Stage I with successive expansion phases.

Where differentiation in Stage II involves minimal ecological differentiation, the result is allospecies. These are simply geographically, and, therefore, reproductively, isolated populations with superficial divergence but are essentially the same "superspecies". In all island taxa, the question arises of assessing endemism based on more and more finely split allospecies versus the overarching superspecies. Mayr and Diamond (2001) observed that the number of resident bird species in the Bismarck Archipelago and Solomon Islands reduced from 251 to 191 if superspecies were used instead of allospecies. The key issue regarding conservation of allospecies is that their conservation status does not reflect their degree of relative phylogenetic distinctiveness.

The IUCN Red List is generated by class-level reviews (e.g. birds, mammals, amphibians, reptiles) and the inclusion of allospecies versus superspecies depends on consensus among the experts involved in reviewing the taxa. In birds and mammals, allospecies are used but, for the amphibians of the hotspot, superspecies are used, pending further research to distinguish allospecies. A useful exercise, to further refine species-level conservation priorities in the hotspot, would be to create an index of phylogenetic distinctiveness similar to the Zoological Society of London's EDGE (Evolutionary Distinct and Globally Endangered) index (Isaac *et al*. 2007). This can then help focus investment on the most endangered and phylogenetically distinct species in the hotspot.

Wilson went on to incorporate further Melanesian island data into his classic paper on island biogeography (MacArthur and Wilson 1963), which has since led to the methodical development and expansion of island biogeographic theory as known today. Thus the global significance of the East Melanesian Islands Hotspot lies not just in the

actual endemism and diversity and the inherent uniqueness of the species themselves but also in the taxonomic and spatial distribution patterns that have underpinned key theoretical developments in evolutionary biology.

Complete datasets for endemism analysis of plant and animal classes are not readily available for the hotspot. Table 8 presents data for three classes of vertebrate. Vascular plant diversity is estimated at 3,000 endemic species but details are difficult to obtain. A full list of globally threatened species in the IUCN categories of Critically Endangered (CR), Endangered (EN) and Vulnerable (VU) is presented in Appendix 1.

Table 8. Endemism Figures for Three Classes of Vertebrate across the East Melanesian Islands Hotspot

Class	Resident and Breeding Species	Hotspot Endemics	Threatened Hotspot Endemics	% Endemism	% Endemics Threatened
Mammals	81	41	21	51	51
Birds	288	148	34	51	23
Amphibians	49	45	5	92	11

Mammalian diversity is highest in the family Pteropodidae (flying-foxes) with 36 species. Biogeographic patterns in this family are obviously related to mobility in flying between islands as a result of foraging for temporally and spatially patchy fruit and pollen. Endemism in Pteropodidae is also high with 26 of these species being restricted to the hotspot. Murid rodents are also high in endemism, with 10 of the 14 native species being endemic. Within these families are endemic genera which are highly threatened as groups. *Pteralopex* (monkey-faced bats) contains five species of which two are CR and two are EN. *Solomys* (Solomons rats) contains three species of which two are EN and one is Data Deficient but likely highly threatened also.

The most diverse bird family is the Columbidae (pigeons) with 35 resident breeding species. Again, as with the Pteropodidae, this family is made up of wide-ranging, strongly volant frugivores. The bird families exhibiting the highest combined diversity and endemism are: the Zosteropidae (white-eyes), with 15 species and 87 percent endemism; the Meliphagidae (honeyeaters), with 21 species and 86 percent endemism; the Monarchidae (monarch flycatchers), with 22 species and 73 percent endemism; the Psittacidae (parrots), with 19 species and 63 percent endemism; and the Columbidae (pigeons), with 35 species and 51 percent endemism. Together, these five families account for over half of the endemic birds of the hotspot. The Columbidae, with its diversity and endemism, is also the family in which three ground-dwelling species (including the monotypic genus *Microgoura* of Choiseul) are suspected to have become extinct following the introduction of feral house cats. Another member of the family, Santa Cruz ground-dove (*Gallicolumba sanctaecrucis*), is assessed as EN, and several species are assessed as VU.

Amphibians are dominated by the family Ceratobatrachidae, which contains 42 of the 49 species known to occur naturally in the hotspot. All but one of these 42 species are

endemic to the hotspot. The Ceratobatrachidae contains two endemic monotypic genera, *Palmatorappia* and *Ceratobatrachus,* as well as a further endemic genus *Discodeles* with five species. One of the latter, Shortland Island webbed frog (*Discodeles guppyi*), is very large and weighs up to 1 kilogram. Solomon Islands leaf-nosed frog (*Ceratobatrachus guentheri*) is so unusual and attractive in appearance that it is targeted for the international wildlife trade; nevertheless, it so far remains reasonably common. Despite the endemism, the amphibian fauna has very small proportion of species listed as threatened but a relatively high proportion of endemics (36 percent) are assessed as Data Deficient.

Beyond these groups are other notable representatives of the East Melanesian Islands Hotspot biota. The endemic, monotypic Solomon Islands skink is the world's largest skink, an herbivorous prehensile tailed tree-dweller ecologically equivalent to the possums of Australasia or leaf-monkeys of Asia. Land-snails of the southwest Pacific family Placostylidae are well studied and known to be highly threatened in neighboring hotspots in New Caledonia and New Zealand but the diversity and status of the many Placostylids of the East Melanesian Islands Hotspot is poorly known. The endemic Camaenid land-snail genus *Papustyla* contains the spectacular Manus green snail (*Papustyla pulcherrima*) as well as the most likely extinct species: Ferguson's papustyla (*P. fergusoni*) of New Britain. The flagship butterfly of the hotspot is Schneider's surprise (*Tiradelphe schneideri*), a monotypic genus known only from the mountains of Guadalcanal, which is assessed as EN.

Prehistoric human introductions of useful species in the East Melanesian Islands Hotspot present a further complicating factor in analyses of species diversity and endemism. The evidence for these introductions comes from the archaeological records of the islands. These species include a large, flightless bird (dwarf cassowary (*Casuarius bennetti*)) and two species of marsupial (common echymipera (*Echymipera kalubu*) and northern pademelon (*Thylogale browni*)) in New Britain and a third species of marsupial (northern common cuscus (*Phalanger orientalis*)) from the Bismarcks to the Solomons. These introduced species were not included as native resident species in the analysis, except for two problematic cases. Admiralty cuscus (*Spilocuscus kraemeri*), which is considered to be an endemic marsupial to the Admiralty Islands, appears to be an introduction from as recently as 2000 years before present but is obviously distinctive from known mainland *S. maculatus* due to the founder effect (Flannery 1995). Similarly, the subspecies *Phalanger orientalis breviceps* is restricted to the Bismarck Archipelago and Solomon Islands, and while it is certainly a prehistoric introduction to the Solomon Islands portion of its range; it is unclear if the New Britain population closer to the New Guinea mainland was introduced early and evolved due to founder effect before being transported further, or if it is a natural subspecies in New Britain.

3.7 Cultural Perspectives on Biodiversity

The East Melanesian Islands Hotspot is characterized by high cultural and linguistic diversity, constitutionally-guaranteed customary land ownership and resource tenure, more than 90 percent rural population on customary land, and a general retention of

kastom in belief systems and resource management practices to the modern day. The word *kastom* is not a direct translation of the word *custom* in English but more about identity in a rapidly changing social and cultural environment. Sillitoe (2000) describes it as follows: *"when people talk about* kastom*, they have in mind something we can gloss as traditional lore, that is, practices that originate in their own cultural tradition and rooted in their value system as opposed to deriving from elsewhere."* Any consideration of biological diversity must take into account general patterns of human perceptions of biodiversity in Melanesia if conservation efforts are to have any meaning to the rural land-owning tribes and clans.

From the coastal communities reliant on fishing and collecting reef-dwelling species, to far-inland bush communities reliant on freshwater and forest species, all tribal communities in the hotspot have a traditional classification and nomenclature system for the biodiversity that they and their ancestors have depended upon for survival. The key determinants are totemic value, conspicuousness to the human eye, and utilitarian value. The greater the utilitarian value, the more fine-scale the classification. A globally threatened lizard will not be identifiable in local eyes from the dozen or more other species on their land. The totemic Solomons sea eagle, on the other hand, will be readily identifiable and have existing local value. Totemic value can be very important, as members of the clan believed to descend from the totem may not kill or eat the totemic animal. For this reason, ethnobiological prioritization is also included in the species outcome section, to identify as much as is possible from a desktop summary, where local priorities may overlap with global priorities.

Local language is the gateway to traditional ecological knowledge. With almost 300 languages in the hotspot, there is no simple means of accounting for the massive wealth of nomenclatural and ethnobiological detail in advance, and any project simply needs to consider traditional ecological knowledge as a necessity rather than a luxury when implementing conservation activities on customary land in Melanesia. The added dimension to traditional ecological knowledge in the hotspot is the ongoing loss of this knowledge in younger generations and even the extinction of some languages.

4. CONSERVATION OUTCOMES DEFINED FOR THE HOTSPOT

4.1 Introduction

Biological diversity cannot be conserved by *ad hoc* actions (Pressey 1994). In order to support the delivery of coordinated conservation action, CEPF invests effort in defining conservation outcomes: the quantifiable set of species, sites and corridors that must be conserved to maximize the long-term persistence of global biodiversity. By presenting quantitative and justifiable targets against which the success of investments can be measured, conservation outcomes allow the limited resources available for conservation to be targeted more effectively, and their impacts to be monitored at the global scale. Therefore, conservation outcomes form the basis for identifying biological priorities for CEPF investment in the East Melanesian Islands.

Biodiversity cannot be measured in any single unit because it is distributed across a hierarchical continuum of ecological scales (Wilson 1992). This continuum can be condensed into three levels: species; sites; and corridors. These three levels interlock geographically, through the occurrence of species at sites and of species and sites within corridors, but are nonetheless identifiable. Given threats to biodiversity at each of the three levels, quantifiable targets for conservation can be set in terms of "extinctions avoided" (species outcomes), "areas protected" (site outcomes), and "corridors created" (corridor outcomes).

4.2 Methodology

Conservation outcomes are defined sequentially, with species outcomes defined first, followed by site outcomes and, finally, corridor outcomes. In theory, within any given region, or, ultimately, for the whole world, conservation outcomes can and should be defined for all taxonomic groups. However, this requires data on the global threat status of each species, and on the distribution of globally threatened species at sites and across corridors. Many of these data are incomplete or absent. For the hotspot, global threat status has been assessed comprehensively only for mammals, birds and amphibians. Some groups of reptiles, fish, invertebrates and plants have been assessed but many gaps remain, particularly among the latter two groups. Also, the distribution of many taxa the in the East Melanesian Islands remains poorly known, with amphibians, birds and mammals being covered best. Thus, conservation outcomes have been defined mostly around amphibians, birds and mammals, with information about plants, invertebrates, reptiles and fish being incorporated where available.

4.2.1 Species Outcomes

Since species outcomes are extinctions avoided at the global level, they relate to globally threatened species. This definition excludes species categorized as Data Deficient, which are considered to be priorities for further research but not yet priorities for conservation action *per se*, because many may turn out, on further research, not to be globally threatened. Also excluded are species threatened locally but not globally, which may be national or regional conservation priorities but are not high global priorities. Species outcomes are met when a species' global threat status improves, particularly when it enters the IUCN Red List category of Least Concern.

Because CEPF has a focus on the conservation of globally significant biodiversity, the process of setting conservation targets for the fund is based on a global standard. The principal basis for defining species outcomes for the East Melanesian Islands Hotspot is the global threat assessments contained within the 2011 IUCN Red List (IUCN 2011), as of August 30, 2011. This list was current at the time of the expert roundtable, which was held on Motupore Island, PNG, in December 2011.

Species outcomes are defined for all globally threatened species, regardless of whether they require species-focused conservation action or not. For most threatened species, the main conservation need is adequate habitat protection, which can be addressed through

conservation of the sites at which they occur. A significant number of threatened species, however, require additional, species-focused actions in order to avert their extinction, such as translocations, captive breeding, meta-population management or control of egg collection. It is from among this group that priority species for CEPF investment were identified, based upon expert opinion during the stakeholder consultation process.

4.2.2 Site Outcomes

As mentioned above, many species are best conserved by protecting their habitats and the biological communities they are part of, through conservation actions at a network of sites. The method used by CEPF to identify these sites is that of Key Biodiversity Areas (KBAs), which are explicitly designed to conserve biodiversity at the greatest risk of extinction (Langhammer *et al.* 2007). The KBA methodology is data-driven rather than based on expert opinion, although, in data-poor regions, the role of experts does become much more important. All KBAs meet one or more standard criteria (Table 9). This transparency allows results to be critiqued and revised at any point in time. The simple principle behind KBAs is that biodiversity conservation means avoiding extinction. Once species are extinct, they are gone forever and biodiversity is diminished. Therefore, the species most likely to become extinct are those already documented as being threatened with extinction, according to the IUCN Red List, and those species not currently threatened but restricted to a limited geographic range where a localized threat could have a major impact on their population. Widespread and common species are covered incidentally, as areas are identified for globally threatened and restricted-range species.

Table 9. Criteria for Identifying Key Biodiversity Areas, Based on Langhammer *et al.* (2007)

KBA Criteria			
A1	Globally Threatened Species	i	Site with confirmed presence of CR or EN species
		ii	>10 pairs or 30 individuals of VU species
A2	Restricted-range Species (global range <50,000 km²)	i	Site containing all or most restricted-range species of the area in question
		ii	Site containing 5 percent of the global population of one or more restricted-range species underrepresented at other KBAs
A3	Bioregionally Restricted Assemblages	i	Site containing a “significant” component of the biota of the region in question
		ii	Site containing unusual species assemblages underrepresented by KBAs generated by previous criteria
A4	Congregations	i	Site that holds on a regular basis >1 percent of the biogeographic population of a congregatory waterbird
		ii	Site that holds on a regular basis >1 percent of the biogeographic population of any congregatory species
		iii	Site known or thought to hold on a regular basis >20,000 individuals of single or mixed species
		iv	Sites known or thought to exceed thresholds at bottleneck sites for migratory species (i.e. staging sites)

Note: Only criteria A1 and A2 were used to identify KBAs in the East Melanesian Islands Hotspot.

Another criterion that can be used to identify KBAs is a representational one, based on "bioregionally restricted assemblages", under which unique biological communities can trigger sites not triggered by individual species. The methodology for identifying KBAs under this criterion has not been elaborated, other than for birds, a group for which the East Melanesian Islands are rich in threatened and restricted-range species in any case. Thus, it was not applied in the hotspot. A further criterion is based on the occurrence of significant congregations of individuals of particular species, such as seabird breeding colonies, marine turtle nesting beaches, feeding assemblages or concentrations of individuals of sessile species. Few sites in the hotspot are known to support globally significant congregations and, hence, this criterion was not applied either. As all marine turtles known to nest in the hotspot are globally threatened, the globally threatened species criterion could be used to identify their nesting beaches as KBAs.

In hotspots where Important Bird Areas (IBAs) have been identified, these form the starting point for KBA delineation. However, in the East Melanesian Islands Hotspot, although it is one of the richest areas of bird endemism in the world, only preliminary work on IBA identification has been undertaken to date. Therefore, data on the distribution of globally threatened and restricted-range birds were integrated with those on other taxonomic groups, to identify KBAs that were sufficient to support significant populations of all the species they were identified for.

In other hotspots, existing protected area networks are also used to guide KBA delineation. Again, this could not be used in the East Melanesian Islands Hotspot, where there has been very limited application of conventional protected area approaches. Consequently, a different approach, specifically tailored to the hotspot, was used to delineate KBA boundaries. This took account of active conservation initiatives and previously defined spatial priorities (e.g. Lees 1990, Swartzendruber 1993, Lipsett-Moore *et al.* 2010) to delineate appropriate units for site-based conservation action.

The first step was to identify target species (globally threatened and restricted range) for the East Melanesian Islands Hotspot. For globally threatened species, this meant taking the entire IUCN Red List for the Solomon Islands and Vanuatu, and splitting the list for PNG to exclude species not found in the islands region of PNG and surrounding waters. For restricted-range species, this meant taking any species with a global breeding range less than 50,000 km^2 (which happened to be roughly half the land area of the hotspot: 99,384 km^2). The second step was to undertake an extensive literature review and obtain as much point locality data on globally threatened and restricted-range species as possible in the available time. Direct observations by reliable observers and specimen records from the last 50 years were taken to be "confirmed" records, while other records (such as indirect observations, villager reports or historical specimen records over 50 years old) were assessed as "provisional". Normally, only confirmed records would have been used to identify KBAs but, due to the extreme scarcity of data from the hotspot, provisional records were also used, with the proviso that KBAs identified solely on the basis of these records require further investigation and documentation to confirm their status as KBAs before receiving investment from CEPF.

Once point locality data had been collated and assessed as confirmed or provisional, KBA boundaries were delineated to include all locality records for CR and EN species, following watersheds, boundaries between language groups and previous spatial priorities. Where applicable, KBA boundaries included adjacent coastal and nearshore marine habitats, such as coral reefs and mangroves, thereby identifying targets for "ridge-to-reef" conservation approaches. However, in keeping with the definition of the hotspot as a terrestrial conservation priority, no strictly marine KBAs were defined. Next, VU species were attributed to these sites, and new KBAs were identified for any VU species that were not sufficiently covered by them, so that, wherever possible, each VU species was represented in at least three KBAs and each subspecies was found in at least two.

For restricted-range species, a matrix of species by island was prepared. For each major taxonomic group, any island that supported more than 50 percent of the restricted-range species in the hotspot was identified as a KBA. Next, restricted-range species were attributed to existing KBAs, and new KBAs were identified where necessary, such that, wherever possible, each species was represented in at least three KBAs.

The preparation of globally threatened and restricted-range species lists, and the collation of point locality data, was undertaken as a desk study during the first months of the ecosystem profiling process. Then KBAs were initially identified at the expert roundtable meeting on Motupore Island in December 2011. The draft results from this meeting were then presented at the stakeholder consultation meetings in the three countries between January and May 2012, to elicit review, refine boundaries, incorporate further species records, and capture contextual data on threats, conservation investments, etc.

In order to help discriminate among the large number of KBAs identified in the hotspot, an initial, biological prioritization was undertaken, using the methodology set out in Langhammer *et al*. (2007). This methodology is based upon the principles of irreplaceability and vulnerability. Irreplaceable species are those that occur at few or no other sites. The sites that support them are priorities for conservation because there are few or no other places where these species can be conserved. Vulnerable species are those threatened with global extinction (i.e. globally threatened species). The sites that support them are priorities for conservation because action is urgently required to avert their extinction (i.e. there is limited time in which to take action). A final consideration is vulnerability at the site level, regardless of the species that occur there. All things being equal, acutely threatened sites (due to, for example, commercial logging or mining) are higher priorities for conservation action than sites not under severe, immediate threat, because action is more urgently required to avoid the loss of the site and the species populations it supports. These three criteria of irreplaceability, species-based vulnerability and site-based vulnerability were combined to assign each KBA to one of five priority levels, as shown in Table 10.

While the initial biological prioritization of sites is an objective approach, it is limited by data availability and a reliance on global measures of conservation priority that may not necessarily have relevance for local stakeholders. Consequently, it was supplemented by a more subjective prioritization, based on expert opinion, undertaken during the

stakeholder consultation workshops. The latter approach risks highlighting areas of interest to individuals or organizations, and tends to focus on better known areas at the expense of little known sites of genuine conservation importance. On the other hand, it also helps provide a more rounded assessment of conservation priority, and provides an opportunity to incorporate traditional ecological knowledge into the process. For these reasons, the results of the biological prioritization were combined with the results of the stakeholder consultations to derive a final list of priority sites for CEPF investment.

Table 10. Criteria for Initial, Biological Prioritization of KBAs, Based on Langhammer *et al.* (2007)

Irreplaceability	Species-based Vulnerability	Site-based Vulnerability		
		High	Medium	Low
Extreme (species endemic to hotspot and not known from any other site)	Extreme (CR)	1	1	1
	High (EN)	1	1	1
	Medium (VU)	2	3	4
	Low (not CR, EN or VU)	3	4	5
High (species known only from 2-10 sites globally)	Extreme (CR)	2	2	3
	High (EN)	2	3	4
	Medium (VU)	3	4	5
	Low (not CR, EN or VU)	4	5	5
Medium (species known only from 11-100 sites globally)	Extreme (CR)	3		
	High (EN)	4		
	Medium (VU)	5		
	Low (not CR, EN or VU)	5		
Low (species known from more than 100 sites globally)	Extreme (CR)	4		
	High (EN)	5		
	Medium (VU)	5		
	Low (not CR, EN or VU)	5		

4.2.3 Corridor Outcomes

While the protection of a network of sites would probably be sufficient to conserve most elements of biodiversity in the medium term, the long-term conservation of all elements of biodiversity requires the protection of inter-connected networks of sites at larger spatial scales. This is particularly important for the conservation of broad-scale ecological and evolutionary processes (Schwartz 1999), and for the conservation of species with wide home ranges, low natural densities, migratory behavior or other characteristics that make them unlikely to be conserved by site-based interventions alone, for example, Solomons sea eagle and Bismarck flying-fox (*Pteropus capistratus*). Such species can be termed "landscape species" (Sanderson *et al.* 2001) or, in the case of an archipelagic hotspot, such as the East Melanesian Islands, "islandscape species".

Corridor outcomes are met when corridors are created but the corridors concerned need not necessarily be exclusively terrestrial or marine. As the East Melanesian Islands is an archipelagic hotspot, where continua of natural habitats extend from mountain ridges

through lowlands and coastal zones and out into nearshore and offshore marine areas, corridor outcomes were defined in the form of "islandscapes": groups of islands and their intervening marine areas. The reality in the hotspot is that conservation at scales above that of the individual site is coordinated most effectively at the provincial level. For this practical reason, provincial boundaries were taken into consideration when delineating islandscape boundaries.

Eight criteria were used to identify islandscapes (Table 11). For example, one criterion was to identify areas sufficient to meet the long-term conservation needs of islandscape species. Another criterion was to identify entire freshwater catchments able to maintain continua of natural habitats across environmental gradients, particularly altitudinal gradients, in order to maintain such ecological processes as seasonal altitudinal migration, nutrient flows and larval dispersal, and to safeguard against the potential impacts of climate change.

Table 11. Criteria for Identifying Islandscapes in the East Melanesian Islands Hotspot

Islandscape Criteria		
P1	Populations of wide-ranging and migratory species (i.e. "islandscape" species)	Broad areas where ranges of islandscape species overlap and allow sufficient range for their populations to persist
P2	Entire freshwater catchments that maintain riparian communities, freshwater biodiversity and diadromous migrations, and minimize flooding and sediment discharge into coastal areas	Particular emphasis on: i. Catchments discharging adjacent to significant reef areas ii. Catchments with known high freshwater biodiversity
P3	Geographic diversification of plant and animal communities to maintain pollinator and seed disperser communities across broad biogeographic zones	Intact altitudinal gradients, especially with lowland forest remaining, biogeographic congruence
P4	Carbon sequestration	Broad areas of intact and/or regenerating forest on land, and seagrass in the marine realm
P5	Coastal corridors maintaining plant succession responses, and littoral/marine species reproduction, to enable ecological adaptation to climate change	Significant littoral forest and mangrove areas, along latitudinal gradients
P6	Coral reef gene flow and species migration, in particular with anticipation of sea temperature changes with global warming	Broad areas of continuous or closely spaced coral reef, along latitudinal gradients
P7	Cultural values	Landscapes of broad cultural significance in mythology, oral history and traditional agroforestry
P8	Invasive species and biosecurity	Particular emphasis on: i. Island groups where invasive species have not yet reached ii. Island groups where eradication/control programs may be feasible

The formulation of criteria for the identification of islandscapes and the preparation of lists of islandscape species were undertaken as a desk study during the first months of the

ecosystem profiling process. The islandscapes were initially identified and delineated at the expert roundtable meeting on Motupore Island in December 2011. The draft results from this meeting were then reviewed and refined at the regional stakeholder consultation workshop in Honiara in May 2012. Compared with definition of species and site outcomes, definition of corridor outcomes was more subjective and expert-decision-based, requiring attention to documenting decision justifications.

4.3 Results

4.3.1 Species Outcomes

In total, 308 species assessed on the IUCN Red List as globally threatened occur in the East Melanesian Islands Hotspot (Table 12 and Appendix 1). These include 113 terrestrial species, 187 marine species and eight species that regularly occur in both terrestrial and marine habitats. The incomplete Red List assessment of reptiles, invertebrates and plants means that the relative numbers of species presently listed as globally threatened per taxonomic group is not a fair representation of relative priorities. In particular, invertebrates are grossly under-represented. Certain invertebrate groups have high levels of endemism and are severely threatened by invasive species, for instance the partulid tree snails include many Pacific island species that are now extinct in the wild (D. O'Foighil *in litt.* 2012). Another example is freshwater invertebrates, which are known to have high levels of diversity and endemism (Polhemus *et al*. 2008) but yet to suffer from a lack of study in the hotspot (see Section 3.4).

Table 12. Summary of Globally Threatened Species in the East Melanesian Islands Hotspot

Taxonomic Group	Global Threat Status				Distribution by Country		
	CR	EN	VU	Total	PNG	Solomon Islands	Vanuatu
Mammals	6	14	9	29	10	20	8
Birds	2	5	34	41	22	21	10
Reptiles	2	4	4	10	5	6	5
Amphibians	0	0	5	5	5	2	0
Fishes	1	3	21	25	21	16	15
Insects	0	2	5	7	5	4	0
Bivalves	0	0	2	2	2	2	2
Anthozoans	0	5	145	150	146	134	79
Plants	2	7	30	39	20	20	10
Total	**13**	**40**	**255**	**308**	**236**	**225**	**129**
Percentage	*4*	*13*	*83*	*100*	*77*	*73*	*42*

Of the 308 globally threatened species in the East Melanesian Islands: 236 (77 percent) occur in PNG, including 57 that are not found elsewhere in the hotspot; 225 (73 percent)

occur in the Solomon Islands, including 40 not found elsewhere in the hotspot; and 129 (42 percent) occur in Vanuatu, including 26 not found elsewhere in the hotspot. Vanuatu supports fewer globally threatened species than the other two countries in the hotspot but it remains a high priority for global biodiversity conservation, because of the significant number of globally threatened species that are found nowhere else.

Almost half of the globally threatened species in the hotspot are reef-building corals in the class Anthozoa. Most of these anthozoans are widespread in the western Pacific Ocean, and often the Indian Ocean as well. They are assessed as globally threatened (mostly VU), because their reef habitats are subjected to a suite of threats, including coral bleaching, disease, damage from tourism and fishing, and predation by crown-of-thorns starfish (*Acanthaster planci*). The principal conservation actions required for these species is habitat protection, and this is being addressed through a number of initiatives within the hotspot and the wider western Pacific, most notably the Coral Triangle Initiative (see Section 6.3.2).

Thirteen globally threatened species in the hotspot are CR, 40 are EN and 255 are VU. The CR species are, by definition, the ones most at risk of imminent extinction and, all things being equal, warrant greater attention than species in the lower threat categories.

The six CR mammal species in the hotspot comprise three species of giant rodent and three species of bat. Unfortunately, three of these species in this group have no recent, confirmed records and may possibly be extinct. Emperor rat (*Uromys imperator*) and Guadalcanal rat (*U. porculus*) were both collected on Guadalcanal in the Solomon Islands in the 19th Century but have not been recorded since; although the island has not been adequately surveyed for these species (Leary *et al*. 2008b,c). Vanikoro flying-fox (*Pteropus tuberculatus*) was collected from the island of Vanikoro in the Solomon Islands in the first half of the 20th century but the island was heavily logged in the second half of the century, and recent surveys did not find the species (Leary *et al.* 2008a). The other three CR mammals are: montane monkey-faced bat (*Pteralopex pulchra*), known only from Guadalcanal; greater monkey-faced bat (*P. flanneryi*), known from Bougainville in PNG, and the islands of Choiseul and Isabel in the Solomon Islands; and Poncelet's giant rat (*Solomys ponceleti*), known from Bougainville and Choiseul.

The two CR bird species in the hotspot comprise a little-known seabird and a flightless rail. Beck's petrel (*Pseudobulweria becki*) was recently rediscovered after almost 80 years; its breeding grounds are suspected to include montane forest on New Ireland in PNG (BirdLife International 2010). Makira moorhen (*Gallinula silvestris*) is known only from Makira Island in the Solomon Islands, from where there have been no confirmed records since the 1950s; although it cannot be presumed extinct because of credible reports in recent years (BirdLife International 2009).

The two CR reptile species are both marine turtles: hawksbill turtle and leatherback. Both species have circumglobal distributions, with only a small proportion of their global populations in the hotspot. Both species nest at a number of beaches in the hotspot, which are of regional, if not global, importance for the species.

Only one CR fish species, Pondicherry shark (*Carcharhinus hemiodon*), is known from the hotspot: from a single historical record from waters off New Britain in PNG. This little-known shark of the India and western Pacific Oceans occurs in nearshore waters, which are subject to large and expanding commercial fisheries (Compagno *et al.* 2003).

Finally, two CR plant species are found in the hotspot. The first of these, carpoxylon palm (*Carpoxylon macrospermum*), is known only from the islands of Aneityum, Futuna and Tanna in Vanuatu, where its wild population is limited to around 40 individuals (Dowl 1998). The second species, *Helicia polyosmoides*, is a small tree known only from Manus in PNG, where it is threatened by commercial logging of its forest habitat (Eddowes 1998).

4.3.2 Site Outcomes

Ninety-five KBAs were identified in the East Melanesian Islands Hotspot, covering a combined land area of approximately 29,623 km² or 30 percent of the total land area of the hotspot (Appendix 2 and Figures 6 to 8). Of these, 69 sites (73 percent of the total) were identified for globally threatened or restricted-range mammal species, 75 (79 percent) for globally threatened or restricted-range birds, 34 (36 percent) for globally threatened or restricted-range reptiles, 18 (19 percent) for globally threatened or restricted-range amphibians, 10 (11 percent) for globally threatened fishes, 22 (23 percent) for globally threatened or restricted-range invertebrates, and 31 (33 percent) for globally threatened or restricted-range plants (Table 13).

Table 13. Summary of Key Biodiversity Areas in the East Melanesian Islands Hotspot

Taxonomic Group	PNG	Solomon Islands	Vanuatu	Total*
Mammals	25	30	14	**69**
Birds	26	24	25	**75**
Reptiles	14	18	2	**34**
Amphibians	9	9	0	**18**
Fish	7	2	1	**10**
Invertebrates	13	8	1	**22**
Plants	13	10	8	**31**
All KBAs	**32**	**36**	**27**	**95**
Percentage	*34*	*38*	*28*	*100*

Note: * = the figures add up to well over 95 because most KBAs are triggered by species from more than one taxonomic group.

The number of KBAs identified for amphibians, invertebrates and plant species would have undoubtedly been much higher if more detailed information had been available on the distribution of these species among sites. This is particularly the case for restricted-range species in these groups, as time and information constraints prevented a comprehensive review of their distribution among KBAs. As the comprehensiveness of

available data on the distribution of globally threatened species among KBAs varies significantly among taxonomic groups, KBAs identified as being important for the conservation of one taxonomic group may also be important for other groups for which data are not yet available. Nevertheless, there are likely to be other sites that meet the KBA criteria that were not identified during this process, especially for fish, invertebrates and plants, and particularly in marine and freshwater ecosystems.

Eighty-six KBAs were identified based on confirmed records (i.e. direct observations or specimens) of trigger species within the last 50 years. For the remaining nine KBAs, there have been no recent, confirmed records of the trigger species, and surveys to confirm their continued occurrence and establish their status and distribution are required prior to investing significant resources in their conservation. None of these nine sites were selected as priorities for CEPF investment.

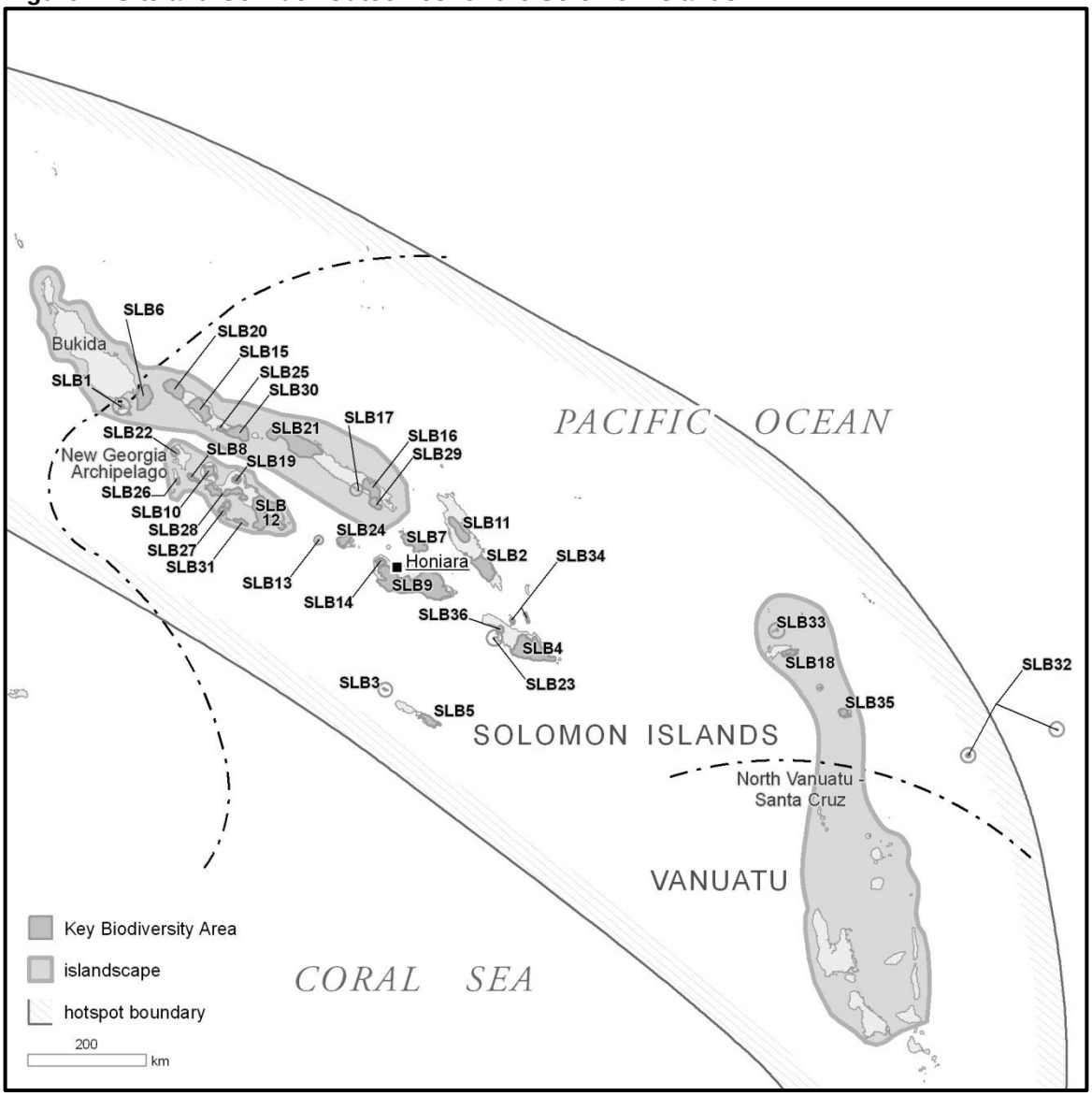
Figure 6. Site and Corridor Outcomes for PNG

Code	Key Biodiversity Area	Province	Total Area (hectares)	Land Area (hectares)
PNG1	Arawe	West New Britain	115,015	87,365
PNG2	Baining Mountains	East New Britain	137,140	135,864
PNG3	Buin	Bougainville	79,183	78,175
PNG4	Buka	Bougainville	6,636	6,636
PNG5	Bulu	West New Britain	17,878	17,557
PNG6	Cape Saint George	New Ireland	90,246	86,398
PNG7	Central Manus	Manus	106,565	82,529
PNG8	Djaul	New Ireland	30,326	11,417
PNG9	East Manus	Manus	15,244	15,244
PNG10	East Mengen	East New Britain	66,291	65,463
PNG11	Garu	West New Britain	899	888
PNG12	Gasmata	West New Britain	97,067	96,266
PNG13	Gloucester Volcanics	West New Britain	21,164	21,164
PNG14	Kerevat Toma	East New Britain	814	814
PNG15	Kimbe Bay Marine	West New Britain	134,478	1,223
PNG16	Kunua Plains and Mount Balbi	Bougainville	75,558	74,325
PNG17	Lavongai	New Ireland	55,922	55,891
PNG18	Lelet Plateau	New Ireland	33,720	33,412
PNG19	M'buke and Purdy Islands	Manus	1,329	169
PNG20	Madina	New Ireland	5,190	5,190
PNG21	Mussau	New Ireland	34,071	31,756
PNG22	Nakanai Central Pomio	East New Britain	118,904	118,205
PNG23	Ndrolowa	Manus	14,697	6,695
PNG24	Ninigo	Manus	376,010	1,551
PNG25	Open Bay	East New Britain	604	604
PNG26	Pokili	West New Britain	1,844	1,818
PNG27	Rambutyo	Manus	9,636	9,220
PNG28	Tench Island	New Ireland	55	39
PNG29	Tigak	New Ireland	57,993	16,428
PNG30	Tong	Manus	1,789	1,619
PNG31	Tsoi Island	New Ireland	296	112
PNG32	Whiteman Range	West New Britain	175,703	175,703

Seventy-six of the 95 KBAs were identified for globally threatened species, either alone or together with restricted-range species. The remaining 19 KBAs are not known to support any globally threatened species but were identified solely on the basis of the occurrence of restricted-range species. Several KBAs were triggered by significant numbers of globally threatened species. For instance, sites with records of 12 or more globally threatened species include: Baining Mountains, Buin, and Kunua Plains-Mount Balbi KBAs in PNG; and Guadalcanal Watersheds, Mount Maetambe-Kolombangara River, and North Western Isabel KBAs in the Solomon Islands. These KBAs are not necessarily the highest priority sites for conservation action in the region, for two reasons: they may not be the most important site for the conservation of any particular globally threatened species; and they may not be as severely threatened as other sites.

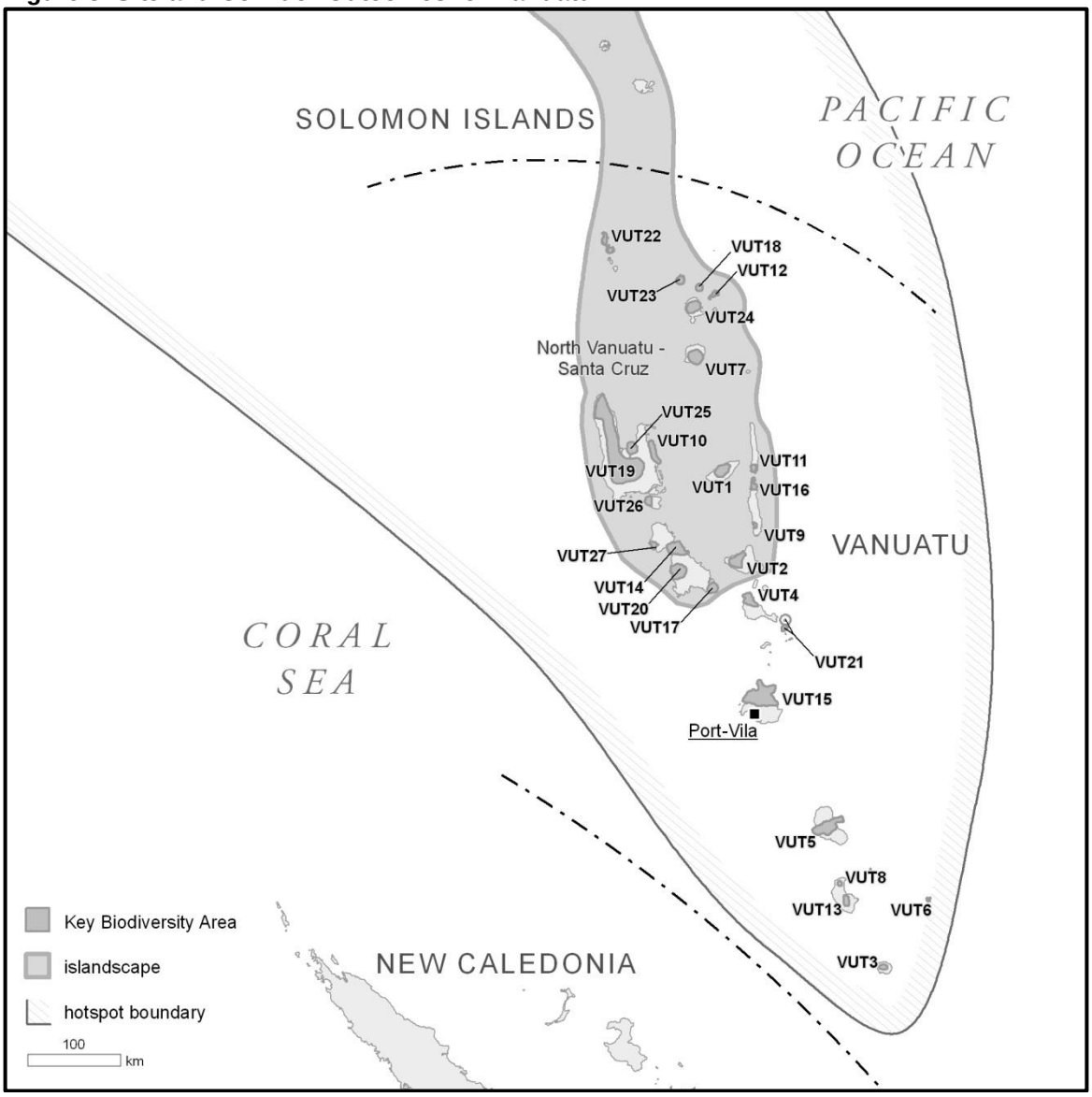
Only a handful of the 95 KBAs in the East Melanesian Islands Hotspot contain conventional, government-managed protected areas. This is because of the unsuitability of government-owned and managed protected areas in a region where approximately 90 percent of land is under customary ownership. A number of KBAs are known to contain community-managed conservation areas but a comprehensive inventory of these areas across the hotspot is not available.

Figure 7. Site and Corridor Outcomes for the Solomon Islands



Code	Key Biodiversity Area	Province	Total Area (hectares)	Land Area (hectares)
SLB1	Alu	Western	3,288	3,231
SLB2	Are-Are South Malaita	Malaita	95,404	54,815
SLB3	Bellona	Rennell Bellona	1,666	1,654
SLB4	East Makira	Makira Ulawa	182,550	150,774
SLB5	East Rennell	Rennell Bellona	33,306	17,073
SLB6	Fauro Island and Islets	Western	78,628	10,827
SLB7	Gela	Central	63,600	37,053
SLB8	Gizo	Western	12,862	3,782
SLB9	Guadalcanal Watersheds	Guadalcanal	376,146	363,032
SLB10	Kolombangara Upland Forest	Western	30,963	30,717
SLB11	Malaita Highlands	Malaita	58,379	58,379
SLB12	Marovo Kavachi	Western	155,741	65,708
SLB13	Mborokua Island	Western	1,222	467
SLB14	Mount Gallego	Guadalcanal	14,763	14,762
SLB15	Mount Maetambe - Kolombangara River	Choiseul	78,399	78,396
SLB16	Mount Sasare Catchments	Isabel	57,172	56,002
SLB17	Mufu Point	Isabel	361	196
SLB18	Nendö	Temotu	20,172	19,869
SLB19	North New Georgia	Western	12,463	12,463
SLB20	North-west Choiseul Karst	Choiseul	74,184	62,600
SLB21	North-west Isabel	Isabel	204,794	72,721
SLB22	North-west Vella Lavella	Western	14,641	10,879
SLB23	Oroa (Phillip) Island	Makira Ulawa	590	9
SLB24	Pavuvu	Central	28,946	13,560
SLB25	Posarae Keleve	Choiseul	7,391	7,250
SLB26	Ranongga	Western	5,469	5,425
SLB27	Rendova	Western	19,954	19,286
SLB28	Roviana - Vonavona	Western	63,800	31,818
SLB29	San Jorge Island	Isabel	24,428	20,133
SLB30	South-east Ultramafics Choiseul	Choiseul	65,801	32,638
SLB31	Tetepare	Western	12,568	12,292
SLB32	Tikopia - Fatutaka	Temotu	4,142	636
SLB33	Tinakula	Temotu	793	771
SLB34	Uki - Three Sisters	Makira Ulawa	13,629	5,466
SLB35	Vanikoro	Temotu	17,807	17,628
SLB36	West Makira Freshwater Swamps	Makira Ulawa	9,987	9,987

Figure 8. Site and Corridor Outcomes for Vanuatu



Code	Key Biodiversity Area	Province	Total Area (hectares)	Land Area (hectares)
VUT1	Ambae	Penama	15,396	15,396
VUT2	Ambrym	Malampa	17,605	17,364
VUT3	Aneityum	Tafea	3,850	3,850
VUT4	Epi	Shefa	13,742	9,590
VUT5	Erromango	Tafea	32,717	30,454
VUT6	Futuna	Tafea	1,077	1,042
VUT7	Gaua	Torba	18,725	18,725
VUT8	Green Hill	Tafea	2,030	2,030
VUT9	Homo Bay	Penama	2,063	2,046
VUT10	Loru	Sanma	14,053	8,555
VUT11	Maewo South	Penama	3,768	3,685

Code	Key Biodiversity Area	Province	Total Area (hectares)	Land Area (hectares)
VUT12	Mota Lava	Torba	3,562	3,362
VUT13	Mount Tukusmera	Tafea	5,969	5,969
VUT14	Neck of Malakula - Crab Bay	Malampa	22,246	17,676
VUT15	North Efate	Shefa	61,201	38,345
VUT16	Pentecost North	Penama	5,197	4,929
VUT17	Ringi Te Suh	Malampa	9,732	2,836
VUT18	Rowa Reef	Torba	4,637	360
VUT19	Santo Mountain Chain	Sanma	168,360	167,482
VUT20	Small Nambas	Malampa	21,390	21,156
VUT21	Tongoa - Laika	Shefa	3,441	3,246
VUT22	Torres Islands	Torba	373	8,261
VUT23	Ureparpara	Torba	5,881	4,198
VUT24	Vanua Lava	Torba	14,851	14,165
VUT25	Vatthe	Sanma	11,332	5,785
VUT26	West Malo	Sanma	5,645	5,596
VUT27	Wiawi	Malampa	4,273	4,166

After undertaking the initial biological prioritization, seven KBAs were assigned to the highest priority level (level 1), 11 sites were assigned to level 2, and a further 29 sites were assigned to level 3 (Table 14). Each of the seven KBAs assigned to level 1 are the only known site for one or more CR or EN species globally, and thus qualify as Alliance for Zero Extinction (AZE) sites (Table 15). These sites are the highest biological priorities for conservation in the hotspot, because the loss of any of them would result in the global extinction of at least one species. Five AZE sites are located in the Solomon Islands and two in Vanuatu.

Table 14. Results of the Initial, Biological Prioritization of KBAs in the East Melanesian Islands Hotspot

Priority Level	PNG	Solomon Islands	Vanuatu	Total
1	0	5	2	**7**
2	4	5	2	**11**
3	14	11	4	**29**
4	7	6	9	**22**
5	7	9	10	**26**
All KBAs	**32**	**36**	**27**	**95**

Note: Criteria for the initial, biological prioritization of KBAs are presented in Table 10.

Table 15. KBAs Qualifying as AZE Sites in the East Melanesian Islands Hotspot

KBA	Country	AZE Trigger Species
Aneityum	Vanuatu	*Emoia aneityumensis* (EN)
East Makira	Solomon Islands	*Gallinula silvestris* (CR)*
		Pteropus cognatus (EN)
Gizo	Solomon Islands	*Zosterops luteirostris* (EN)
Guadalcanal Watersheds	Solomon Islands	*Pteralopex pulchra* (CR)
		Tiradelphe schneideri (EN)
		Uromys imperator (CR)*
		Uromys porculus (CR)*
Nendö	Solomon Islands	*Clytorhynchus sanctaecrucis* (EN)
		Pteropus nitendiensis (EN)
Santo Mountain Chain	Vanuatu	*Cyphosperma voutmelense* (EN)
Vanikoro	Solomon Islands	*Pteropus tuberculatus* (CR)*

Note: * = provisional record.

4.3.3 Corridor Outcomes

Four islandscapes were identified in the East Melanesian Islands Hotspot (Table 16 and Figure 9). The islandscapes cover a total land area of 55,662 km², equivalent to 56 percent of the total area of the hotspot. The four islandscapes contain 60 KBAs (equivalent to 63 percent of the total). The full list of KBAs within each islandscape is presented in Appendix 3.

Table 16. Summary of Islandscapes in the East Melanesian Islands Hotspot

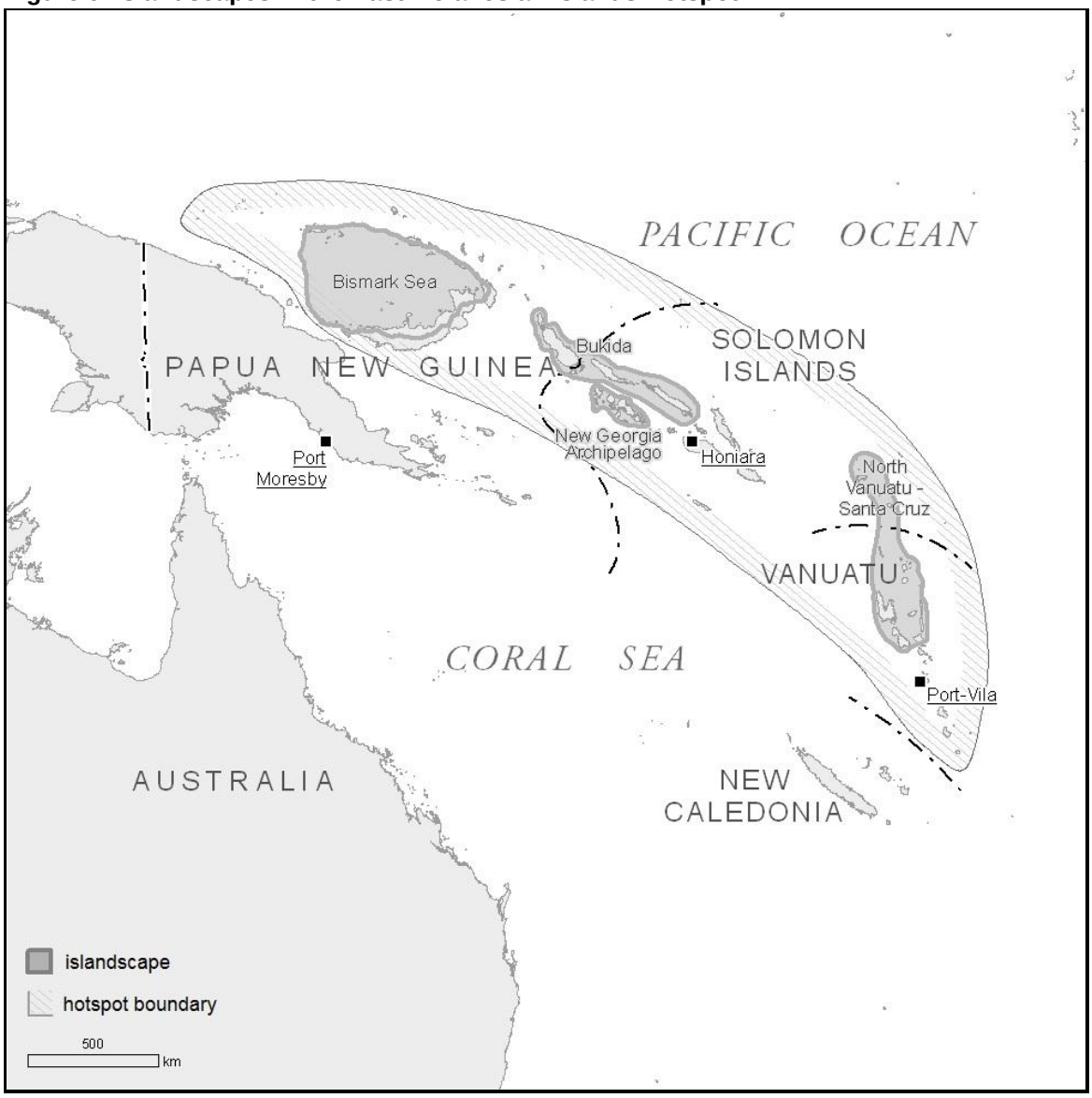
Islandscape	Countries	Total area (km^2)	Land area (km^2)	# of KBAs
Bismarck Sea	PNG	221,754	23,440	15
Bukida	PNG and Solomon Islands	70,254	17,233	13
New Georgia Archipelago	Solomon Islands	17,362	5,085	9
North Vanuatu - Santa Cruz	Solomon Islands and Vanuatu	100,005	9,904	23

All four islandscapes met at least six of the eight criteria for the identification of islandscapes (Table 11). The four islandscapes were considered sufficient to sustain populations of all 20 islandscape species identified in the hotspot, although only three of these species have significant populations in more than one islandscape: Admiralty flying-fox (*Pteropus admiralitatum*); Solomons sea eagle; and Heinroth's shearwater (*Puffinus heinrothi*). For all of these species, conservation of individual sites in isolation is unlikely to meet their long-term conservation needs.

The delineation of islandscape boundaries was somewhat subjective, because of varying degrees of ecological and biogeographic connectivity between nearby islands and island groups. The Santa Cruz Islands of the southeastern Solomon Islands were merged with the northern island groups of Vanuatu because of joint importance for sustaining seabird

populations, and to enhance resilience of marine ecosystems to climate change by preserving a latitudinal continuum of corals. Manus was incorporated with the northern and western catchments of islands in the Bismarck Archipelago, because a recent study of ocean currents shows a discreet marine unit in the Bismarck Sea (Steinberg *et al.* 2006). In addition, the current threat of deep-sea mining in the Bismarck Sea is placing the entire ecosystem under threat. The New Georgia Archipelago was separated from Bukida because it is geologically and biogeographically distinct, being composed of young volcanic islands, rather than Eocene-epoch composite islands, and being a discrete archipelago rather than an ancient land bridge.

Figure 9. Islandscapes in the East Melanesian Islands Hotspot



5. SOCIO-ECONOMIC CONTEXT OF THE HOTSPOT

5.1 Introduction

The biodiversity of the East Melanesian Islands is unique and important and has been part of the culture and wellbeing of the indigenous people for thousands of years. Conserving this unique biodiversity will be successful if conservation makes people active participants in conservation actions. How this should happen partly depends on the ways that people use and depend on biodiversity as a resource. This chapter, therefore, looks at the social and economic use of and dependency on biodiversity in the three hotspot countries (with a focus on the islands region in the case of PNG). The chapter is based upon a review of current knowledge, as documented in published and unpublished reports, complemented by interviews with selected stakeholders across the region.

5.2 Socio-economic Context

5.2.1 Demography

There are more than 1.7 million people living in the East Melanesian Islands Hotspot, comprising almost 1 million in the island region of PNG, over 500,000 in the Solomon Islands and over 200,000 in Vanuatu (Table 18). While the island region of PNG has the highest population, its large land area makes it the least densely populated part of the hotspot, with 16.9 persons per square kilometer. Melanesians make up more than 97 percent of the population of the East Melanesian Islands, with Polynesians, Micronesians and other ethnic groups accounting for the remainder. Around 90 percent of the people of the East Melanesian Islands live in rural areas and follow subsistence lifestyles.

Table 18. Summary Population Statistics for the East Melanesian Islands Hotspot

Country/Region	Provinces	Population	Land Area (km^2)	Coastline (kilometers)	Population Density (persons/km^2)
PNG (island region)	5	959,694	56,702	4,008	16.9
Solomon Islands	9	533,672	28,400	5,310	18.8
Vanuatu	6	243,023	12,190	2,528	19.9
Total	**20**	**1,736,389**	**97,292**	**11,846**	**17.8**

PNG

The islands region of PNG has been inhabited mainly by Melanesians for around 30,000 years. A small population of Micronesians and Polynesians, who are recent migrants to the region, are concentrated mainly on atolls offshore from Manus and Bougainville.

The 2011 PNG census (Anon. 2012) estimated that the population of the islands region grew by a mean of 2.3 percent from the last census in 2000. However, population growth rates in New Ireland, West New Britain and Bougainville were significantly higher than

in Manus and East New Britain (Table 19). The high population growth rate in West New Britain is influenced by in migration from other provinces to work mainly on oil palm estates, which require a large labor force. The lower population growth rate in Manus is influenced by out-migration of people, driven, in part, by a lack of higher education institutions in the province. The overall sex ratio for the islands region is 52 percent male versus 48 percent female (Anon. 2012).

Table 19. Summary Population Statistics for the PNG Islands Region

Province	Population	Population Growth Rate	Population Density (pers/km^2)	Number of Households	Rural Population (%)	Urban Population (%)
Manus	50,321	1.3	24.0	11,229	83.4	16.6
New Ireland	161,165	2.8	16.7	34,422	91.1	8.9
East New Britain	271,252	1.9	17.5	58,517	95.5	4.5
West New Britain	242,676	2.5	11.6	49,077	89.1	10.9
Bougainville	234,280	2.6	25.1	47,888	97.7	2.3
Total	**959,694**	**2.3**	**18.1**	**201,133**	**93.0**	**7.0**

Notes: based on preliminary results of the 2011 census (Anon. 2012); urban and rural population estimates are based on the 2000 census.

More than 90 percent of people live in rural areas, where they depend on fishing and agriculture to support their livelihoods. Like other developing countries, there is a growing urban population, ranging from 2.3 percent of the population in Bougainville to 16.6 percent in Manus (Table 19). The increasing urban population is attributed to the movement of people from rural areas to towns to seek employment and other benefits not easily available in rural areas. Unfortunately this is contributing to the establishment of informal settlements on the outskirts of towns throughout the islands region, as in other parts of the hotspot. The growth of urban populations and informal urban settlements is contributing to increasing destruction of forest adjacent to towns to make way for gardens. Most of the people living in informal urban settlements are unemployed and make gardens to grow food for home consumption or sale to urban markets.

Solomon Islands

The Solomon Islands have a population of 533,672, with a growth rate of 2.8 percent and a very young population (Solomon Islands National Statistics Office 2006). Current estimates indicate that 41.5 percent of the population is less than 15 years old (Solomon Islands National Statistics Office 2006). The high proportion of young people means that the population growth rate will continue to be high, driving competition and demand for formal employment.

Melanesian's make up 94.5 percent of the population, Polynesians 3 percent and Micronesians 1.2 percent. The Polynesians inhabit the remote outer islands of Rennell and Bellona, Ontong Java, Sikiana, Tikopia, Anuta, Reef Islands and Duff Islands (Solomon Islands Curriculum Development Centre 1990). The Micronesian population is

dispersed throughout the Solomon Islands, with the largest concentration in Western province. Most of the Micronesian residents were relocated to the Solomon Islands from Kiribati in the 1960s by the British colonial administration. There is also a small migrant population from other parts of the world, mainly from Australia, Asian countries and PNG, and these people are concentrated in Honiara and other urban areas (Anon. 2002). There is also internal migration mainly from rural areas to urban areas. For instance, the population of Honiara more than doubled between 1986 and 2006 (Solomon Islands National Statistics Office 2006). This can mainly be attributed to migration from rural areas. Rural to urban migration is motivated by many factors, including employment, education, drive for a perceived better life in the city and decreasing land availability for agriculture in rural areas.

Population distribution is variable among the provinces, with Mailata being the most populated and Rennell Bellona the least populated (Table 20). Excluding Honiara city, population density ranges from 5.9 persons per square kilometer in Isabel province to 33.2 persons per square kilometer in Malaita province but with a mean population density of 18.8 persons per square kilometer (Table 20).

There are more males than females to about the age of 45 years but the ratio reverses in favor of woman in the older age group. This trend is true for all provinces in the Solomon Islands apart from Malaita and Temotu, where females out-number males in the younger age group as well. The most plausible explanation for this unusual sex ratio is out-migration of males for work in other provinces and urban areas (Anon. 2002).

Table 20. Population Distribution by Province in the Solomon Islands, Based on the 2005/6 Census

Province	Population	Percentage of Total Population	Land Area (km^2)	Population Density (pers/km^2)
Malaita	140,569	26	4,234	33.2
Western	81,852	15	5,279	15.5
Guadalcanal	84,438	16	5,336	15.8
Makira Ulawa	50,056	9	3,188	15.7
Central	24,491	5	1,000	24.5
Isabel	23,638	4	4,014	5.9
Choiseul	31,259	6	3,294	9.5
Temotu	23,800	5	926	25.7
Rennell-Bellona	4,409	1	671	6.6
Honiara city	69,189	13	458	151.1
Total	**533,701**	**100**	**28,400**	**18.8**

Source: Solomon Islands National Statistics Office (2006).

Vanuatu

According to the 2009 population and household census (Anon. 2009), Vanuatu's population is 234,023 (Table 21). Males outnumber females by a slight margin, making up 51 percent of the population with females making up 49 percent. The population is relatively young, with people less than 15 years old making up 39 percent of the total.

The proportion of people living in urban areas is 24 percent, making it the highest in the East Melanesian Islands. However, the urban population is not distributed across Vanuatu: only Sanma and Shefa provinces report urban populations (Anon. 2009). Vanuatu's urban population is growing at the rate of 3.6 percent per year compared to the rural population growth rate of 1.9 percent (Anon. 2009). The most likely explanation for this disparity is migration of people from rural areas to urban areas, and this is likely due to similar factors driving this trend in PNG and the Solomon Islands.

Table 21. Population Distribution by Province in Vanuatu, Based on the 2009 Census

Province	Population	Percentage of Total Population	Land Area (km^2)	Population Density ($pers/km^2$)
Torba	9,359	4	867	10.8
Sanma	45,855	20	4,262	10.8
Penama	30,819	13	1,204	25.6
Malampa	36,727	15	2,809	13.1
Shefa	78,273	34	1,507	51.9
Tafea	32,540	14	1,632	19.9
Total	**234,023**	**100**	**12,281**	**19.0**

Source: Anon. (2009).

5.2.2 Ethnicity, Languages, Religion, Culture and Social Structure

The East Melanesians Islands are one of the most culturally and linguistically diverse regions on earth, and the majority of the population, especially in rural areas where most conservation takes place, qualify as indigenous people, according to the World Bank's Indigenous Peoples Policy (Operational Policy 4.10). They are distinct communities; the land on which they live and the natural resources on which they depend are inextricably linked to their identities and cultures. Recognizing this, representatives of local indigenous communities and their organizations from across the hotspot were engaged in the stakeholder consultations, and the resultant CEPF investment strategy fully respects the dignity, human rights, economies and cultures of indigenous peoples, and embraces the principle of free, prior and informed consultation.

Culture and custom are important throughout the East Melanesian Islands and have supported the lives of these people for about 30,000 years since they were first settled. Some of the most relevant aspects of culture and custom to biodiversity conservation relate to user rights, ownership, conflict resolution, clanship, traditional leadership, initiations and ceremonies. Traditional cultural practices have an influence on how the

modern economy grows in each of the three countries of the East Melanesian Islands. An example is the practice of customary land ownership and customary tenure over marine and coastal resources (e.g. reef fishes, sea-cucumbers, mangroves, etc.), which allows customary owners to control access to land and resources. The vast majority of the people still adhere to traditional culture and customs but as modern economies develop, some of these customs are being sidelined or slowly lost.

The key point with customary ownership and tenure is that land and resources do not belong to any one individual or household but are collectively owned by a community (typically defined on the basis of kinship and descent rather than geographic proximity). Consequently, decisions about use of land and resources are traditionally made collectively and (although certain prominent individuals within the community may have disproportionate influence) by consensus. Because customary ownership and tenure are recognized in the constitutions of the three hotspot countries, these traditions are still respected today, by both social convention and statutory law. Thus, for practical as well as ethical reasons, all on-the-ground conservation activities in the East Melanesian Islands must be implemented with the participation and consent of local communities.

PNG

A total of 110 languages are spoken across the islands region of PNG. Manus province accounts for 30 languages, which is the most per province, while East New Britain province has the fewest, with 13 languages. New Ireland province has 19 languages, the Autonomous Region of Bougainville 23 and West New Britain province 25. Languages often define culture and tradition, and this would make Manus the most culturally diverse province, especially with its low population.

Christianity is the main religion practiced in the islands region, and churches play a prominent role in society. The main denominations in Manus province are Roman Catholic (45 percent), Adventist (21 percent), Evangelical (13 percent) and Lutheran (5 percent). In New Ireland province, United and Roman Catholic are the commonest denominations, with 40 percent and 39 percent respectively, followed by Adventist (8.7 percent) and Pentecostal (5 percent). Roman Catholic is the main Christian denomination in East New Britain, West New Britain and Bougainville, with 50.3 percent, 55.7 percent and 68.2 percent respectively. The United Church is the second most common denomination in East New Britain (32.3 percent) and Bougainville (14.5 percent).

Almost all the land (about 95 percent) in the PNG islands region is owned by customary landowners. Only a small portion of the land is owned by the state and the private sector. To have access to land, private agriculture companies (especially oil palm companies), enter into deals with local clans on a lease back arrangement. Customary tenure and user rights over natural resources are also very common, which allow clans to have access to resources they need. User rights are commonly used to govern access to coastal and nearshore marine resources.

Solomon Islands

There are 74 languages in the Solomon Islands, of which three have no living speakers (Lewis 2009). Almost all of these languages belong to the Malayo-Polynesian subgroup of the Austronesian language family. The two exceptions are English, the language of the former colonial power, and Pijin, an English-based creole. The Pijin spoken in the Solomon Islands is historically related to Tok Pisin of PNG and Bislama of Vanuatu, with which it is mutually intelligible. English and Solomon Islands Pidgin are the common languages of communication in the country.

Christians makes up 97 percent of the Solomon Islands population. The main denominations are the Anglican Church of Melanesia (33 percent), Roman Catholic (19 percent), South Seas Evangelical Church (17 percent), Seventh-day Adventist (11 percent) and United Church (10 percent). There are fewer than 500 practicing Muslims in the country, and around 3 percent of people subscribe to indigenous belief systems.

Customary land ownership is practiced throughout the Solomon Islands and is recognized through the constitution. Access to land for development is, therefore, limited by customary ownership. A number of studies have identified customary ownership as a major constraint for agriculture, infrastructure and urban development but this view is contested by a study by Bourke *et al.* (2006), which found it not to be a limiting factor for agricultural production because the informal sector of the economy that produces food for local markets and domestic consumption is conducted entirely on land that is traditionally owned.

Vanuatu

Vanuatu has 108 living languages (Lewis 2009) and, with its small population, is the most linguistically diverse country in the world (Regenvanu 2007). On average, 2,000 people speak each language. English, French and Bislama are the common languages that allow the people of Vanuatu to communicate with each other.

Melanesians have a very strong traditional culture and have the most influence on the Vanuatu national culture. Although the culture is similar across the country, there are three cultural regions: northern; central; and southern. Wealth in the northern cultural region is acquired or established by how much one can give away. The central cultural region exhibits a more typical Melanesian cultural system, involving the inheritance of titles through lineage and being active in ceremonies as dictated by custom. In the southern cultural region there is a system of granting titles and privileges, which appears to have been influenced by religion and western culture.

Christianity is the main religion of Vanuatu. Presbyterian is the most common denomination, accounting for a third of the population. Roman Catholic and Anglican are the next most common denominations, accounting for 15 percent each. Other denominations include Seventh-day Adventist, Church of Christ, and Neil Thomas Ministries.

5.2.3 Economy

The economy of the East Melanesian Islands is very small by global standards and can be divided into the formal and informal sector. The informal sector is mainly based on agriculture and exploitation of marine resources and located in the rural areas, although it is growing in urban areas. The PNG islands region, with the largest population and land area in the hotspot, also contains the richest mineral, forestry and agricultural resources. Because the East Melanesian Islands economy is small, governance, natural disasters and climate change strongly impact how the economy performs. Vanuatu's economy, the smallest in the hotspot, is especially vulnerable to natural disasters and climate change impacts (Anon. undated).

PNG

The economy of PNG's islands region is dependent on mining, forestry, fisheries and agriculture. New Ireland province hosts one of the largest gold mines in the world on Lihir Island, while Bougainville is the location of the Panguna mine, the largest open-cut copper mine in the world. The environmental impacts of this mine are commonly cited as a contributory factor to the recent political conflict on Bougainville, which led to its closure in 1989, since when it has not been in operation.

The palm oil sector in West New Britain province is the largest of its kind in both the East Melanesian Islands and PNG as a whole. The province has more than 60,000 hectares of oil palm plantations, with New Britain Oil Palm Ltd accounting for 33,126 hectares (New Britain Oil Palm Ltd 2011), Hargy Oil Palms Ltd accounting for 9,500 hectares (Hargy Oil Palms Ltd 2012) and smallholders accounting for 18,000 hectares (I. Orrel, pers. comm. cited by Brodie and Turak 2001). Further planting and expansion of oil palm continues every year. For instance, Hargy Oil Palms Ltd (2012) has a vision to increase annual production to 200,000 metric tons, by increasing its plantations to 20,000 hectares and purchasing palm oil from smallholders. Other significant oil palm plantations can be found in New Ireland province, which has 8,145 hectares of plantings (New Britain Oil Palm Ltd 2011).

Smallholder palm oil production is very important for the rural population, and involves families from indigenous communities and other parts of PNG. Of the 1.9 million metric tons of palm oil produced in PNG in 2005, smallholder production accounted for one-third of the total (Curry *et al*. 2007). Smallholder blocks are owned by indigenous communities, in the form of village oil palms, and also by in-migrants from other areas under the Land Settlement Scheme.

The principal economic activity of the population of PNG in general, and the islands region in particular, is agriculture, with more than 75 percent of households in the country being dependent upon subsistence agriculture. The cash-based but informal village economy is dependent on cocoa, coconut (copra), betelnut, oil palm, poultry, livestock and fishing. Table 22 gives an indication of the involvement of the population of the islands region in the cash economy. Working for wages, which ranges from 4 to 12 percent, is partly dictated by how the population is distributed between villages, where

there is no formal business, and urban areas or specific development areas, such as mining and forestry camps.

Cocoa and coconut are important in East New Britain and Bougainville, supporting both commercial agriculture (company estates) and smallholders (village based). Average cocoa production in Bougainville for the 10-year period before the political crisis began in 1989 averaged 15,400 metric tons per year; smallholder production accounted for 72 percent of annual production (Bourke and Betitis 2003).

Tourism is a growing sector of the PNG economy, and the country attracts around 70,000 international visitors each year. Tourists visit the islands region for surfing, diving, recreational fishing, culture and birdwatching. Diving is the main tourism product, followed by birdwatching and surfing. At the moment, surfing is restricted to New Ireland province but there is major potential in the other provinces. Dive tourism mainly targets New Ireland, West New Britain and East New Britain provinces. Tourism infrastructure and the high cost of travel are the limiting factor for the growth of the tourism sector.

Table 22. Summary of the Distribution of the Population Involved in the Cash Economy in the PNG Islands Region

Province	Sell Crops and Fish (%)	Work for Wages (%)	Self-employed (%)	Own a Business (%)
Manus	7.4	6.7	1.3	0.6
New Ireland	5.2	9.9	1.5	1.2
East New Britain	12.5	11.7	3.3	1.6
West New Britain	7.5	12.4	2.2	1.3
Bougainville	8.4	4.1	0.9	1.1

Solomon Islands

The Solomon Islands economy is highly dependent on agriculture and fisheries to support the estimated 82 percent of the population who live in the rural areas. However, the contributions of agriculture and fisheries to the formal economy are hard to measure because they are mainly considered part of the traditional and subsistence economies. The formal economy, which is based around urban areas, has not shown any persistent growth that could support formal employment and new entrants into the labor force (Anon. 2002). The rural-based sector of the economy, mainly focused on agriculture and fisheries, supports a large labor force. Much of the economic development in the country is focused on Guadalcanal and Western provinces. The remaining seven provinces lack significant economic investments and, therefore, depend mainly on the informal economy.

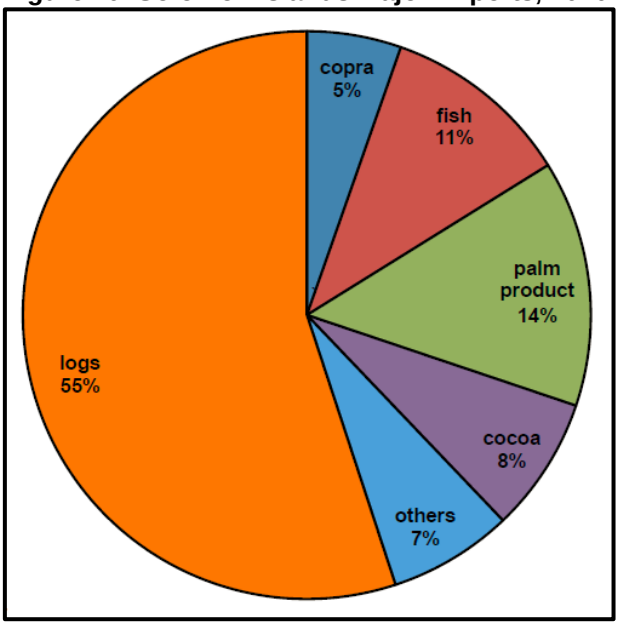
The export revenue of the Solomon Islands is mainly generated from the export of primary products, such as logs, cocoa, coconut, palm oil and fish (Figure 10). Log exports have been the main source of foreign exchange in recent years, accounting for 45 to 55 percent of foreign exchange and 20 to 30 percent of government revenue (Sizer and Plouvier 2000, Central Bank of Solomon Islands 2011). Despite an overall decrease in the

prime logging areas, there was a 37 percent increase in the volume of log exports in 2010 to 1,428,211 cubic meters compared with the previous year, which was partly attributed to the export of stockpiled logs cut in previous years (Central Bank of Solomon Islands 2011).

Cocoa and coconut are important primary products that have contributed to the economy of the Solomon Islands since independence and continue to play an important role when the economy is not performing well and lacks investment (Central Bank of Solomon Islands 2011). In 2010, coconut (copra) accounted for 5 percent of export revenue, while cocoa accounted for 8 percent (Figure 10). Both crops are grown by smallholders, and provide an important source of diversity in rural economies.

Palm oil production in the Solomon Islands is relatively new, with a smaller area of plantings compared to PNG. The total area planted to date is only 6,318 hectares (New Britain Palm Oil Ltd 2011). The palm oil sector was badly affected by recent political crises but, under the new ownership and management of New Britain Palm Oil Ltd, there has been an improvement in yields from oil palm estates in the Solomon Islands, which have increased the contribution of oil palm to national economy to 14 percent (Figure 10). Further increases in palm oil production are expected in coming years as new plantings are harvested (New Britain Palm Oil Ltd 2011).

Figure 10. Solomon Islands Major Exports, 2010



Source: Central Bank of Solomon Islands (2011).

Tourism is an emerging sector, with a focus on diving, but is currently limited by the high costs of domestic travel. There is only one active mine in the Solomon Islands: the Gold Ridge Project on Guadalcanal operated by Australian Solomons Gold Ltd. However, a number of mineral exploration licenses have been granted throughout Solomon Islands, including for nickel in Isabel and Choiseul provinces. Economic activities and income from the mining sector is expected to grow in the coming years, presenting a number of environmental and social challenges, including with regard to biodiversity conservation.

Vanuatu

Vanuatu's formal economy is small and relies on tourism, which accounts for two-thirds of gross domestic product (GDP). Copra and beef production, along with forestry, account for the remaining one-third of GDP (Economist Intelligence Unit 2003). Vanuatu's small economy, with an estimated GDP of US$580 million in 2003, is vulnerable to natural disasters (e.g. volcanoes, earthquakes and cyclones) and climate

change impacts (Anon. undated). For example, in 2003 there was a 7 percent decrease in cocoa production due to damage caused by Cyclone Ivy (Anon. undated).

The main source of foreign exchange for Vanuatu is from tourism and fisheries. Tourism supports and contributes to the vibrant services sector, which accounts for 77 percent of GDP. The tourism sector is growing, and tourism arrivals are increasing. In 2003, tourism arrivals grew by 25 percent compared to the 1997 levels (Anon. undated).

However, Regenvanu (2007) argues that the informal economy is more important than the formal economy in Vanuatu, because the 84 percent of the population who live in rural areas depend on it to support their livelihood on a daily basis. Even urban-dwellers depend on it to subsidize their modern lifestyles. The informal economy is centered on production, processing and sale of agricultural and marine products, supplemented by provision of services such as carpentry and transportation, and production of baskets, mats and other handicrafts.

Despite a positive outlook, GDP growth is being offset by a relatively high population growth of 2.3 percent (Anon. 2009). Between 1994 and 2003, per capita income decreased by 18 percent (Anon. undated). Because three-quarters of the population live in rural areas and rely primarily on agriculture, slow growth of the agriculture sector, which is constrained by poor access to markets and low productivity, is not sufficient to improve per capita income. This is further constrained by Vanuatu's social and cultural system, which is geared towards sustaining a traditional subsistence economy not an externally driven, market-based economy.

6. POLICY CONTEXT OF THE HOTSPOT

6.1 Introduction

In recent years, there has been growing pressure on the ecosystems of the East Melanesian Islands Hotspot. Foreign investment, notably in the forestry and mining sectors, has resulted in serious environmental degradation, with minimal economic benefits for the majority of local people. In response, the governments of the East Melanesian Islands countries have introduced a range of environmental policies, under the framework provided by a lattice of multilateral environmental agreements at regional and global levels.

The East Melanesian Islands countries have all ratified the United Nations Convention on Biological Diversity and the United Nations Framework Convention on Climate Change (UNFCCC), and made progress with localizing the key provisions of these global agreements in their respective national laws. Thus, the global policy response to biodiversity loss and climate change is embedded in the laws of each country. The size of individual Pacific islands countries and territories and the similarities among the environmental challenges they face means that certain capacities and responses to conservation issues can be more efficiently delivered at the regional level rather than the

level of individual countries. In this way, national responses to global policy directions are complemented by a range of regional agreements and institutions.

6.2 Overview of the Regional and National Political Situation

6.2.1 Governance Structures

PNG

PNG is a constitutional monarchy, with Queen Elizabeth II as the head of State. This allows PNG to be a member of the Commonwealth. The Queen is represented in the country by a governor-general. PNG has a parliamentary system of government, with elections every five years. The government is led by the prime minister, who selects a cabinet from among members of parliament. PNG is a multiparty democracy, with numerous political parties. However, party loyalties are often weak, leading to a series of unstable coalition governments, and frequent changes in leadership.

Included within the East Melanesian Islands Hotspot are four provinces, plus the Autonomous Region of Bougainville. Bougainville is administered differently from the other provinces under the peace agreement signed in 1998. While Manus, New Ireland, East New Britain and West New Britain are each headed by a provincial governor, the Autonomous Region of Bougainville is headed by a president.

In common with the other hotspot countries, PNG has a three-tier system of government. At the provincial level, the provincial executive council is the highest decision making body, comprising the provincial governor, elected representatives and appointed representatives. The provincial governor is typically a member of parliament, thereby creating a direct link between the national and provincial levels of government.

Each province contains one or more districts, each with one or more local-level governments (LLGs). There are 12 districts and 50 LLGs in the four provinces of the islands region (Table 17). Each LLG comprises a number of wards, each of which is represented by a ward councilor. A ward is normally a village but, where a village has a large population, it can be divided into several wards. The ward councilors are members of the LLG assembly, which is chaired by the LLG president.

Under Sections 42 and 44 of the Organic Law on Provincial Governments and Local Level Governments, provincial governments and LLGs have extensive law making powers. A number of LLGs in Manus, West New Britain and New Ireland provinces have utilized these provisions to pass environmental laws regulating the use of the marine and terrestrial environment.

Table 17. Summary Statistics on Geography and Local Administration for the PNG Islands

Province	LLGs	Districts	Land Area (km^2)	Number of Islands	Reef Area (hectares)	% Land Occupied
Manus	12	1	2100	208	230,000	Not known
New Ireland	9	2	9557	149	139,000	43.6
East New Britain	18	4	15274	46	68,000	22.2
West New Britain	11	2	20387	Not available	137,000	28.5
Bougainville	12*	3	9384	168	240,000	53.7
Total	**62**	**12**	**56,702**	**571 +**	**814,000**	

Notes: LLGs = local-level governments (* = basic census areas in Bougainville); reef area estimates from Frielink (1983).

The Autonomous Region of Bougainville is governed differently from the other provinces under the 1998 peace agreement signed between the Government of PNG and the Bougainville Revolutionary Army. The peace agreement grants Bougainville a wide range of autonomous powers not available to the other provinces. Traditional leaders are part of the formal government structure. Instead of LLGs, traditional chiefs form councils of elders and village assemblies. A village assembly is composed of one or more villages, and several village assemblies combine to form a council of elders.

Solomon Islands

The Solomon Islands are a constitutional monarchy with Queen Elizabeth II as head of state, represented by a governor-general, who must be a citizen of the country. The Solomon Islands have a parliamentary system of government. The governor-general is elected by parliament, as is the prime minister. The prime minister chooses other members of the cabinet, who are collectively responsible to the House of Assembly. The governor-general appoints the chief justice of the Supreme Court, on the advice of the prime minister and leader of the opposition. The country has a multiparty system, and national politics are characterized by numerous, weak parties, a large number of independents, unstable coalition governments and frequent changes in prime minister and cabinet ministers.

Similar to PNG, there are three levels of government: national; provincial; and local. The country is divided into nine provinces, each with a provincial assembly, which elects a premier to chair it. At the moment the provincial government system is not delivering services and promoting rural development as it was originally intended to. There is a popular call for a constitutional review of the provincial government system to make it more effective, accountable and functional. There is a perception among the Solomon Islanders that provincial assemblies need more powers to be decentralized to them if they are going to be effective in governing and developing the provinces. Anon. (2002) calls for more (unspecified) powers to be devolved to the provinces, to encourage people to participate in their governance.

Nevertheless, the Solomon Islands system of governance appears to be working well in some areas where custom and tradition are still strong and respected, albeit not part of the formal government structures. Solomon Islands law recognizes customary and traditional laws and governance where they complement and are consistent with formal government laws and policies. There are two main traditional systems of governance in the Solomon Islands: the "Big Man System" and the "Chiefly System". Under the Big Man System, authority is acquired through wealth, respect and power, while, under the Chiefly System, it is inherited through chiefly lineage. Martial prowess, fairness, generosity, care for kinship and magic are all important qualities needed to acquire "big man" status.

Chiefs and big men, commonly referred to as traditional leaders, are still very active in the Solomon Islands today. Some provinces recognize the importance of traditional leaders and have formed institutions around them. Good examples are the Isabel Council of Chiefs in Isabel province, the Shortland Islands Council of Chiefs in Western province and the Lauru Land Conference of Tribal Chiefs in Choiseul province. These semi-formal traditional institutions of governance play an important role in conflict resolution (especially settlement of land disputes), promoting development aspirations of their people and management of the both marine and forest resources.

Vanuatu

Like PNG and the Solomon Islands, Vanuatu has three levels of government. However, in contrast to those countries, Vanuatu is a republic, with a president as head of state. The role of the president, like that of the Queen, is largely ceremonial. A parliamentary system is followed, with a 52-member parliament, which elects a prime minister as head of government.

A significant feature of the governance system in Vanuatu is the National Council of Chiefs, which has a formal role in advising the government on customary law, and is influential in designating community conservation areas. The identification of sites of national biodiversity significance to be declared as community conservation areas is called for by the 2002 Environment and Conservation Act. The act stipulates a transparent process of consultation with landowners, chiefs and other interested parties. The act also stipulates the establishment of a Biodiversity Advisory Council, responsible for advising the government on the implementation of the Convention on Biological Diversity and, in particular, on matters related to bioprospecting.

The national government devolves some of its powers to six provinces, which are governed by provincial councils with elected members. Each province is headed by a chairman, elected by the provincial council members. The provincial councils have significant autonomy to develop policies and development plans (called Rural Economic Development Initiatives) to promote development in rural areas (Lane 2006).

Custom and culture are strong in Vanuatu and, therefore, traditional leaders are still active and play a critical role in the governance of the rural communities and the traditional economy. The Government of Vanuatu recognizes the importance of the traditional economy and declared 2007 as the "Year of the Traditional Economy" (Regenvanu 2007). Traditional leaders operating within the context of custom and culture

are better placed to manage the traditional economy than formal government. Thus, in this case, formal government and traditional governance complement each other well.

6.2.2 Conflicts and Security Issues

PNG

Secession movements have been a problem in the islands region of PNG since long before independence from Australia in 1975. During the 1960s, secession was on the agenda of the Paliau Maloat cargo cult movement in Manus, and the Mataugan Association in East New Britain and Bougainville. In 1989, armed conflict broke out on Bougainville, which only ended a decade later with the recognition of Bougainville as an autonomous region. According to the terms of the peace accord, signed in 1998, a referendum on full independence will be held between 2015 and 2020. More recently, citing Bougainville as a precedent, leaders from New Ireland and East New Britain have called for similar autonomy for their provinces due to neglect by the national government.

Problems with secession at the periphery of the country have been accompanied by political instability at the center. National government has been marred by instability since independence, with regular collapses of governing coalitions and political crises. Since 2011, there has been a political impasse, brought about by wrangling among the legislative, judicial and executive branches of government over who is the legitimate prime minister. Parliamentary elections were held in mid 2012, in an attempt to create a legitimate government. However, many analysts fear that PNG is in danger of political and economic collapse. The country's political system is unstable, the crime rate has soared, corruption is rampant, essential services including health care and education continue to decline, and smuggling of guns into the country is exacerbating ethnic conflicts.

Solomon Islands

The Solomon Islands is very ethnically and linguistically diverse, and, like PNG, has volatile national politics. In 1999, ethnic tensions between indigenous Isatabus on Guadalacanal and Malaitan settlers spilled over into violence, expulsions and reprisals. Rival militias were formed and parts of the country descended into lawlessness. A peace agreement was signed between the two main militias in 2000 but the country continued to suffer from lawlessness. In July 2003, at the request of the governor-general, a force of Australian and Pacific island police and troops was dispatched to the Solomon Islands under the auspices of the Regional Assistance Mission to Solomon Islands (RAMSI). The intervention was successful and, within two years, the country was relatively stable. By the end of 2007, RAMSI had been scaled back to around 600 police officers, military advisors and civilian advisors. RAMSI remains in the country, and currently delivers a wide program of development assistance, in addition to providing law and order.

In an effort to bring lasting stability and unity to the country, the Solomon Islands Truth and Reconciliation Commission (TRC), established by an Act of Parliament in 2008, is a key policy instrument of the government's development strategy. The TRC was

conceived as an independent, nationally owned commission, with the objective of promoting national unity and reconciliation, engaging all Solomon Islanders in the reconciliation process and investigating the nature, causes and responsibility for the human rights violations that occurred during the ethnic tensions. The government's development strategy affirms that reconciliation and the associated rehabilitation to support it are fundamental to sustain development, peace and harmony in the Solomon Islands (Commonwealth of Nations 2012).

Conflicts over land, resources and economic opportunities that were played out at the national level during the tensions can also be observed within individual communities. There are clear signs of conflict over resources in many communities, especially in places where logging companies are operating, and these can develop into political conflict and security concerns. In a country where 80 to 90 percent of the land is under customary ownership, substantial areas of forest have been exploited with few benefits to the majority of traditional owners. Conflicts have arisen among communities, even within families, among those who benefit directly from employment or timber royalties and those who are negatively affected by environmental degradation. In general, logging activities have fuelled conflict and antagonism among Solomon Islanders due to state, company and individual exploitation or manipulation of resource owners (Government of the Solomon Islands 2008).

Vanuatu

Following independence from France and the United Kingdom in 1980, Vanuatu's national politics were initially very stable, characterized by the dominance of two political parties (Lane 2006). However, since the late 1990s, national politics have become more fragmented and unstable as a result of the emergence of more parties and candidates. In the 2002 elections, for instance, 10 parties nominated a total of 261 candidates for only 52 seats (Lane 2006). This has led to a series of coalition governments, which tend to be unstable and require compromises to minority parties.

Political instability in the 1990s led to greater devolution of powers to the provinces. Vanuatu has, fortunately, escaped the types of armed conflict and lawlessness that have plagued other parts of the hotspot in recent decades. The main exceptions were a brief rebellion by French-speaking landowners and plantation workers on Santo Island in 1980, and an attempted coup by a paramilitary group in 1996.

6.3 Global and Regional Agreements

The countries in the East Melanesian Islands Hotspot are signatories to a range of global and regional agreements designed to promote environmental protection and sustainable development. The impact of these agreements on national policy is variable, as economic development is typically given precedence over environmental concerns. Nevertheless, they may have mediated the impacts of population pressure, economic development and climate change to some degree.

6.3.1 Hotspot Parties to Global Agreements

Convention on Biological Diversity
This convention, effective since 1993, has 193 member countries. Its objectives are the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources. It seeks to promote conservation of biological diversity in the wild, through requesting signatories to identify regions of biodiversity importance, establish a system of protected areas, restore degraded ecosystems, maintain viable populations of species in natural surroundings, and develop or maintain necessary legislation and/or other regulatory provisions for the protection of threatened species and populations. All hotspot nations now have an official National Biodiversity Strategy and Action Plan (NBSAP), which acts as an overarching guide to biodiversity conservation in the country.

The NBSAP for PNG was developed over two years, through an extensive process of stakeholder consultation. Published in 2007, the NBSAP provides a strategic roadmap for sustainable development over the period from 2008 to 2013 and beyond (Government of PNG 2007). The NBSAP has the following main goals:

- Conserve, sustainably use and manage the country's biological diversity.
- Strengthen and promote institutional and human capacity building for biodiversity conservation, management and sustainable use.
- Strengthen partnership and promote coordination for conserving biodiversity.
- Strengthen existing protected areas and ensure that protected areas for terrestrial species and marine species are increased to 10% by 2010 and 2012 respectively.
- Ensure a fair and equitable sharing of benefits arising out of genetic and ecosystem resources.
- Promote and strengthen research of the country's biological diversity and the sustainable development of the country's biological resources.

The initial process to develop an NBSAP for the Solomon Islands was launched in 1996. However, implementation was not completed, due to difficulties experienced by the government, and funding for the process was withdrawn in 2006. A new process was initiated, with support from the United Nations Development Programme (UNDP), The Nature Conservancy (TNC) and WWF, resulting in the successful completion of the country's first NBSAP in 2009 (Government of the Solomon Islands 2009). The NBSAP sets out 12 strategic goals for protecting, conserving and promoting the country's unique and endemic biodiversity, including:

- Ensure the commitment of the Solomon Islands government and stakeholders to conserving and managing biodiversity is integrated into national legislation, sectoral plans, policies and programs.
- Ensure unique plant and animal species are given appropriate levels of protection and are managed sustainably with a better informed public on the significance of the species.

- Ensure biodiversity of the Solomon Islands is protected from introduced and modified species, through legislation, monitoring, research and awareness.
- Empower stakeholders to effectively participate in the conservation and sustainable use of biological resources.
- Ensure that people, resource owners and the public are better informed of the importance and values of biodiversity through research, with improved monitoring systems for information sharing.
- Ensure that pressures, impacts and mitigation measures of climate change are adequately supported and addressed to conserve the country's biodiversity.

The first NBSAP for Vanuatu was published in 1999, again following a two-year period of consultations and research. The strategy highlights six key objectives for the effective management of the country's biological resources (Government of Vanuatu 1999a):

- Ensure sustainable management and conservation of Vanuatu's biodiversity.
- Develop appropriate policy, planning and legal mechanisms for the management of biodiversity.
- Improve our knowledge about biodiversity in Vanuatu.
- Improve the capacity of national and provincial governments, NGOs and community organizations to manage biodiversity.
- Increase local awareness of the importance and value of biodiversity.
- Foster community participation in the management and conservation of biodiversity.

UNFCCC and Kyoto Protocol

The UNFCCC, signed in 1992, aims to promote international cooperation with regard to both mitigating the effects of climate change by limiting greenhouse gas (GHG) emissions, and adapting to unavoidable impacts. There are now 195 parties to the convention, which was ratified by the Solomon Islands in 1993, and PNG and Vanuatu in 1995. Realizing that the provisions with regard to GHG emissions reductions in the original convention were inadequate to confine global temperature increases within "safe" limits, parties to the convention began negotiations aimed at a stronger global response. This led to the Kyoto Protocol being adopted in 1995, which contains legally binding commitments for developed countries. The Kyoto Protocol was ratified by the hotspot countries in 2002 and 2003, and finally came into force in 2005. The first commitment period runs from 2008 to 2012, and this will be followed by a second five-year period from 2013. As Non-Annex I countries, PNG, the Solomon Islands and Vanuatu have no binding commitments to reduce GHG emissions under the Kyoto Protocol.

Ramsar Convention

Effective since 1975, the Ramsar Convention, also known as the Convention on Wetlands of International Importance especially as Waterfowl Habitat, has 162 member countries. It is an *"intergovernmental treaty that embodies the commitments of its member countries to maintain the ecological character of their Wetlands of International Importance and to plan for the 'wise use', or sustainable use, of all of the wetlands in their territories"*

(Ramsar 2011). Of the hotspot countries, only PNG is a contracting party to the convention, joining in 1993. To date, the PNG government has designated only two wetlands as 'Ramsar sites', or wetlands of international importance, covering almost 6,000 km^2. These wetlands are Tonda Wildlife Management Area in Western province and Lake Kutubu in the Southern Highlands; neither is located inside the hotspot.

In general, wetlands, especially freshwater wetlands, are underrepresented within the existing networks of protected areas and community conservation areas in the hotspot, which is of great consequence because they are of high importance to human wellbeing. Many of the KBAs identified in the hotspot (see Section 4.3.2) meet the criteria for designation as Ramsar sites, and there is clearly considerable potential for further uptake and application of the convention and the principle of wise use in the hotspot.

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)

CITES has been in operation since 1975 and has 169 contracting parties. Its aim is to ensure that international trade in specimens of wild animals and plants does not threaten the survival of species. CITES works by subjecting international trade in specimens of select species to certain controls. These require that all import, export, re-export and introduction from the sea of species covered by the Convention must be authorized through a licensing system. The species covered by CITES are listed in three appendices: Appendix I includes species threatened with extinction and can only be traded in exceptional circumstances; Appendix II includes species not necessarily threatened with extinction, but in which trade must be controlled in order to avoid utilization incompatible with their survival; and Appendix III contains species that are protected in at least one country that has asked other CITES member countries to assist in controlling the trade. CITES is an important convention for the East Melanesian Islands, where international trade in wildlife and wildlife products is a major threat to some groups of plants and animals, such as certain timber trees, reef fish and sea cucumbers. All three countries are parties to the convention, with PNG acceding in 1975, Vanuatu in 1989 and the Solomon Islands as recently as 2007.

World Heritage Convention

Effective since 1975, the World Heritage Convention has 189 member countries, including all three from the hotspot. The convention's aim is to identify and conserve cultural and natural monuments and sites of outstanding universal value, through the nomination of World Heritage Sites by national governments and their recognition by the United Nations Educational, Scientific and Cultural Organization (UNESCO). As of March 2012, only one natural World Heritage Site (East Rennell in the Solomon Islands) had been declared in the hotspot, along with one cultural site (Chief Roi Mata's Domain in Vanuatu). East Rennell is a high conservation priority, which was identified as a KBA during the ecosystem profiling process (see Section 4.3.2 and Appendix 2). Given the global importance of many sites in the hotspot for the conservation of biodiversity, it is highly likely that other areas would qualify for natural World Heritage Site status.

United Nations Declaration on the Rights of Indigenous Peoples
While not a multilateral environmental agreement, the United Nations Declaration on the Rights of Indigenous Peoples forms a significant part of the global legal framework regulating the rights of indigenous people regarding ownership of, management of and access to land and natural resources. It is, therefore, directly relevant to many conservation issues in the hotspot, which relate to conflicts around resource rights. This landmark declaration was adopted by the General Assembly of the United Nations in 2007 following approval by 143 member countries (including the three hotspot countries). The declaration outlines the rights of the world's indigenous peoples and outlaws discrimination against them. In particular, it enshrines the principle of free, prior and informed consent with indigenous communities regarding matters that affect them.

6.3.2 Hotspot Parties to Regional Agreements and Institutions

The hotspot countries are party to various regional agreements, which have led to the establishment of the following regional institutions: the Secretariat of the Pacific Regional Environment Programme (SPREP) in Apia, Samoa; the Forum Fisheries Agency (FFA) in Honiara, Solomon Islands; the Melanesian Spearhead Group in Port Vila, Vanuatu; the Secretariat of the Pacific Community (SPC) in Noumea, New Caledonia; and the Pacific Islands Forum Secretariat in Suva, Fiji. These are all inter-governmental institutions that play vital but neutral roles in helping national governments comply with international standards and best practices. They help formulate regional policies to help build regional capacities to respond to environmental issues, and address shortfalls in human resources at the national level. The Melanesian Spearhead Group is a political lobby grouping, while SPREP, FFA, SPC and the Pacific Islands Forum are responsible for different aspects of regional governance and cooperation.

The Pacific Regional Environment Program has 21 member countries, and its secretariat, SPREP, has been the driving force behind NBSAPs in the region, as part of the overall Action Plan for Conservation of Nature. Its most recent meetings have been mainly to allow member countries to update one another on progress with development and implementation of NBSAPs. These meetings also have a role in shaping environmental governance in the region. When capacities constraints are identified, SPREP provides the necessary technical support and funding, where possible.

The Pacific Islands Forum is a political grouping of 16 independent and self-governing states (of which one, Fiji, is currently suspended) that aims to enhance cooperation among independent countries in the Pacific Ocean. The Pacific Islands Forum initiated the Pacific Plan, following a report by a group of eminent persons, which sets out a road map for development in the Pacific. Unlike SPREP and FFA, the Pacific Islands Forum, SPC and the Melanesian Spearhead Group do not have a specific focus on environmental issues. However, their meetings are large, high profile gatherings of senior officials, which create opportunities to hold governments accountable for their development policies and performance in meeting national, regional and international environmental commitments. Such regional meetings are also important mechanisms for exchanging information, negotiating common positions, and promoting collaborative research into shared environmental and development problems.

A key environmental initiative being developed under the auspices of the Pacific Islands Forum is the Pacific Oceanscape initiative, which was endorsed by the leaders of 15 countries at the Pacific Islands Forum Leaders Summit in August 2010, including the three hotspot countries. This groundbreaking initiative envisions a secure future for Pacific island countries and territories, based on sustainable development, management and conservation of the ocean. The broad objectives of the initiative are: integrated ocean management; adaptation to environmental and climate change; and liaising, listening, learning and leading. Overall, the intent is to foster stewardship at local, national and regional scales to ensure in perpetuity the health and wellbeing of the ocean and people. The initiative is being taken forwards by the Forum's Marine Sector Working Group, comprising the Pacific Islands Forum Secretariat, FFA, the Secretariat of the Pacific Community, USP and SPREP, with technical support from CI, IUCN and the United Nations Environment Programme (UNEP).

The Pacific Oceanscape initiative is currently at an advanced planning stage. The Marine Sector Working Group has developed a framework that sets out six strategic priorities for immediate implementation. Most of these priorities relate to offshore marine conservation, and are therefore not directly relevant to the East Melanesian Islands Hotspot, which is, by definition, a terrestrial conservation priority. Nevertheless, there are a number of potential linkages, particularly with regard coastal and nearshore marine habitats, which are included in the CEPF investment strategy for the hotspot. Specifically, under Strategic Priority 3 (sustainable development, management and conservation), there is an action to "implement integrated coastal resource management arrangements, drawing on the strengths and traditions of community, district, provincial and national levels of government to achieve sustainable island life". Under Strategic Priority 4 (listening, learning, liaising and leading), there are actions to facilitate "targeted capacity building for achieving policy and management objectives" and to connect "people and places for sharing, learning and action". Finally, under Strategic Priority 5 (sustaining action), there is an action to "incorporate consideration of the economic development benefits of sustainable management of coastal and marine resources in decisions affecting national development".

Other regional agreements and initiatives relevant to the East Melanesian Islands Hotspot include the Coral Triangle Initiative: the single largest marine conservation initiative in the hotspot. The Coral Triangle Initiative is a regional cooperation program to protect the outstanding coastal and marine resources of the Coral Triangle region (The Coral Triangle Initiative 2012). The initiative involves the governments of PNG and the Solomon Islands (although not Vanuatu, which lies outside the Coral Triangle), together with those of Indonesia, Malaysia, the Philippines and Timor Leste, with technical support from CI, TNC and WWF, and financial support from the GEF, via the Asian Development Bank (ADB), and the United States Agency for International Development (USAID).

Another important regional agreement relevant to marine conservation is the Multilateral Treaty on Fisheries between Certain Governments of the Pacific Island States and the Government of the United States of America (commonly known as the "US Treaty").

This agreement is essentially a financial mechanism put in place by the US Government to compensate Pacific island states for tuna resource extraction. In April 2011, PNG withdrew from the treaty, citing the US Government's failure to incorporate conservation measures into the treaty following two years of negotiation (WWF 2011a).

6.4 Environmental Policies and Legislation

6.4.1 PNG

Legislative Framework

All three hotspot countries have a written constitution as their main law, which guides all other laws and how the government behaves and functions. PNG's constitution came into effect in 1975 and sets forth a number of national goals. The fourth goal requires that *"natural resources and environment to be conserved and used for the collective benefit of us all, and to be replenished for the benefit of future generations"*. To further this goal, the constitution calls for wise use of resources and directs that all necessary steps be taken to ensure adequate protection of PNG's flora and fauna (Clarke *et al.* 2008).

The key piece of environmental legislation in PNG is the 2000 Environment Act. This is a comprehensive piece of legislation, designed to promote sustainable development of the environment and wellbeing of the people. The act sets out to balance short-term development needs with the long-term maintenance and replenishment of the country's natural capital. This is pursued through the promotion of the sustainable use natural resources, the assignment of proportionate priorities to respective short-term and long-term environmental, economic, and social considerations, and the regulation of industries with adverse environmental effects (Clarke *et al*. 2008).

The act imposes a general duty mandating that no person shall carry or an activity that will harm or is likely to harm the environment without taking all reasonable or practicable measures to minimize such harm. Breach of this general duty is not a criminal offence nor actionable in a civil suit but compliance may be enforced through an Environment Protection Order, a Clean-Up Order, or an Emergency Direction. The Act also provides for the drafting of environmental policies by which environmental protection and sustainable development can be pursued.

Other pillars of the legislative framework for biodiversity conservation in PNG include: the 1991 Forestry Act, which seeks to utilize and protect the country's forest resources to achieve economic growth, while conserving them for future generations; the 1982 National Parks Act, which provides for the establishment and management of protected areas; the 1966 Fauna (Protection and Control) Act, which regulates the control, harvesting and culling of fauna, and provides for the establishment of designated areas where animals are protected; and the 1998 Fisheries Management Act, which regulates the management and sustainable development of fisheries (Clarke *et al.* 2008).

Institutional Framework
All East Melanesian Islands countries have equivalent environment and conservation agencies, which are primarily mandated to manage and establish both terrestrial and marine protected areas under their respective constitutions. In PNG, the key government agencies responsible for ensuring that natural resources are managed and exploited with appropriate environmental safeguards are the PNG Forest Authority, the Department of Lands and Physical Planning, the Department of Agriculture and Livestock, and the Mineral Resources Authority. Institutions such as the PNG Forest Research Institute and the National Agricultural Research Institute also play an important role, by conducting applied research and monitoring the impacts of government policies in the natural resources sector.

In common with many countries in the world, many of the key government agencies do not work in a coordinated fashion to implement complex national development agendas. In fact, many of these agencies seem to work against each other, as evidenced by the recent spate of legislative amendments, which are an indication of agencies clashing over their respective mandates.

6.4.2 Solomon Islands

Legislative Framework
The rights of customary landowners are enshrined in the constitution of the Solomon Islands. In line with the constitution, certain pieces of legislation make explicit reference to customary rights and/or contain exemptions from certain provisions for land and sea areas held under customary tenure. The Provincial Government Act, for instance, includes the wording: *"nothing in this section shall be construed as affecting traditional rights, privileges and usages in respect of land and fisheries in any part of the Solomon Islands"* (Cultural Survival 2010).

The central pillar of the legislative framework for biodiversity conservation in the Solomon Islands is the 1998 Environment Act. The act promotes the protection of the environment and prevention of pollution. To achieve these goals, the act provides for controls on economic development, including pollution monitoring and controls, and an environmental impact assessment (EIA) process. The act also includes necessary measures to comply with and give effect to multilateral environmental agreements (Clarke *et al.* 2008).

Other key elements of the legislative framework for biodiversity conservation include: the 1954 National Parks Act, which provides for the declaration of national parks; the 1998 Fisheries Act, which provides for the proper management and development of fisheries; the 1969 Forest Resources and Timber Utilization Act, which controls and regulates the timber industry; the 1990 Mines and Minerals Act, which regulates the mining industry; and the 1998 Wildlife Protection and Management Act, which provides for the protection, conservation and management of wildlife by regulating the export and import of certain animals and plants, in compliance with international obligations under CITES (Clarke *et al.* 2008).

Recent additions to the legislative framework for biodiversity conservation include the 2010 Protected Areas Act, and the National Strategy for Inshore Fisheries and Marine Resources (Kool *et al*. 2010). Both documents recognize customary land ownership and resource rights. They also explicitly acknowledge the role of civil society organizations in facilitating biodiversity conservation by customary landowners and their important responsibility in resource management.

Institutional Framework

The Ministry of Forestry is responsible for the overall management of the forest resources of the Solomon Islands, and for drafting, enacting and implementing forestry legislation and policy. The ministry supports family-based reforestation initiatives and encourages sustainable forestry activities, establishment of plantations, and domestic processing of timber.

The national institution charged with environmental management and monitoring is the Environment and Conservation Department within the Ministry of Environment, Climate Change, Disaster Management and Meteorology. This is a new ministry, established in 2008. The division is responsible for coordinating environmental management and monitoring, while at the same time mainstreaming environmental considerations across all development sectors. The institutional mandate to integrated environmental considerations into the development plans developed by other ministries is laudable. Unfortunately, severe shortages in human resources have prevented the division from effectively carrying out its responsibilities in this area, or in setting and monitoring environmental standards, as prescribed by the 1998 Environment Act (Government of the Solomon Islands 2008).

6.4.3 Vanuatu

Legislative Framework

The overarching framework for management of Vanuatu's environment is set out in the constitution, which was adopted in 1980. Section 7(d) states that every person has a fundamental duty to safeguard the wealth, resources and environment of the country, in the interests of the present and future generations. Importantly, Section 74 states that *"the rules of custom shall form the basis of ownership and use of land in the Republic of Vanuatu"* (Clarke *et al*. 2008).

Vanuatu's legislative framework contains a number of innovative, forward-looking provisions, related to the conservation of biodiversity. Most notable among these are provisions for the establishment of "community conservation areas" under the 2002 Environment and Conservation Act. Under Section 35 of the act, the Director of Environment can negotiate with customary landowners for any site to be registered as a community conservation area if it is considered to have unique genetic, cultural, geological or biological resources, or to provide habitat for animal or plant species of national or international conservation importance. Before a site can be registered as a community conservation area, prior consent must be obtained from all parties with an interest in the land and an appropriate management plan must be in place.

Similar provisions are contained within the 2001 Forestry Act. Under Section 50 of the act, an area of forest with particular cultural or social significance for local communities can be declared as a "conservation area" upon the written request of the customary landowners to the minister. This act also requires prior consultations to be held with interested parties. The act also provides for the designation of plant species as protected species, which may not be felled or removed in the course of commercial logging operations without the express authorization of the ministry.

Establishment of conventional, government-managed protected areas is provided for in the 1993 National Parks Act, which makes provision for the declaration of national parks and nature reserves. The act also empowers the minister to formulate regulations for the administration of national parks and nature reserves, and the implementation of management plans for them. The act requires that concerns of customary landowners be addressed in protected area management plans but does not prescribe a process of prior informed consent.

With regard to regulating development activities with potential negative environmental impacts, the key pieces of legislation are the 2002 Environmental Management and Conservation Act and the 2011 EIA Regulation. These specify the requirements of an EIA and lay out the process to be followed when carrying one out. The act applies to all development activities that either impact or are likely to impact on the environment of Vanuatu, and which require any license, permit or approval under any law (Clarke *et al.* 2008).

Other key pieces of environment-related legislation in Vanuatu include: the 1964 Import of Plants Act and the 1986 Animal Imports Act, which regulate the movement of animal and plants into and within the country; the 1986 Mines and Minerals Act, which regulates the mining industry; the 1997 Plant Protection Act, which provides for the exclusion and effective management of plant pests; the 2001 Forestry Act, which is the main piece of legislation regulating the forestry industry; and the 2002 Water Resources Management Act, which provides for management plans, committees and protection zones for the management of water resources (Clarke *et al.* 2008).

Institutional Framework

The key government institutions responsible for the implementation of the above legislation are the Forestry Department and the Department of Environment and Conservation (formerly the Environment Unit) under the Ministry of Lands and Natural Resources. Although being housed within a single ministry helps facilitate collaboration between the two divisions, they both face severe human and financial resource constraints, and are scarcely able to deliver on their mandates. In particular, the additional activities needed to implement and report on activities under multilateral environmental agreements depend almost entirely on international donor support. At the provincial level, there are no full-time staff persons with a dedicated responsibility for environmental issues. This impedes the implementation of environmental policies on the ground. Another constraint to the effective implementation of environmental legislation is that responsibility for environmental matters is dispersed among five ministries and 15 line

departments. There is a need for improved cooperation and coordination to facilitate biodiversity conservation among all concerned agencies (Government of Vanuatu 1999a).

6.5 Protected Areas

The East Melanesian Islands Hotspot has a limited coverage of protected areas, whether marine or terrestrial. Despite the identification of biological priority areas (e.g. Swartzendruber 1993, Lipsett-Moore *et al.* 2010) and even with the necessary laws in place, there has been little progress towards the establishment of formal protected areas. In part this reflects the limitations of conventional protected area approaches in a context of customary land ownership and resource tenure and limited government capacity, and in part it reflects conflicting land-uses, especially logging in lowlands and mining in highlands.

The World Database on Protected Areas (IUCN and UNEP 2009) lists only three formal protected areas for the PNG Islands Region: Ndrolowa Marine Managed Area in Manus province, Talele Island National Park in East New Britain; and Loroko National Park in West New Britain. Together, these cover only 60 km^2 or 0.1 percent of the PNG portion of the hotspot. Similarly, only five formal protected areas are listed for the Solomon Islands: Arnavon Islands Marine Conservation Area; East Rennell World Heritage Site; Kolombangara Forest Reserve; Komarindi Catchment Conservation Area; and Queen Elizabeth National Park. These cover a combined area of 737 km^2, equivalent to 3 percent of the national land area. Finally, in Vanuatu, the World Database on Protected Areas lists four formal protected areas, covering 98 km^2 or 1 percent of the total land area: Erromango Kauri Forest Conservation Area; Nguna-Pele Marine Protected Area; President Coolidge and Million Dollar Point Marine Reserve; and Vatthe Forest Conservation Area. Although established with government support, these areas are typically managed by or in collaboration with customary land owners.

As an alternative to conventional, government-managed protected areas, various approaches to community-managed conservation areas have been piloted in the hotspot, for both terrestrial and marine areas. Government and civil society partners in all three countries have promoted locally managed marine areas (LMMAs), which are seen as a way to empower local people to manage their marine and coastal resources, while similar approaches have been promoted for terrestrial forests, including community conserved areas in Vanuatu. The World Database on Protected Areas (IUCN and UNEP 2009) lists more than 100 community-managed protected areas in the hotspot, such as M'Buke LMMA and Garu Wildlife Management Area in PNG, Redman Marine Conservation Area and Tetepare Community Conservation Area in the Solomon Islands, and Emua Marine Protected Area and Vatthe Forest Conservation Area in Vanuatu. Community-managed protected areas are typically small areas of reef other nearshore marine habitats but a few contain significant stands of terrestrial forest.

7. CIVIL SOCIETY CONTEXT OF THE HOTSPOT

7.1 Introduction

There are numerous interpretations of the term "civil society". While the term is often used synonymously with NGOs, CEPF adopts a broader definition of civil society as the set of institutions, organizations and individuals located between the family, the state and the market, in which people associate voluntarily to advance common interests (Holloway 2001). Specifically, this includes many kinds of NGOs and voluntary organizations, philanthropic institutions, and social movements (SustainAbility 2003). In common with McIlwaine (2007), CEPF also includes private businesses, media and professional organizations and cooperatives in its definition of civil society. Organizations or associations of citizens outside the public sector are variously known as civil society organizations, or non-state actors. Smaller groups, restricted in geographic spread to one or more villages or islands and rooted in community initiatives, are referred to as CBOs.

7.2 Regulatory Framework

All legislation quoted or described in this section may be consulted through the databases of the Pacific Islands Legal Information Institute (2012).

7.2.1 PNG

With some qualifications, the PNG constitution recognizes the rights of persons to form into associations. It also strongly affirms the rights of local indigenous communities to their land and resources and calls for *"development to take place primarily through the use of Papua New Guinea forms of social and political organization"* (Government of PNG 1975).

With its Associations Incorporation Act, PNG is the only Pacific island country to have introduced specific legislation concerning the establishment of the range of civil society organizations that now serve modern island societies (Lakshman 2012). It is a comprehensive piece of legislation that requires public notification of the intention to form an association so that people may raise objections to the Registrar at the PNG Investment Promotion Authority, before formal application for incorporation. Incorporated associations are required to submit annual audited accounts and may own property, invest, sue and be sued as legal entities. The act applies to most forms of non-profit organization but not churches, which are governed by special legislation often specific to individual cases.

While most civil society organizations register under the Associations Incorporation Act, a few have chosen to register as non-profit companies (AusAID 2005). According to the report of an Australian Agency for International Development (AusAID) scoping mission (AusAID 2005), the greatest legal constraint to civil society freedom of action at the local level is the Organic Law on Provincial and Local Level Government, which the report

describes as being centralized, top down and not inclusive of communities in relevant service delivery systems. Other laws under which civil society organizations can register apply mainly to for-profit companies and associations that act for private gain of their members. These include the 1974 Business Groups Incorporation Act, the 1974 Land Groups Incorporation Act, the 1982 Cooperative Societies Act and the 1961 Savings and Loan Societies Act (Lidimani 2007). The Income Tax Act of (1959) exempts various types of civil society organization from income tax, including charitable bodies, non-profit bodies and research funds.

International NGOs (INGOs) can establish and work in the country through a memorandum of understanding (MoU) with the PNG government. Most them are non-membership organizations that work for the public good and are, therefore, recognized as public-benefit organizations like charitable bodies (Lidimani 2007). As in the Solomon Islands, there is no specific legislation governing the registration of INGOs.

7.2.2 Solomon Islands

The freedom to assemble and form associations is protected under Sections 12 and 13 of the Solomon Islands constitution (Lidimani 2004), so that civil society groups can coalesce without formal registration and act successfully in the interests of their members or the country in general. Civil society groups may attain formal legal status through registration, as is the case for many NGOs, or remain unregistered, as many CBOs do. Neither the effectiveness nor the privileges enjoyed by civil society organizations are affected by their legal status (Lidimani 2004).

The Solomon Islands Government recognizes civil society organizations' important role as alternative development partners. Active civil society organizations comprise both membership and non-membership organizations, as well as international, national and localized community-based groups.

NGOs may be registered under the Charitable Trusts Act of 1964 or the Cooperative Societies Act of 1953. A charitable trust is registered with the Registrar of Companies and is set up only for charitable purposes, as identified in the act. A charitable trust is not for business; and it is not required to report or to submit audited financial reports to the Registrar of Companies. It is governed by a board of trustees whose duties and accountability are not clearly defined. A cooperative society, on the other hand, has to be registered with the Registrar of Companies, as its major objective is the economic benefit of its members. Its establishment is complex and time consuming. Both types of NGO may receive grants and donations (Lidimani 2004, The Company Haus 2011).

A recent review of the enabling legislative framework for NGOs in the Solomon Islands noted the need for both acts to be updated to take account of changed sociopolitical and economic conditions (Lidimani 2004). For example, despite the substantial growth of NGOs, there is no central registry of them except with the Registrar of Companies. In their financial operations, NGOs have to comply with the Customs and Excise Act, Goods Tax Act, Income Tax Act, Sales Tax, and Stamp Duties Act. NGOs may be

exempted from these tax acts by the instruction of the minister responsible for the administration of the concerned acts. Of particular interest, from a financial perspective, is Lidimani's (2004) observation that NGOs registered under the Charitable Trusts Act are not required to have annual audited accounts. This is a regulatory loophole that poorly governed NGOs can exploit.

Churches and religious organizations are assured of freedom of worship and belief under the constitution. They are required to be registered with the government and may do so under the Charitable Trusts Act. Churches have a great influence on the people of the Solomon Islands and are instrumental in maintaining a strong interest in biodiversity conservation in the people. They also have a powerful voice nationally and can be effective advocates for issues of concern to the public.

Depending on the purpose of the association, CBOs may register as either cooperative societies or charitable trusts. While associations for setting up businesses for the profit of their members are required to be registered under the Cooperatives Act, associations set up solely for charitable purposes need not be formally registered. Some 200 trusts are registered under the Charitable Trusts Act (The Company Haus 2011). In the absence of comprehensive registration of CBOs, it is not possible to report how many exist. They include women's groups, youth groups, men's clubs, village interest groups, church affiliated groups, sports groups, and a wide variety of other interest groups.

An additional legal framework available for CBOs is the formation of community companies under the Companies Act of 2009. Community companies are free and simple to set up. Audits are not required, provided that profits are for the community and not for individual gain, and priority is given to preservation and protection of community assets (The Company Haus 2011).

There is no specific legislation governing the operations of INGOs in the Solomon Islands, and they usually enter the country through signing an MOU with the government. A recent increase in the number of INGOs either establishing local offices or forming partnerships with local NGOs has been *"facilitated arguably by a less rigorous establishment environment"* (Lidimani 2004).

The devolution of responsibility for land and marine resource management to provincial levels under the 1996 Provincial Government Act facilitates liaison of locally active civil society organizations with relevant provincial officials working with local community resource owners (National Parliament of the Solomon Islands 1996). The same act allows for the codification of customary law related to land, enabling official recognition of local taboo sites (National Parliament of the Solomon Islands 1996). The Solomon Islands is replete with small taboo sites, averaging one to two hectares, declared and respected for generations through customary laws (T. Masolo verbally 2012).

The 1998 Environment Act and the 2010 Protected Areas Act both recognize the role of civil society organizations in conservation activities. The former act stipulates the inclusion of relevant NGO activities in the three-yearly report of the Director of Environment and Conservation. The Protected Areas Act goes further than any previous

act by stipulating the inclusion of four NGO members on the 10-member Protected Areas Advisory Committee to the Minister of Lands and Natural Resources. This has potential to give the NGO members a very influential voice given the stipulated quorum of five. The functions of the committee include the requirement of regular reports of activities from relevant NGOs, and the formulation of a code of conduct for NGOs in relation to the relevant standards of conduct under the Act.

7.2.3 Vanuatu

Articles 73 to 75 of the constitution of Vanuatu assure its citizens freedom of association. As in the Solomon Islands, formal registration of civil society organizations is not mandatory. However, it is seen as an advantage. Vanuatu NGOs may be registered either under the 1981 Charitable Associations (Incorporated) Act or as companies limited by guarantee under the 1986 Companies Act. As charitable associations, NGOs are registered with the Vanuatu Financial Services Commission. The Tax Act exempts from value added tax all charitable associations working for the public benefit. Charitable purposes include scientific, cultural and general social welfare objectives.

Churches and other religious organizations have to be registered under the 1995 Religious Bodies (Registration) Act, which was supplemented by the 2005 Church of Melanesia (Vanuatu) Trust Board Act. INGOs have no special provision in Vanuatu law but may work in the country under an MoU with the government. The MoU may include exemption from paying value added tax.

7.3 Operating Environment

PNG, the Solomon Islands and Vanuatu share similarities in terms of: cultural complexity and linguistic diversity; complicated land and resource ownership systems that often result in conflicts; a majority rural population residing in isolated villages largely regulated by customary laws; high levels of spirituality, linking people closely to the land, to their clan groups and to their ancestors; and difficulties in communication. In all three countries, external agencies seeking to promote biodiversity conservation have to recognize the existence of overlapping formal and informal rules in a system of legal pluralism (Menzies 2007). For civil society organizations working on biodiversity conservation, customary laws, church regulations and beliefs must be adhered to with as much respect and rigor as statutory laws and the policies of donor agencies.

7.3.1 PNG

Formation of civil society organizations in PNG appears to be generally uninhibited by legal, policy or regulatory barriers. Most civil society organizations focus primarily on service delivery and, as such, are respected by government, as evidenced by the availability of public funding to churches. There is, however, no clear policy for government support to civil society organizations for service delivery.

The value of civil society's contribution to public policies and public accountability is officially recognized through sanctioned participation in a range of national and local government bodies, including those dealing with resource governance, such as the Forestry Board and the Fisheries Board, as well as politically influential bodies, such as the Consultative Implementation and Monitoring Council, and the Ombudsman Commission. The 1997 Provincial Government Administration Act requires provincial government members who are also members of the national parliament to encourage cooperation among government agencies and NGOs for development at district, provincial and national levels.

At subnational levels, civil society organizations are represented on provincial assemblies, ward development committees, and school board management committees. It is of interest to note that civil society participation in these latter three institutions has been subjected to abuse due to the appointment of cronies or relatives by those in positions of authority (AusAID 2005). This is not surprising given the strong clan and kinship links that exist within PNG society.

Conservation-focused civil society organizations can wield much power through their influence on local communities, whose rights to ownership of land and resources are recognized and affirmed in the country's constitution. This relationship can be a source of great strength when coordinating common responses to environmental issues but it can also be open to abuse, due to the imbalance of power in favor of civil society organizations, due to their greater resources, access to information and political influence.

The highly dissected terrain and difficulty in communication leaves many communities isolated and difficult to service. The official languages of communication in PNG are English, Tok Pisin and Hiri Motu but civil society organizations have to be able to communicate to groups of communities belonging to different language groups that share a single site or species of conservation priority.

Most land and natural resources are owned by local communities, so civil society organizations involved in promotion of development activities or biodiversity conservation have to be able to interact directly with multiple land and resource-owners scattered through frequently remote and inaccessible territories. At the local community level, civil society organizations must invest in understanding the system of rights both to ownership and to use. In some areas, user rights may belong to communities at some distance from the resource location, such as fishing rights to a coastal area belonging to an inland tribe. The right of ownership may be to the land or to the resources on the land or merely to the use of the land (Government of PNG 1991). Civil society organizations that work closely with people have to deal daily with the conflict between traditional cultures and values and the demands of modern economic development in determining the use of natural resources.

In PNG, as elsewhere in the hotspot, customary relations within cultural groupings provide a stronger basis of trust than do allegiances to cross-cultural groupings, such as through NGO membership (AusAID 2005). Consequently, PNG civil society

organizations do not have a strong umbrella organization, although some of them are linked to the Pacific Islands Association of NGOs through the Melanesian NGO Centre for Leadership, which has 94 members (The Tanorama Network 2012).

The AusAID scoping mission of 2005 (AusAID 2005) made some interesting but unsurprising findings on civil society organizations in PNG. These include the following:

- The clan system tends to crowd out other forms of voluntary associations.
- Political culture reflects values and practices of clan and kinship, which impede the practice of democracy and good governance within civil society organizations and the broader PNG polity.
- Social capital (i.e. trust, tolerance, inclusion, etc.) is very high within clan/kinship groups but low among civil society organizations with cross-clan membership.
- A growing but still small number of intermediary/specialized civil society organizations have influenced policy and raised accountability issues in limited areas, including conservation and use of natural resources.

Overall, civil society organizations that deal with clans and local communities are close to the power base for decisions on biodiversity conservation. Customary landowners control 90 percent of the nation's land and all nearshore reefs. The challenge for biodiversity conservation in PNG is to determine and maintain a critical balance between the increasing demand for national economic development through resource utilization, and the integrity of the unique natural identity of the land, its living resources and its people who are so closely bound to them. An important finding of the AusAID scoping mission was that agreements with international extractives companies have led to significant shifts in power from customary landowners to politicians and private sector concerns with interests over natural resources (AusAid 2005). The mission noted that civil society's capacity to increase environmental accountability in PNG had yet to be demonstrated.

Both an awareness of the relevant laws that govern resource management and an understanding of the power dynamics within local communities are vital in order to advise local resource owners wisely and avoid costly and time consuming litigation. This is evident from the work of such organizations as the Centre for Environmental Law and Community Rights, which services several development NGOs that deal directly with local communities to manage or prevent conflicts arising over claims to resource use and ownership (PNG Eco-forestry Forum 2010).

7.3.2 Solomon Islands

In general, civil society organizations in the Solomon Islands are able to form, associate and function freely with minimal legal constraints. Those organizations that are involved directly or indirectly in biodiversity conservation are increasingly recognized as important partners by the government, as evidenced by explicit recognition of their role in recent legislation. The work of civil society organizations with and for local

communities is enabled by official, widespread recognition of the key role of customary land and resource owners in managing their own resources.

Politically, civil society organizations, inclusive of CBOs, are powerful agents for resource management. Solomon Islanders own land communally with ownership extending over contingent marine areas. The list in Appendix 8 includes several landowner groups that have come together to pool conservation efforts, although these represent only a small proportion of active CBOs in the country. A growing number of community-based conservation areas have been set up and managed by landowners themselves. These self-initiated actions are often in response to strong teachings of churches about environmental stewardship (M. Wairiu verbally 2012). However, community cohesion necessary for official recognition and sustainability of managed resources, including protected areas, does not come easily, nor is it assured once achieved.

The 1996 Provincial Government Act stipulates the maintenance of a registry of chiefs and elders in each province. Chiefly positions may be contested and rights to resources questioned by conflicting claims. Civil society organizations supporting and facilitating community-based conservation initiatives have to be constantly aware of such possibilities and deal with them sensitively, to ensure maximum benefit to the society as a whole.

While close links with resource owners at the local community level lends some political space to civil society organizations directly or indirectly involved in biodiversity conservation, this privilege is often more limited at the national level. Demands on natural resources for national economic development give large private sector concerns greater political space, particularly in the forestry, fisheries, agriculture and mining sectors.

Nevertheless, civil society organizations are increasingly recognized by government, where they are often represented on important national committees, including ones concerned with natural resources and the environment. In fact, civil society organizations' membership of the Protected Areas Advisory Committee and their strengthened links with the Department for Environment and Conservation are credited with greatly increasing the voice for community-based conservation at the national level.

Political space for civil society organizations is helped by substantial media interest. Conservation issues are regularly featured in public media, including the national TV, radio and newspaper. The latter offers an environment page for free whenever needed.

Regional associations of NGOs across the Pacific help create greater political space for Solomon Islands civil society, as they are able to lobby together in support of conservation, through regional forums and within individual nations. A recent example is the Coral Triangle Initiative, under which the Solomon Islands Government (and those of other participating nations) collaborates with CI, TNC, WWF and other partners (T. Masolo verbally 2012). Another example is the Regional Conference on Development Models, held in Bangkok in August 2011, at which Asia-Pacific civil society

organizations called on governments and donors to *"affirm and ensure participation of the full diversity of civil society organizations as independent development actors in their own right"* (BetterAid 2012).

As in PNG, inter-clan cooperation through membership of national NGOs is a recent occurrence (Upton 2006), and cohesion is often strongest at the level of CBOs. Difficulties in communication from island to island and over rough mountainous terrain with few road linkages challenge civil society organizations working with scattered village communities.

Civil society organizations that work closely with local communities can communicate through the two official languages: Solomon Islands Pidgin; and English. Successful ones have learnt to deal with differences of language, values, cultures and communications that exist among different communities, and to build long-term relationships based on trust.

A network of civil society organizations, the Development Services Exchange (DSE), tries to facilitate sharing of resources between its members to improve overall service delivery by civil society to Solomons Islands society in general. Close linkages between the civil society sector and government are facilitated by frequent consultations with DSE (T. Masolo verbally 2012).

7.3.3 Vanuatu

Vanuatu is a much smaller country than either PNG or the Solomon Islands, and there are correspondingly fewer NGOs and CBOs active in conservation in the country. Nevertheless, they are more prominent and appear to have greater influence in the formulation of government policies. Their work is also better recognized by private sector organizations that have become more interested in biodiversity conservation.

Conservation NGOs in Vanuatu generally have amicable relationships with government, in recognition of the general interest in nature conservation that most communities have. This public interest and the political space it gives conservation NGOs has been widened by recent training of media persons organized by SPREP. Vanuatu's public media outlets have also been active in promoting awareness about climate change and other environmental issues (T. Tiwok *in litt.* 2012).

In addition to wider media exposure, conservation NGOs continue to have positive influence through their cooperative efforts with weakly resourced government departments. A government environment official cited by T. Tiwok (*in litt.* 2012) reported that *"with increasing shortfalls in finances, government departments have looked to strengthened links with NGOs for implementation of their plans. The Department of Environment and Conservation, for example has signed several MoUs with NGOs for sharing information and implementation of many of its activities"*.

The official languages of communication are English, French and Bislama. The latter, a local creole, is the most widely used of the three. Civil society organizations can get by in most communities with Bislama. A good system of island airstrips make island-hopping relatively straightforward for Vanuatu civil society organizations but the costs are prohibitive and ground transportation within each island is typically not cheap.

As in the Solomon Islands, most NGOs in Vanuatu are members of a national network: in this case, the Vanuatu Association of NGOs (VANGO). As in the Solomon Islands, the Vanuatu government values its association with local NGOs and collaborates closely with them through VANGO.

7.4 Funding Environment

7.4.1 PNG

Civil society organizations active in PNG receive funding both directly and indirectly through intermediaries. The latter include: INGOs, such as the Global Greengrants Fund, which has provided over 140 seed grants of between US$3,000 to US$5,000 to local organizations in PNG since 2001 (Global Greengrants Fund 2012); church groups, such as Bread for the World, which has its Pacific office in PNG; and UN organizations, such as UNDP. Direct funding, on the other hand, comes mainly from bilateral and multilateral donors and private foundations.

The largest international donor to PNG is Australia, which invested around US$360 million during its 2007/2008 financial year. One-quarter of this total was allocated to civil society organizations, of which about US$7.6 million was granted directly to 13 civil society organizations and US$88.1 million was received by civil society organizations indirectly through projects implemented by private companies, consultants, INGOs and faith-based organizations (AusAID 2007). Other funders of civil society organizations active in PNG include: the European Union (EU), which has committed over US$8 million towards strengthening the role of civil society organizations in PNG; the Climate Investment Fund, which has committed an estimated US$75,000 to building civil society capacity to work on climate change resilience; the Packard Foundation; and the Interchurch Organisation for Development Cooperation (ICCO).

INGOs active in PNG raise their own funds internationally. Those involved in biodiversity conservation in the PNG islands region include organizations with a global mission, such as CI, TNC, Wildlife Conservation Society (WCS) and WWF, as well as those with a more restricted geographic focus, such as Live and Learn, and Seacology. Funding sources for these international organizations include the Christensen and Packard Foundations, USAID, private donations and their own internal resources.

International volunteer organizations send technical volunteers to PNG for short periods to service civil society organizations' specific needs. These are provided through Canadian University Students Organisation, Japan Overseas Cooperation Volunteers (JOCV), Peace Corps, United Nations Volunteers, Volunteer Service Organisation

(VSO), and Volunteer Service Abroad (VSA), among other organizations. A national volunteer scheme also exists in PNG. Most of these are active in the part of the country within the East Melanesian Islands Hotspot.

Domestic and international NGOs both report finding it increasingly difficult to raise funds for biodiversity conservation, as evidenced by some NGOs putting major programs on hold pending funding availability.

7.4.2 Solomon Islands

The DSE report of 2008 found that funding received by locally based NGOs, including INGOs, was dominated by contributions from international donors, with smaller amounts self-generated, gained through fundraising, granted by the Solomon Islands government or donated from others (DSE 2008). Grants from international donors to civil society organizations commonly range from US$18,000 to US$90,000. INGOs active in biodiversity conservation usually fundraise internationally and are able to attract funding from sources that are beyond the reach of most domestic NGOs.

One of the largest funders of civil society, the EU, supports both NGOs and private sector organizations, such as the Solomon Islands Chamber of Commerce. In November 2011, the EU committed some US$570,000 for capacity building of six civil society organizations, including DSE, Kastom Garden Association, and Marovo Island Natural Biodiversity and Livelihood Trust. The Australian government is another major funder but its priority is currently on strengthening the public sector, although it recognizes the importance of civil society organizations in community development. Its volunteer program (Australian Volunteers International or AVI) provides technical assistance to civil society organizations working in the conservation field. New Zealand is a smaller donor, and supports organizations linking conservation with livelihoods, such as the WorldFish Center. The Coral Triangle Initiative was able to attract the interest of a wider range of international donors, including ADB, the GEF and USAID.

7.4.3 Vanuatu

Vanuatu civil society organizations are largely funded by international donors, including the international development agencies of Australian, New Zealand, the United Kingdom, Canada, Germany, France and the EU. Grants of up to US$50,000 are available from the GEF and the Government of New Zealand, through a small grants program administered by UNDP. A few private foundations, including the MacArthur Foundation, also support civil-society-led conservation efforts, particularly in relation to LMMAs. Most donor agencies prefer to support activity costs rather than provide core administrative support to NGOs. This presents a continuing challenge, especially for domestic NGOs, which struggle to meet day-to-day running costs and retain experienced staff.

Concern over long-term financial viability is one reason offered by T. Tiwok (*in litt*. 2012) for the close cooperation observed between NGOs, national governments and provincial governments. Aware of the limited timeframe of project funding, NGOs look to provincial and national governments to continue long-term support for the

conservation initiatives they helped establish. This is a precarious situation for biodiversity conservation in light of the diminishing finances available to government agencies, which already depend on NGOs for delivery of important aspects of their missions, such as monitoring of biodiversity and natural resources. It is unrealistic to expect national and provincial governments to support the operations of NGOs when they scarcely have sufficient resources for their own operations.

7.5 Possible Recipients of Conservation Grants

7.5.1 PNG

Stakeholders consulted during the ecosystem profiling process recommended that conservation funding for civil society be targeted towards civil organizations already active in the hotspot. Such organizations were felt to be in the strongest position to deliver conservation results in a very challenging operating environment, because of their knowledge of local languages and customs, understanding of conservation issues, existing relationships with local communities, and experience in working with provincial and local governments in the islands region.

Among the civil society organizations active in the islands region, educational and research institutions have important roles to play in a country that is still cataloguing its biodiversity and where conservation success will depend upon local communities taking informed decisions about natural resource management. Spirituality is an important aspect of people's life in PNG, whether through indigenous world views and belief systems or through Christianity. In this context, engaging faith-based organizations with an active interest in nature conservation can yield high dividends. Beyond these groups, INGOs, domestic NGOs, CBOs and private sector organizations are all present in the region, and all have complementary roles to play. Effective partnership arrangements among these different actors will be essential.

The identification of potential recipients of conservation grants needs to take account of several important issues that may impinge on the effectiveness of conservation efforts in the islands provinces. Most important among these are proven sensitivity to the development needs of customary land and resource owners, and willingness to form partnerships with other organizations with complementary experience and expertise.

A list of potential recipients of conservation grants are presented in Appendices 5 to 7. These include civil society organizations based in the hotspot, as well as ones based in the adjacent north coast of the PNG mainland. The organizations based in the latter are located in Lae, Lumi and Madang towns.

7.5.2 Solomon Islands

Most national NGOs in the Solomon Islands are either members or affiliates of DSE: an umbrella body working to strengthen effective NGO coordination. DSE's database includes both national and provincial NGOs, as well as CBOs (DSE 2008). The sectors in

which domestic civil society is most active, as identified by the organizations themselves, include: education; communication; health; livelihoods; recreation; governance; conservation/environment; values/beliefs; social welfare; and disaster/rehabilitation.

A relatively small number of civil society organizations have a mission that directly relates to biodiversity conservation. However, other groups active in natural resource sectors, such as agriculture and forestry, have potential to become more active in promoting biodiversity conservation as part of their activities. These include notable development NGOs such as the Solomon Islands Development Trust (SIDT) and Uttermost Rural Development Foundation, as well as suppliers of local resource products inclusive of a few private sector associations, such as the Bee Keepers Cooperative Association, Marangato Holdings and Village Eco Timber Enterprise. They also include a few INGOs and CBOs active in conservation but not listed by DSE.

Most civil society organizations listed by DSE (2008) reported working in two or more sectors. Without talking to them directly it is not possible to label any of them with a specific sector of predominant focus. For the purposes of this report, civil society organizations were identified as potential recipients of conservation grants if they indicated that they work in agriculture, forestry, fisheries and/or conservation and environment (Appendices 8, 9 and 10). Most of these organizations are NGOs or CBOs, although they also include faith-based organizations, emphasizing their role in strengthening spiritual links to nature through calls for stewardship, and private-sector organizations, highlighting the importance of this section of civil society in promoting environmentally sustainable management practices in natural resource sectors.

7.5.3 Vanuatu

While Vanuatu's Environment and Conservation Department is under-resourced and the country has only four NGOs whose activities address biodiversity conservation either directly or indirectly (Appendix 11), CBOs in Vanuatu have shown great initiative in the field (Appendix 12). Table 23 lists a selection of well known community-managed conservation areas, which were largely initiated by customary land and resource owners and are maintained through the attraction of tourists to the areas concerned. Other examples of community-managed conservation areas in Vanuatu include Happyland Kauri Reserve on Erromango, the last remaining substantial Pacific kauri (*Agathis macrophylla*) stand in the country, which was established with support from the EU and Vanuatu Forestry Department.

Sixty-four of the 92 civil society organizations in Vanuatu listed by VANGO (2011) are classified as CBOs. These are small, geographically localized community organizations. Development activities by civil society organizations in Vanuatu appear to be more grassroots-based with less prominent participation by national NGOs. This is a reflection of the diversity in language and culture that exists in the country. It also reflects the power of customary land and resource owners to make independent decisions over the management of their own resources.

Table 23. Selected Community-managed Conservation Areas in Vanuatu

Location	Conservation Area	Year Established	Notes
Ambae	Duviara Conservation Area	1996	50 hectares of cloud forest with 12 endemic plants, 25 bird species, one endemic fish
Ambrym	Lake Fantery Conservation Area	Not available	220 hectares with >30 bird species, marine turtles, forest
Efate	Nguna-Pele Marine Protected Area	Not available	>3,000 hectares of marine and land areas set aside as "resource factories" by an independent network of 16 communities on two islands
Epi	Nikaura Marine Protected Area	2000	Dugong and marine life
Malakula	Libansese Conservation Area	1998	Riverine area. Mangroves, freshwater and brackish habitats
	Nabi Protected Area	1994	>1,000 hectares of diverse forest and coastline vegetation. Declared by customary owners under Chief Timothy Nehapi. Birds, marine turtles
	Nial Botanical Conservation area	1990	2 hectare private reserve demonstrating agroforestry, nursery, spices and selected trees
Maskelyne Islands	Lorhari Marine Conservation Area	2001	Marine life
	Nombong Sakao Marine Conservation Area	Not available	Marine life
	Ringi Te Suh Marine Conservation Area	1994	100 hectares of reef for research, education and recreation. Main activity is restocking of giant clams
Uri & Uripiv Islands	Uri Narong Marine Park	1994	>50 hectares of coastal and nearshore habitats, including mangroves, tidal flats and reefs
Santo	Loru Rainforest Protected area	1995	220 hectares of coastal rainforest. 28 bird species with five endemics, bata, coconut crabs. Village run taboo plot for research/monitoring
	Vatthe Conservation Area	1994	2,276 hectares of lowland alluvial forest. > 36 bird species with five endemics.

Source: Wantok Environment Centre (2012).

All of the conservation areas in Table 23 are owned and managed by local communities, even if their establishment was assisted by government or other NGOs, as in the case of Vatthe Conservation Area and Nguna-Pele Marine Protected Area. Demand for land and marine resources on the part of a rapidly increasing population will threaten the continuing existence of those conservation areas in highly populated islands, such as in the Maskelynes. The challenge is to find suitable agricultural practices and fisheries technologies that are socially acceptable and utilize resources more efficiently than is currently the case. Further, these need to be integrated with livelihoods development sensitive to local contexts.

Four NGOs active in promoting biodiversity conservation nationally are listed in Appendix 11. These comprise three local NGOs and one INGO. Other INGOs listed by VANGO include Transparency International, World Vision and CARE International, none of which has an institutional focus on biodiversity conservation. Nevertheless, these organizations could be important partners in conservation initiatives, due to their

implementation networks, relationships with local communities, and expertise in natural resource management, resources rights, livelihoods and other areas.

While there are only a few national NGOs active in conservation efforts, they are dependent for their success on political support from the Department of Environment and Conservation and the Department of Fisheries. These two departments have important roles to play in assisting national NGOs with coordinating the activities of so many CBOs and even private sector concerns that have been encouraged to act for the benefit of biodiversity in Vanuatu. Additionally, provincial councils can be effective supporters of CBO conservation efforts, as they have the power to legislate on environmental issues.

7.6 The Civil Society Sector

7.6.1 PNG

Culturally extremely rich in diversity, PNG is challenged to keep its people united. The common language of communications is Tok Pisin, one of three official languages of PNG, along with English and Hiri Motu. The churches are a strong force in binding people of different clans and are officially recognized as effective social service providers for PNG's scattered communities (AusAID 2005).

The bountiful natural wealth of PNG has attracted an influx of entities with conflicting missions: from those intent on rapid exploitation, substantial profit and quick withdrawal, to those with resolve for long-term investment in PNG's natural capital. The former include large multinational companies with ability to persuade influential politicians and community leaders, while the latter include well meaning but often cash-strapped NGOs, which may be treated with suspicion by national leaders as well as face an uneasy welcome by the local communities they purport to serve.

Within this milieu, a growing number of INGOs have entered the country both to establish local NGOs that implement their missions as well as to extend their own presence to local communities in wider geographic locations. In general, while conservation INGOs focus on biodiversity conservation, they may introduce development activities into their programs as a means of assisting local resource owners to better manage their total resources, inclusive of biodiversity. This may include facilitating entry to specific markets, such as through fair trade certification (see TNC 2012).

While there is overlap between INGOs and domestic NGOs, the approach of the latter is generally driven by tradition, which respects spiritual links with nature and values a natural resource for its utility. Within this approach, biodiversity conservation is translated into maintaining the long-term utility of natural resources bequeathed by ancestors. Most domestic NGOs have, therefore, established themselves to respond to specific development needs of local communities. Those NGOs that work on biodiversity conservation often recognize the primacy of local people's needs for basic survival, and, therefore, focus on agriculture, land-use planning, forestry, fisheries management, ecotourism and appropriate technology. They may also move into certified commodities

markets for the products of the communities they work with, such as for Forest Stewardship Council (FSC) certified timber (PNG Eco-forestry Forum 2010). Local NGOs and CBOs necessarily have limited boundaries dependent on clan relations, language linkages, physical terrain, and challenges of communications and funding. For stronger advocacy, some have formed national associations, such as the PNG Eco-forestry Forum and the PNG Centre for LMMAs.

Papua New Guineans are largely Christians, and churches have a significant role to play in people's lives and in the establishment of values. The concepts of stewardship of creation and the sacredness of life are fundamental biblical teachings, which make churches and other faith-based organizations potentially strong partners in biodiversity conservation efforts.

With the exception of the environmental management activities of mining and oil palm companies, few private sector organizations are currently involved in biodiversity conservation in the PNG islands region. This may be an area that could be encouraged, for instance in the tourism sector, where active interest already exists through the Divers' Association involved in installation of mooring buoys to protect fragile reefs, and the partnership between Mahonia Na Dari and the Walindi tourist resort at Kimbe.

The collective expertise and skills of civil society organizations active in the PNG part of the hotspot are inclusive of those necessary for successful delivery of conservation outcomes. Academic institutions are well placed to generate information on biodiversity and document traditional ecological knowledge, as well as to develop human capacity for conservation through formal education and training. Faith-based organizations are well placed for anchoring the values that link people to nature and promote biodiversity conservation. Local NGOs are well placed to raise conservation awareness at the community level, and to help communities make decisions, establish legal rights and enter into agreements for conservation of biodiversity. National and international NGOs are well placed to provide technical assistance to local NGOs and CBOs, undertake policy analysis and advocacy, and raise resources internationally. Close cooperation among different sections of civil society should be encouraged. This should include some mentoring of local NGOs and CBOs by national and international organizations. This will take considerable time, effort and trust but the eventual result should be a stronger grassroots conservation movement that is effective, self-sustaining and accountable to the people it supports.

7.6.2 Solomon Islands

Seventy-four different languages separate Solomon islanders, who use Solomon Islands Pidgin as a common language, which, together with English, is the official language. Religion unites people of different languages and cultural groupings, and is a potent force in motivating resource owners to conserve their resources. The Solomon Islands civil society sector has developed significantly in recent years, due to the influx of development assistance associated with RAMSI. Activities of the sector can contribute directly or indirectly to biodiversity conservation. Most domestic NGOs focus on

development activities. However, these can contribute indirectly to conservation goals, for example through the promotion of local products based on natural resources, which can encourage the sustainable management of the resource.

It is at the local community level, through the activities of CBOs, that conservation actions in the Solomon Islands can be most effective (e.g. Upton 2006). However, most CBOs are not formally registered, which precludes them from directly receiving external funding for their conservation activities, because they are not recognized as legal entities that can sign contracts and MoUs with donor agencies.

Some 13 CBOs are listed by DSE (2008) as being active in conservation (Appendix 8). CBOs are mainly village based and may extend, through associations, to encompass several villages in a single province. Village-based associations are usually governed through a customary system of leadership that is accountable to the people in a largely egalitarian society (R. Horoi verbally 2012). Choice of leadership varies through the country from a more democratic system electing a "big man" leader, on most islands, to a more hierarchical inherited leadership system in the Polynesian outliers.

DSE (2008) lists 10 national NGOs with a focus on conservation or related fields (see Appendix 9). One characteristic of the approach adopted by these groups is the attention they give to local people's development in their conservation projects, to divert pressure away from threatened species and habitats. Notable challenges for NGOs active at the local community level include committing to long-term partnerships with CBOs throughout the process of developing consensus-based solutions to conservation challenges and integrating them into the customs and traditions that govern village life, as strengthening CBO capacity through a mentoring process of hands-on training and nurturing. National NGOs struggle to service the needs of the numerous, scattered communities and their organizations, because they themselves also need institutional strengthening. A partial exception is the Solomon Islands Community Conservation Partnership (SICCP), which was established by the American Museum of Natural History (AMNH) and CI, and has access to funding and technical support from international partners, including the University of Queensland.

The role of the churches in promoting sustainable development can be important. Various churches have already been active in this regard, such as the United Church, whose ecotimber fairtrade project was unfortunately curtailed by national political upheaval, and the Seventh Day Adventist Church, which as an organic gardening program, called Kastom Garden. Other churches, such as the Anglican Church, emphasize stewardship and care for creation, affirming the customary care for nature inherent in Solomon Islander custom and tradition.

There has been little exploration on the role of the private sector in conservation. Several ecotourism concerns do exist, and diving operations have been growing in popularity. Greater involvement of the private sector, through integration of biodiversity conservation into national development strategies and plans and introduction of environmentally sustainable practices in the natural resource sectors, would be beneficial.

Twelve INGOs are listed by DSE (2008) as active in the Solomon Islands in conservation and related fields (see Appendix 10). These include Asia-Pacific Sustainable Development, Greenpeace, Live and Learn, Oxfam International, TNC, WWF, WorldFish Centre, and international-volunteer-placing organizations from Australia (AVI, Australian Youth Ambassadors for Development), Canada (Canadian University Students Organisation) and New Zealand (VSA).

An additional international player is the Center for Biodiversity and Conservation (CBC) at AMNH, which works with local communities through its local partner, SICCP. It is developing a legal framework for obtaining local resource owners' commitments to long-term resource conservation, through community conservation agreements. Its aim is to pilot a system of community-based conservation areas through the Solomon Islands that will become the basis for a wider system of national conservation areas.

Given the complexity of resource ownership systems and the resulting vulnerability to conflicts over rights, national and international civil society organizations working with local communities for biodiversity conservation recognize the need for facilitation skills for a wide variety of processes, including community consensus building, conflict prevention and resolution, knowledge sharing, good governance and management skills as well as for technical skills related to biodiversity conservation These are evident in the staffing of well resourced local offices of INGOs and in the range of skills offered for a fee by the various members of DSE (2008).

Unfortunately, a full complement of this range of skills cannot be accessed by any individual domestic NGOs. They have neither the finances nor the international network to attract the full range of necessary skills and experience. Domestic NGOs do, however, possess the crucial advantage of being local, with an understanding of local communities that INGOs can very rarely gain. Given sufficient resources and technical support, domestic NGOs could build relationships with a wider range of CBOs spread throughout the multiplicity of languages and cultures that exist in the Solomon Islands. Effective biodiversity conservation has to cover more areas than a single INGO can cover with its demonstration projects. Thus, efficient use of resources would dictate that INGOs should strengthen the capacity of domestic NGOs, in order that they can, in turn, build capacity of CBOs to implement conservation activities.

At present, however, this is not universally the case. When INGOs establish local offices, even with local staff, they still remain responsive to the vision, mission and directives of the international headquarters. Their conservation priorities may not necessarily coincide with local priorities. They may bring a lot of resources into the country but these may not always be utilized efficiently to meet locally determined conservation priorities or build lasting capacity locally. Additionally, INGOs usually offer higher salaries and better benefit packages than local NGOs, and tend to attract the most qualified and experienced staff away from local organizations. In these ways, INGOs can be a negative influence on development of local civil society as well as a positive one.

At the same time, there have certainly been good examples of INGOs introducing new ideas, building local capacity and making lasting commitments to partnership with local communities. Working with local communities can take considerable time and commitment, however, as demonstrated by the work of TNC in setting up the Solomon Islands' first marine conservation area: Arnavon Islands Marine Conservation Area, in 1995. Comanaging the marine protected area with local resource owners and the provincial government has kept TNC engaged for well over a decade. An assessment by van Beukering *et al.* (2007) noted its fledgling success in addressing poverty and its strong support from resource owners but the question arises as to when TNC's participation can be withdrawn without affecting the community's commitment towards protected area goals. Sustainability of biodiversity conservation by the people of Solomon Islands in the long run has to be based on a set of values that they subscribe to.

7.6.3 Vanuatu

Vanuatu has over 100 traditional languages, each with its own cultural identity linked to its land and resource ownership system. The common pidgin language is Bislama while both French and English are recognized official languages. Vanuatu has the highest ratio of languages to population of any country in the world. This is reflected in the wide variety of cultures that characterize all three nations in this hotspot. As in the Solomon Islands and PNG, the indigenous languages are not written and information is transmitted through oral tradition. Hence communications across language groups remains limited, except through Bislama.

Apart from churches and their affiliated groups, such as women's and youth organizations, organized civil society activity in Vanuatu is more limited than in the other countries in the hotspot. In contrast, there are a large number of informal CBOs in Vanuatu, many of which are engaged in community-based natural resource management.

Effective conservation efforts have to deal with numerous small resource and land owning units that exist in Vanuatu. Formation of associations of small CBOs and strong networking between them and national organizations is a key requirement for effective nationwide conservation. Appendix 12 illustrates the general composition of the domestic civil society sector in Vanuatu. It is largely composed of small CBOs with a very local focus. Networking of these CBOs through coordination by national NGOs or relevant government agencies will be necessary to establish a comprehensive system of conservation areas that will more effectively conserve Vanuatu's unique biodiversity. The necessity of national networking is attested to by the NGOs involved in promoting conservation nationally in Vanuatu. Their relevant missions, governance structures and networking patterns are provided in Appendix 11.

Religion and faith-based organizations also play important roles in both uniting and dividing people across language groups. Vanuatu's churches have not been as active in conservation activities as those in the Solomon Islands but they nevertheless have significant potential to support conservation outreach, which is consistent with their teachings of the importance of stewardship and care for creation.

Interest in biodiversity conservation in Vanuatu is also shared by private companies, especially those involved in tourism. For example, a website promoting independent travel in the country advertises 14 conservation areas scattered across six islands (Wantok Environment Center 2012). It will be in the interest of such private sector concerns that conservation areas are maintained as advertised. Conservation areas are typically maintained by CBOs in partnership with national NGOs or relevant government departments. Recognizing the value of unspoiled natural areas to the tourism industry, domestic NGOs and tourism companies have mounted training programs at a number of sites to help facilitate mutually beneficial interactions between tourists and their local hosts. Such training programs could be usefully expanded to integrate biodiversity conservation into the business practices of the tourism industry.

7.7 Geographic Coverage

7.7.1 PNG

Given the multitude of languages, clans and cultures and the localized distribution of each, it is not surprising that civil society organizations that work at community level are likewise restricted in geographic spread. All of the CBOs (Appendix 5) and most of the domestic civil society organizations active in the PNG islands region (Appendix 6) are local, and none of them (with the possible exception of the PNG Centre for LMMAs) are active throughout the region. Similarly, no INGO has a presence in all four provinces plus the Autonomous Region of Bougainville (Appendix 7). In the PNG provinces within and adjacent to the hotspot, there appears to be a greater concentration of active civil society organizations near the larger urban centers of Madang and Lae on the north coast of the mainland (14 relevant civil society organizations), with decreasing numbers in Manus (10), East New Britain (nine), West New Britain (eight); New Ireland (eight) and Bougainville (five).

7.7.2 Solomon Islands

It should be noted that the CBOs listed in Appendix 8 are concentrated in only five of the nine provinces of the country: Choiseul; Guadalcanal; Makira Ulawa; Malaita; and Western. Conservation CBOs do exist in other provinces but are not registered, thus information about them is difficult to obtain. National NGOs, such as Environment Concerns Action Network Solomon Islands (ECANSI), service the needs of these unregistered CBOs, which promote biodiversity conservation as part of customary natural resource management systems. Regarding the domestic NGOs listed in Appendix 9, all of them operate in more than one province but none of them work in all nine.

The only province that currently lacks some assistance with community-based conservation efforts is the Temotu province in the southeast (M. Wairiu verbally 2012). The recent successes of conservation NGOs, such as ECANSI, SICCP and TNC that work closely with local communities by inducing or supporting CBOs, suggest that, in the long term, it is CBOs that will play the leading role in biodiversity conservation, since they comprise resource owners and act at the local level. Indeed, some NGOs observe

that development projects are most effective when delivered within family and clan groups (Upton 2006).

7.7.3 Vanuatu

The CBO conservation areas and the activities of the NGOs listed in Appendix 9 are located in four of the six provinces and eight of the 13 larger islands of Vanuatu. Larger islands without recorded activities include Maewo, Pentecost, Santa Maria and Vanua Lava. These islands belong to the provinces of Banks Torres and Penama.

7.8 Civil Society Capacity

The academic literature is replete with discussions and little concurrence on what civil society capacity comprises. A quick exploration of the literature (Eade 1997, Low and Davenport 2002, Social Designs 2012) indicates that the "capacity" of a civil society organization may be categorized into three main aspects integral to its ability to effect the changes it desires:

- The capacities of the people who govern, manage, and implement the organization's mission through its programs.
- The capacity of the organization itself to survive as an organic institution despite changes in leadership and other personnel.
- The capacity of the organization to act out or to implement its mission as related to its vision.

The capacities of people in civil society organization management and program implementation are usually addressed through appropriate training and assessed through monitoring pre-identified achievement indicators. Necessary staff capacities for running a civil society organization include planning, budgeting, organizational development, fundraising, leadership and mentoring, as well as technical knowledge and skills for implementing programs specific to the organization.

Specific training in civil society management and governance has not been paid sufficient attention to in the East Melanesian Islands. Given the critical role of civil society organizations in advancing biodiversity conservation goals, not to mention wider development agendas, good governance and effective management of civil society organization is imperative. Some attention needs to be paid, therefore, to appropriately skilling not only the managers of civil society organizations but also their governing boards. This need has been specifically identified for NGOs in the Solomon Islands (Upton 2006).

The capacity of an organization to survive is determined by the strength of its institutional structures, including its values, constitution, policies, procedures and organizational culture. Without strong institutional structures, in particular good financial management, civil society organizations can rapidly lose the trust of their staff, members, funders or all three, and decline or disappear.

The capacity of an organization to implement its mission depends upon specific technical capacities but also upon general organizational capacity discussed above. The technical capacity needs of civil society organizations vary widely, depending on the scale and nature of their missions. Capacity needs assessments, therefore, have to compare current capacity against the ideal requirements for mission delivery.

Civil society capacity building can be delivered from one organization to another, either vertically, through training and mentoring, or horizontally, through skill exchange and networking. In addition, the potential for civil society organizations at all levels to learn from the communities they serve should not be overlooked, especially given the wealth and diversity of traditional ecological knowledge that exists in the hotspot.

7.8.1 PNG

Over the last decade, the capacity of many of the most prominent domestic NGOs working on conservation in PNG appears to have decreased rather than increased, for example Conservation Melanesia, Melanesian Environment Foundation, PNG Centre for Research and Conservation Foundation, Pacific Heritage Foundation, Partners with Melanesia, and Village Development Trust. It will be useful to explore the problems encountered by these organizations, in order to learn from the experience. According to one school of thought, biodiversity conservation in PNG has been compromised by large INGOs, whose approaches have ignored generations of conservation practice through the customary means and whose presence has impeded the development of a truly local conservation movement (Barry 2003). According to this view, domestic NGOs have a better understanding of the ways and values of people, which have enabled them to conserve the country's biodiversity since the first human settlement (Barry 2003).

7.8.2 Solomon Islands

Local community members are generally well motivated to address conservation issues relevant to their lives, hence CBOs typically do not lack a pool of keen volunteers. What they often require, however, is capacity building in the technical skills necessary to establish and to maintain biodiversity conservation activities (D. Boso verbally 2012). Specific skill requirements vary from CBO to CBO, according to the nature of the issues they are addressing, but typically include: leadership skills; management skills; conflict-management skills; fundraising and financial management acumen; networking skills; ability to liaise effectively with provincial government; and good knowledge of local biodiversity conservation issues. CBOs also require funding to implement activities, and ideally this should be self-generated, to ensure sustainability. It may be necessary for CBOs to provide some of their members with stipends to perform key functions on a part-time or full-time basis, such as community conservation wardens, biodiversity monitors, or community educators. Boats, trucks, diving gear and computers, for example, may also be necessary, depending on the nature of conservation activity.

Strengthening of national civil society organizations that support and network CBOs is an obvious necessity. These organizations include NGOs, church groups and, potentially, private sector groups, such as diving operators and farmers associations. National civil

society organizations in the Solomon Islands have a variable record of success, which can largely be attributed to differences between organizations with regard to quality of leadership. Good leadership, however, has to be supported by capable staff members, who in turn have to be offered attractive remuneration. Human resources development at the national level often includes skills in community mobilization, such as facilitation of participatory processes enabling communities to formulate, implement, manage, monitor and evaluate their own development plans.

A recent analysis by Upton (2006) identifies a list of strengths needed by national civil society organizations if they are to be effective at building CBO capacities: committed, well informed governance board; strong management leadership; long-serving, capable staff; good information management and storage system; well managed finances; and legitimacy. Fortunately, these are not uncommon to civil society organizations in the country. However, scrutiny of existing capacities, as extracted from the DSE (2008) database, indicates an absence of key organization skills, as well as technical skills specific to biodiversity conservation. These include budgeting, international fundraising, strategic planning, wildlife identification, biodiversity research, natural resource and public policy analysis, establishment of financing mechanisms, and application of forest carbon finance and markets.

National and international civil society organizations have an important role in facilitating relations between provincial government and CBOs during the establishment of community-based conservation areas. However, not all provincial governments have actually established offices for themselves in the provinces (M. Wairiu verbally 2012). This hinders CBOs wishing to access local government assistance. Going forwards, a key ingredient in successful community-based conservation approaches will be strong provincial government support. Additional technical assistance from national and international civil society organizations will continue to be required, particularly for such activities as research, habitat management, invasive species management, monitoring and evaluation.

Sharing of resources, particularly human resources, among civil society organizations can be helpful, not only by filling in skills gaps but also by generating income for civil society organizations. The DSE database of 2008 recorded human resources available for sharing across civil society organizations: often for a fee. The most frequently offered skills were: leadership training; financial management, book keeping and accountancy; good governance; peace building and conflict resolution; participatory techniques; and forestry and agriculture (DSE 2008). This list is an indicator of what civil society organizations in the Solomon Islands consider as their needs for capacity building. High on the list are leadership training and financial management.

7.8.3 Vanuatu

Vanuatu's NGOs operate in a challenging environment of uncertain, inadequate finances, high staff mobility, lack of appropriate volunteers for governing boards, and increasing expectations from government and local communities. Like their counterparts elsewhere in the hotspot, domestic NGOs in Vanuatu are continually challenged with attracting

finance and capable staff. When locally available human resources do not match their requirements for technical skills, domestic NGOs often seek them through international-volunteer-placing organizations, at least seven of which already work in the country: Australian Business Volunteers; AVI; AYA; JOCV; Peace Corps; VSA; and VSO (VANGO 2011). Shortage of skills and human resource capacity is typically linked to lack of funding. NGOs usually offer less competitive salaries than other sectors. Consequently, they suffer from high staff turnover, losing employees to private sector or international organizations for more attractive remuneration packages and longer-term positions. The short-term project funding typically available to domestic NGOs restricts their ability to retain experienced staff for long periods, to maintain continuity of project activities on the ground, or to meet their core organizational running costs (rent, utilities, administrative staff, etc.). It also makes it difficult for organizations to develop their programs in a strategic way, or to properly evaluate and reflect on the results of their activities, as they are constantly under pressure to secure new grants and commence new activities.

CBOs have made significant contributions to biodiversity conservation in Vanuatu working under their own initiative and with locally available resources. Their achievements include establishment of individual community-managed conservation areas (Table 23). Although these achievements are impressive, effective biodiversity conservation at national scale will require larger, continuous areas to be designated spanning multiple land and resource owning groups. National and international NGOs and provincial governments will be needed to facilitate the necessary coordination among local communities to take conservation area networks to scale. Delivery of the necessary coordination at the national and provincial levels and support to CBOs at the local level will require well managed NGOs that have credibility not only with other NGOs but also with the private sector, government and donor agencies.

The need for capacity building to achieve this for its NGOs and CBOs members is well recognized in the current strategic plan of VANGO (2011). Revitalized from near collapse as recently as 2009, VANGO recognized from painful experience the need to build capacity for long-term sustainability in Vanuatu's civil society sector. To strengthen NGO effectiveness through good governance and partnerships, VANGO identifies five areas to focus on: information sharing; building capacity; strengthening key relationships; advocacy; and volunteerism (VANGO 2011).

7.9 Networks and Partnerships

Beyond organizational capacity and financial resources, the key capacity needs of civil society organizations in the East Melanesian Islands Hotspot, identified by them during the ecosystem profiling process, relate mainly to specific biodiversity conservation skills and strategies for engaging with national and regional policy processes. Fortunately, the civil society organizations in the hotspot are able to access the services of several regional institutions and networks of which their countries are members.

These include:

- The Pacific Invasives Learning Network, which brings members together to share experiences and skills in invasive species management, and empowers them through linking them to technical information and skills.
- The Pacific Invasives Partnership, which is a partnership of conservation NGOs, regional government bodies, and agencies of the New Zealand and US Governments aiming to strengthen the capacity of Pacific Island Countries and Territories to effectively manage invasive species threats.
- The LMMA Network, which is a regional network of conservation practitioners working on LMMAs across Southeast Asia, Micronesia, Polynesia and Melanesia, which collaborate for capacity building, collective learning and understanding the conditions under which LMMAs can contribute to conservation.
- The Coral Triangle Initiative Network, which is a partnership of governments, INGOs and funding bodies, to coordinate marine conservation initiatives in the Coral Triangle.
- SPREP, which facilitates cooperation and information sharing among Pacific islands countries, particularly with regard to implementation of the Convention on Biological Diversity.

As well as being a source of technical skills and information, the regional institutions and networks outlined above also provide forums for networking among civil society organizations, which can lead to collaborative actions or exchange of skills and knowledge. There are also a variety of networks at national and sub-national level that involve civil society organizations with a focus on biodiversity conservation, and these are described in the following sections.

7.9.1 PNG

The range of skills and breadth of the geographic coverage of the civil society organizations listed in Appendices 5 to 7 suggests that, with appropriate networking and partnership arrangements among them, the major requirements for civil-society-led conservation actions could be met throughout much of the PNG islands region. Networking, however, often relies upon personal relationships, and these can be difficult to maintain in a context of high turnover of staff. This comes back to the issue of civil society organizations not having sufficient (or any) long-term funding to meet their core operational costs and retain experienced staff.

7.9.2 Solomon Islands

Appendices 8 to 10 provide an indication of the types of local and national networks that civil society organizations in the Solomon Islands are part of. Networking and partnerships with other civil society groups and with government institutions are generally weaker among domestic civil society organizations than among INGOs. One exception to this pattern is SIDT, and its success is illustrative. SIDT is the oldest and most successful national NGO in the Solomon Islands (M. Wairiu verbally 2012). Its

network partners include: the media, which give it space for advocacy, awareness raising and publicity; the regional NGO Foundation of the Peoples of the South Pacific International (FSPI), which gives it access to international expertise when needed, assistance with raising funds from international sources, and advice on governance and management problems when these arise; and key national NGOs and faith-based groups, including the Solomon Islands Christian Association (SICA), which provides it with a wide base of support and services to draw from.

National NGOs can benefit from supportive mentoring relationships with international civil society organizations. Existing networks include: USP, which supports the Solomon Islands LMMA (SILMMA) network and ECANSI; CBC at AMNH, which supports SICCP; and various Australian and New Zealand universities, which have been invited to provide assistance with particular projects.

As discussed in Section 7.9.3, achieving effective biodiversity conservation at scale will require networks among local communities spanning multiple resource owning units. This will require coalitions of CBOs across and, even, between provinces. The facilitation of such CBO networks is a challenge for civil society and government. In the Solomon Islands, however, some examples already exist, from which lessons can be learned for replication elsewhere. These include: the Lauru Land Conference of Tribal Chiefs, facilitated by TNC, which covers the whole of Choiseul Island; and the SILMMA network, coordinated by the Fisheries Department with support from USP, which is national in scope.

7.9.3 Vanuatu

The tight financial budgets of government departments and the problems NGOs encounter at the community level have compelled the two groups to work more closely together for their mutual benefit. One example is the NGO Reef Check Vanuatu, which focuses on coral reef monitoring and which has extended its work to include community awareness. Reef Check Vanuatu has signed an MoU with the Fisheries Department, which agreed to host it. Having a government department's official support eases acceptance of the NGO by local communities. In return, Reef Check Vanuatu has agreed to forward all information it collects from its coral reef monitoring activities to the Fisheries Department, making it available to the government for the development of policies and management plans.

Among themselves, Vanuatu's NGOs network closely, in a variety of *ad hoc* and more structured ways, especially when sharing of skills is necessary. For example, Wan Smolbag Theatre and Foundation of the Peoples of the South Pacific Vanuatu collaborate over several programs, particularly those targeting youth, to leverage their complementary skills. The potential for networks and partnerships involving NGOs and private sector organizations is largely untapped, although a few examples do exist, particularly in the tourism sector. The work of the Vanua-Tai community volunteers for the conservation of marine turtles in Vanuatu is a good example of a domestic civil society organization (Wan Smolbag Theatre) engaging a private company (Positive Earth

Organisation Bungalows) to publicize and support conservation by local communities. Partnerships and exchanges between conservation NGOs and private sector companies can also help identify sources of long-term funding for community-based conservation initiatives.

7.10 Investment Types and Modalities

From the analysis in this chapter and the results of the stakeholder consultations carried out as part of the ecosystem profiling process, it is clear that local communities and their organizations must be the agents of conservation action at the ground level, if it is to be effective, and socially, politically and financially sustainable into the long-term. Nevertheless, many individual resource owning units are, by themselves, too small to sustain the species populations, habitats and ecosystem services for which they are important. This requires linking together multiple units to establish conservation areas of sufficient size that they are ecologically viable and resilient to the effects of climate change. While it may be tempting to invest directly in multiple CBOs to maximize impact, there are several strong reasons to suggest that this may not be successful.

First, most CBOs in the hotspot are not formally registered, do not have bank accounts and, in case, lack the capacity necessary to comply with donor's requirements for financial management and reporting. Second, the processes of running a "modern" (i.e. non-traditional) organization that requires formal meetings, minutes and financial reports is alien to many village-based CBO members and cannot quickly be learned. Third, if neighboring CBOs are required to work together directly, the challenges of cross-clan cooperation may be too great to overcome, due to differences in language and culture, as well as lack of trust, between clans; a series of parallel relationships with a national NGO or other "outside" partner may be a more workable arrangement. Finally, the need for conservation activities in an area where biodiversity is still abundant may not be easy to appreciate by a local community not exposed to the devastation of the natural environment that has occurred elsewhere.

Consequently, it may be of benefit for conservation funders, including CEPF, to affirm and strengthen the roles that CBOs at are already good at and that can be sustained with locally available resources, and not ask them to take on responsibilities too far beyond that.

Strong domestic NGOs can be the conduit of international funding and other resources to CBOs, together with knowledge, research capacity and innovative techniques provided by INGOs or regional institutions. Domestic NGOs can act as mentors for CBOs: advising them on their work, as well as monitoring the health of their organizations and the impacts of their activities. INGOs, in turn, may mentor domestic NGOs, depending on the needs of the latter.

As well as strengthening individual civil society organizations, it will also be necessary to encourage and strengthen networking and partnership formation among them, so that they can leverage each other's capacities for a more effective conservation movement at local,

national and regional levels. For example, several NGOs with complementary expertise in agriculture, social analysis, land use and biodiversity conservation may form a coalition to serve a network of CBOs covering a series of contiguous conservation areas. Nodal organizations to facilitate sharing of skills and expertise, such as DSE in the Solomon Islands, can be very useful in this regard.

The mission statement of Coalition for Education Solomon Islands is a useful example of what a civil society network for conservation could be set up to do. The members of the coalition meet regularly and collaborate to produce deeper analysis on education issues, build capacity, conduct advocacy campaigns, contribute to education policy formulation, and network with other actors nationally and regionally (DSE 2008).

8. CLIMATE CHANGE ASSESSMENT

8.1 Introduction

National and regional awareness of the potential impacts of climate change and variability on communities, natural resources and the environment has increased considerably since the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro in 1992. Climate change and variability are predicted to cause severe impacts in the East Melanesian Islands Hotspot, partly due to the dependence of much of its population on natural resources sensitive to climate change, and the vulnerability of its coastal populations to sea-level rise. The last five years have witnessed governments developing policies and plans to mitigate and/or adapt to the adverse impacts of climate change at local, national and regional levels, in the anticipation of mobilizing much needed resources outside their own budgets.

This chapter briefly outlines the main climate change and variability issues relevant to biodiversity conservation in the East Melanesian Islands Hotspot, and describes how these can be taken into account by conservation strategies. The chapter is based upon a specially commissioned thematic study, based on a review of the most pertinent literature from the last 20 years of climate change research in the Pacific and globally, complemented by consultations with key stakeholders from government, NGOs, CBOs and private sector organizations in the three hotspot countries. The draft findings of the study were shared with government representatives from the hotspot countries during the 10th International Conference on Southern Hemisphere Meteorology and Oceanography in April 2012, with experts from eight Japanese universities at a meeting of the Japan Council for Conservation of Biodiversity in the South Pacific Area, also in April 2012, and with civil society stakeholders from across the hotspot during the consultation meetings held between January and May 2012. Feedback from all of these consultations was incorporated into the final report.

8.2 Climate Change and Variability

8.2.1 Greenhouse Gas Emissions

In compliance with the UNFCCC and the accompanying Kyoto Protocol, the countries of the East Melanesian Islands have, since 1997, applied the methodology of the Intergovernmental Panel on Climate Change (IPCC) to inventory GHG emissions and identify major sources, both anthropogenic and natural. GHG emissions are mostly from: burning fossil fuels (i.e. coal, oil and gas); decomposition of biomass (e.g. during deforestation and other land-use change); and release of gases, principally methane, by ruminant animals.

Based on 1998 data for 12 Pacific island countries, including those in the East Melanesian Islands, per capita emissions by the energy sector averaged less than 1 metric ton of CO_2 per year. The comparable global figure for 1996 was 4 metric tons of CO_2 per capita per year. Thus, per capita and (because of the small total population) aggregate emissions of CO_2 from the energy sector of the East Melanesian Islands are both very low by global standards.

GHG emissions from land use, land-use change and forestry (LULUCF), due mainly to commercial logging and plantation agriculture, are also significant. The Government of PNG (2000) estimated that annual LULUCF emissions from the country as a whole totaled 82 to 99 million metric tons (Mt) of CO_2 equivalent, representing 95 percent of PNG's current emissions. However, the first National Communications Reports to the UNFCCC from the Government of the Solomon Islands (2001) and the Government of Vanuatu (1999b) both reported LULUCF emissions less than 1Mt of CO_2 per year.

It is expected that more current data on GHG emissions will become available for the hotspot countries when they complete their second National Communication Reports to the UNFCCC during 2012.

8.2.2 Observed and Projected Changes in Climate

There is strong regional (Australian Bureau of Meteorology 2007, 2011; SPC 2011) and global scientific evidence (Metz *et al.* 2007, Parry *et al.* 2007, Solomon *et al.* 2007) that there is warming of the climate system, which is now evident from observations of the increase in global average air and ocean temperatures, widespread melting of snow and ice, and rising sea level.

In 2001, the IPCC Third Assessment Report (Houghton *et al.* 2001) concluded that global mean temperature has increased over the last 100 years, and that there is new and stronger evidence that most of the warming over the last 50 years is attributable to human activities. It was noted that the 1990s were the warmest decade in the last 100 years, at least in the northern hemisphere. Other observations consistent with the observed warming included increases in global average sea level and ocean heat content, and decreases in snow cover, glacier ice and sea ice. In 2007, the IPCC Fourth Assessment

Report (Parry *et al.* 2007, Solomon *et al.* 2007) reaffirmed that global warming has taken place over the 100 years, as a result of high confidence in the new data and information that had been generated, and attributed the observed warming due to human activities.

Studies carried out in the Pacific region, especially in PNG, the Solomon Islands, Vanuatu and Fiji, confirm that global patterns in climate change are mirrored at the regional level, and that climate change and variability are expected to have adverse impacts on people and natural resources (Holthus *et al.* 1992, Kay *et al.* 1993, Nunn *et al.* 1994a,b, Hay and Sem 2000, Hay *et al.* 2003). For example, there are now more intense and longer droughts observed in these countries. Research by the Australian Bureau of Meteorology (2011) in the East Melanesian Islands shows trends of temperature increase of approximately 1ºC on land and up to 0.6ºC in the oceans over the last 15 years.

Globally, sea levels have risen by an average of 1.8 millimeters per year over the last 100 years, increasing to an average of 3.1 millimeters per year between 1993 and 2006. Thermal expansion and the melting of glaciers and ice caps are major contributors to sea-level rise. Observations from the East Melanesian Islands (Australian Bureau of Meteorology 2011) are consistent with the global trend, although the rate of sea-level rise for the hotspot is higher than the global average, at around 5 to 7 millimeters per year.

Climate variability coupled with climate change poses a great challenge to the East Melanesian Islands region (Sem *et al.* 1996, Kaluwin and Hay 1998, Hay *et al.* 2003). This variability ranges over many times and space scales, from small-scale weather phenomena, such as localized thunderstorms, to large-scale features, such as low pressure weather systems, to more prolonged features, such as droughts and floods. Longer-lived climate phenomena are often associated with changes in the atmospheric circulation that encompass a larger area, such as the Pacific Decadal Oscillation, ENSO, the South Pacific Convergence Zone (SPCZ) and the Inter-tropical Convergence Zone (ITCZ).

One of the dominant features of atmospheric circulation in the southwest Pacific is the SPCZ, whose location varies systematically with ENSO-related expansion and contraction of the West Pacific Warm Pool (an area of low primary production found in PNG and Solomon Islands waters); these movements result in large rainfall anomalies in the East Melanesian Islands on inter-annual and decadal time scales (Kaluwin *et al.* 1998, Salinger 2001).

The drivers of climate change and variability in the East Melanesian Islands have significant impacts on the sustainability of the communities and their resources. This is quite evident in the Solomon Sea and its atoll communities. Of particular concern is the vulnerability of atolls and their human communities to extreme precipitation events. The strongest tropical cyclones tend to develop when La Niña conditions are persistent, leading to flooding in of low-lying islands and communities. However, the relative influences on ENSO and the other strong signals, such as the SPCZ, on the precipitation regime of the East Melanesian Islands are as yet not well understood (Kaluwin and Hay 1998, Salinger 2001).

The remainder of this section summarizes projected impacts of climate change and variability on the Pacific region as a whole and the East Melanesian Islands Hotspot in particular. It is based upon analyses such as the IPCC Fourth Assessment Report (Metz *et al.* 2007, Parry *et al.* 2007, Solomon *et al.* 2007), Japanese and Australian government-funded studies for the Pacific island governments (Hay *et al.* 2003, Australian Bureau of Meteorology 2007, 2011), and a number of specific reports on climate change impacts and vulnerabilities in the marine ecosystems of the Pacific region (Lehodey *et al.* 1997, Reid *et al.* 2010, SPC 2011). It should be noted that there are significant differences (and, hence, apparent inconsistencies) among the predictions made by different models, due their different scales and the lack of information at global and regional levels.

All models are heavily dependent upon data of sufficient quality and reliability, and collected over a suitable timeframe. Moreover, most models do not include uncertainties in climate-carbon-cycle feedback nor do they include the full effects of changes in ice sheet flow, due to lack of data. The models used by the IPCC (Solomon *et al.* 2007) and Pacific reports (Australian Bureau of Meteorology 2007, 2011) have predicted that average temperatures will increase by 0.4 to 1.0ºC by 2030. With increases of this magnitude, thermal expansion alone (i.e. not accounting for melting of glaciers and icecaps) would lead to 0.3 to 0.8 meters of sea-level rise by 2030. Thermal expansion could continue for many centuries, however, due to the time required to transport heat into the deep oceans. GHG emissions above the current rates would cause further warming and induce many changes in global climate system during the 21st century that would likely be larger than those observed to date. Even if GHG concentrations were stabilized by 2100, anthropogenic warming and sea-level rise would continue for centuries due to the timescales associated with climate processes and feedback.

Increases in atmospheric CO_2 concentrations will lead to increasing acidification of the ocean. Ocean acidification will continue to increase and affect health of reefs, irrespective of changes in sea surface temperatures. It is very likely that hot extremes, heat waves, and heavy precipitation events will become more frequent in the hotspot. A range of models have indicated it is likely that future tropical cyclones will become more intense, with higher wind speeds and heavier precipitation, due to increases in tropical sea surface temperatures. There is an increase in intensity of cyclones in the Solomon Sea region. Storm surges, large waves, spring tides and low pressures continue to impact terrestrial and marine resources and human communities. Long-term and short-term drought is becoming persistent in the Pacific region, particularly on atolls but also on the high islands of PNG, the Solomon Islands and Vanuatu.

8.3 Potential Scenarios of Future Climate Change and Climate Variability

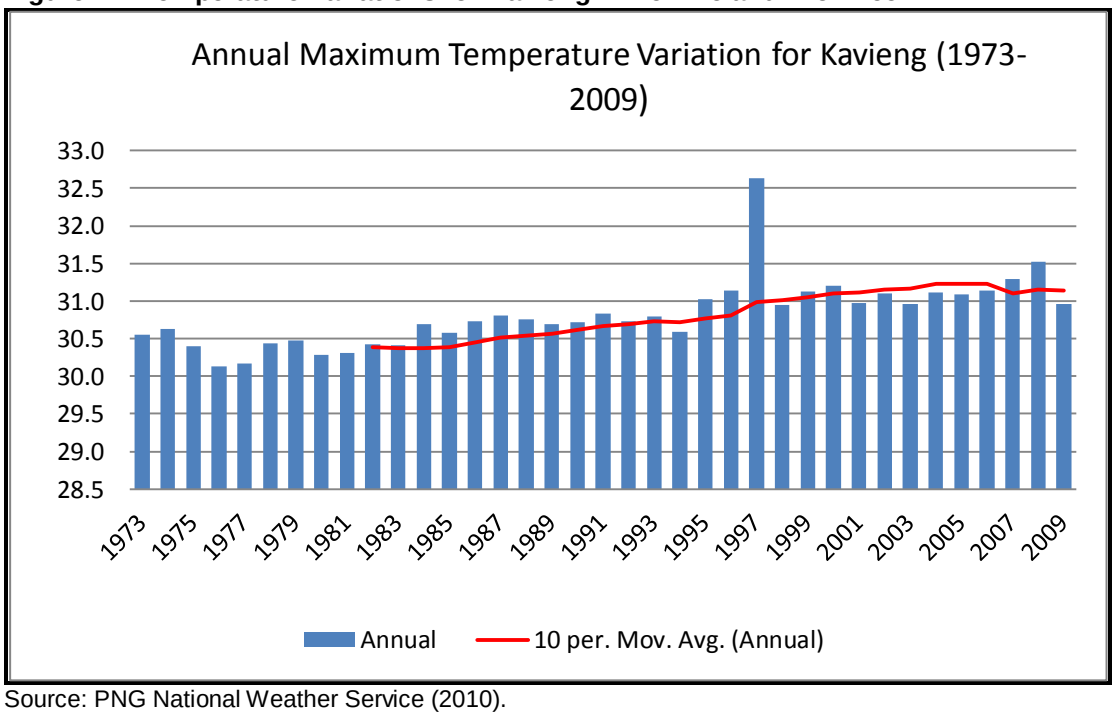
The impacts of global climate change can be best described in terms of their effects on the biophysical and human systems in the East Melanesian Islands Hotspot countries and their neighbors (Hay and Sem 2000, Hay *et al.* 2003, Australian Bureau of Meteorology 2011). Climate change can affect both long-term climatic conditions and extreme weather events, by changing the temperature, wind, rainfall and wave climate. These direct effects

can contribute to the incidence of drought, fire and other biological and natural hazards. The combined effect of GHG-induced climate change and sea-level rise can contribute to coastal erosion, flooding, salinization of soil and saltwater intrusion into lagoons and groundwater lenses. The quantity and quality of available water supplies can affect forestry, agricultural activities, fisheries production and human health. Any changes in ocean circulation and upwelling could affect the fish populations and catch. Tourism, a very important economic activity in the East Melanesian Islands region, could be affected through beach erosion, loss of land and degradation of reef ecosystems, as well as through changes in seasonal rainfall patterns.

8.3.1 Temperature

The IPCC Fourth Assessment Report (Solomon *et al.* 2007) and research by Australian Government (Church *et al.* 2010, Australian Bureau of Meteorology 2011) project a global average temperature increase in the order of 1.5 to 4.5°C and an accompanying sea-level rise of between 150 to 950 millimeters by the year 2100, based on different emissions scenarios. There is also evidence that the ENSO and SPCZ phenomena will have a major influence on changes and variability in atmospheric and sea surface temperatures in the East Melanesian Islands Hotspot. Figure 12 shows the results of National Oceanographic and Atmospheric Administration (NOAA 2011) measurements of sea temperatures between Solomon Islands and PNG during the period from 1986 to 2000, indicating that El Niño episodes cause warming of approximately 1 to 2°C at depths below 150 meters. Such warming, if it became more frequent or intense, could have significantly impacts on the marine biodiversity of the hotspot.

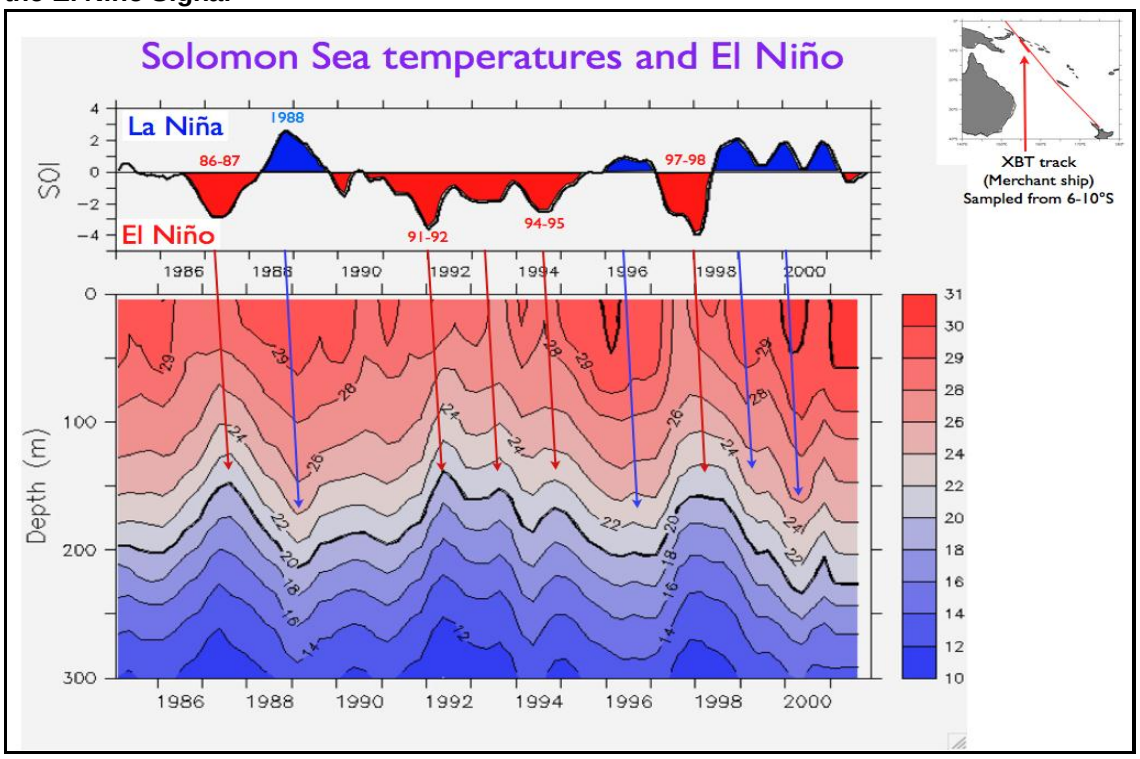
Figure 11: Temperature Variations for Kavieng in New Ireland Province



Source: PNG National Weather Service (2010).

Analyzed data from 34 weather stations in the western Pacific show that surface air temperatures increased during the 20th century at rates well in access of the global average, with the greatest increases in the zone southwest of the SPCZ in the East Melanesian Islands (Kaluwin and Hay 1998, Salinger 2001). Compilation of data by New Zealand's Institute of Water and Atmospheric Research (Salinger 2001) and recent data by PNG National Weather Service (2020; see Figure 11) and NOAA (2011; see Figure 12) shows a significant change in the climate of the East Melanesian Islands since the mid-1970s.

Figure 12. Temperature and Depth Profile in the Solomon Sea, Showing the Influence of the El Niño Signal



Source: NOAA (2011).

The records also indicate that rainfall has increased in the northeast and decreased in the southwest of the Pacific. Interannual variations in temperature and rainfall were found to be associated with ENSO resulting in water shortages and drought in PNG, the Marshall Islands and Fiji. Research also found that an eastward movement of the SPCZ had taken place, and that the climates of PNG, the Solomon Islands and Vanuatu had all become drier. These changes are considered to be consistent with anthropogenic activity.

When extrapolated, the temperature trends for the last 50 years in the East Melanesian Islands suggest future temperature increases in the hotspot, which may have significant effects on marine and terrestrial biodiversity. The need for research and better understanding of the way in which ecosystems will be impacted by these changes is needed, to develop appropriate adaptation measures.

8.3.2 Sea Level

The "best estimate" of sea-level rise, as projected by a mid-range IPCC scenario 2A (Solomon *et al.* 2007), is a rise of about 50 millimeters by 2100. Current observational data indicate a regional average sea-level rise of about 20 to 30 millimeters, which is not far from the business-as-usual scenario (Australian Bureau of Meteorology 2011). At present, little can be said with any certainty about regional or national-scale changes attributable to such scenarios of sea-level rise.

Table 24: Recent Trends in Sea Level Based on SEAFRAME Stations in the East Melanesian Islands Hotspot

Location	Latitude / Longitude	Period of Measurement	Trend (millimeters per year)
Vanuatu	17°45'19.2"S / 168°18'27.7"E	Jan 1993 to Mar 2011	+3.3
Solomon Islands	9°25'44.1"S / 159°57'19.3"E	Jul 1994 to Mar 2011	+4.8
PNG (Manus Island)	2°2'31.5"S / 147°22'25.6"E	Sep 1994 to Mar 2011	+6.3

Source: Australian Bureau of Meteorology (2011).

Globally, sea levels rose by an average of 3.1 millimeters per year between 1993 and 2006. However, data compiled from the tide gauges managed by the Australian National Tidal Centre in South Australia from 1992-2012 (Australian Bureau of Meteorology 2007, 2011) show accelerated rates of sea-level rise across the East Melanesian Islands Hotspot (Table 24). The cause and duration of this variation is unknown but it is likely to be related to ENSO (Australian Bureau of Meteorology 2011).

8.3.3 Tropical Cyclones

Global climate models currently suggest that a doubling of CO_2 concentrations will increase sea-surface temperatures in the central equatorial Pacific by 1°C and increase rainfall intensity. Although the IPCC Second Assessment Report (Houghton *et al.* 1996, Watson *et al.* 1996) and research by the Australian Bureau of Meteorology (2011) did not reach a consensus regarding tropical cyclones in a changed climate regime, recent research has indicated a possible increase in intensity of 10 to 20 percent, with a doubling of CO_2 concentrations. A great deal of international effort has enabled the identification of seasonal and interannual trends in oceanic conditions but scientists are not yet in a position to identify long-term trends in temperature and salinity. According to the statistics on tropical cyclones between 1940 and 1994, the average number of tropical cyclones per year was seven.

Changes in frequency, area of occurrence, time of occurrence, mean intensity and the maximum intensity of the tropical cyclone cannot be predicted by present statistical models. However, tropical cyclones usually take place between latitudes 8°S and 20°S and longitude 145°E and 125°W. The probability of occurrence reaches a maximum near 8°S and decreases with increasing latitude. During an ENSO, a tropical cyclone has more

than a 40 percent probability of being severe. The IPCC (Houghton *et al.* 1996, Solomon *et al.* 2007) concludes that it is very much open as to whether the frequencies, area of occurrence, time of occurrence, mean intensity or maximum intensity of tropical cyclones will change as a consequence of global warming.

Recent variations in frequency and intensity of tropical cyclones over the tropical Pacific Ocean and surrounding land areas are related to the fact that since the mid-1970s warm ENSO episodes (El Niño) have been relatively more frequent or persistent than the opposite phase (La Niña). Because the ENSO phenomenon is the primary mode of climate variability on short timeframes (two to five years), the present large interannual variability in rainfall associated with ENSO is likely to mask any effects attributable to global warming.

8.3.4 Coastal Zones

Most of the East Melanesian Islands have a large ratio of coastline to land area, hence are disproportionately affected by climate change impacts in their coastal zones. Moreover, a majority of the human population of the hotspot lives within 1 kilometer of the sea. Under the most likely scenarios for future climate change, human pressure on coastal ecosystems will be exacerbated by increased storms, sea-level and wave action. The most significant impacts are expected to include: damage to and loss of mangroves, coral reefs and other habitats; declines in populations of clams, reef fish and other marine organisms; and displacement of human communities inland, with subsequent conversion of natural vegetation. There have been reports of land losses from the Solomon Islands, Vanuatu and the PNG islands region due to rising sea levels (Duguman 2010).

8.3.5 Agriculture

Agriculture remains a major socio-economic activity in the hotspot. Under likely scenarios of climate change, traditional crops will be affected, placing heavy reliance on imported foodstuff. This will have implications for changing agricultural systems, as new crops are introduced that are better suited to the altered climatic regime. Storm surges and inundation of seawater on atoll islands and coastal areas will damage staple agricultural crops and make land unsuitable for agriculture. Increased temperatures will cause heat stress on many agricultural plants and could lead to drought, particularly during the dry season. On the other hand, increased concentrations of CO_2 are expected to stimulate growth of many crops, except for sugar cane and maize. More research is needed on the effects of climate change and sea-level rise on agricultural food crops in the East Melanesian Islands. Preliminary research in this area is being conducted by the agriculture departments of the three hotspot countries, with support from the EU. This work has already demonstrated promising preliminary research, for instance on the application of drought-resistant crops.

8.3.6 Social and Economic Dimensions

The IPCC assessment of the social and economic dimensions of climate change (Carter *et al.* 1994, Watson *et al.* 1996) makes little specific reference to the East Melanesian Islands or to the Pacific islands in general; all islands are treated as if they are the same. For the world as a whole, the IPCC (Metz *et al.* 2007) estimates a net loss of about 1.5 to 2.0 percent of global Gross National Product (GNP) under a scenario of doubling of atmospheric CO_2 concentrations. Developing countries, however, are estimated to face a net loss of 2 to 9 percent of GNP.

Global climate change has a number of social and economic dimensions in the East Melanesian Islands countries with implications for biodiversity conservation and social justice. These include that the hotspot countries make a small or negligible contribution to GHG emissions, yet they are among the countries which are most impacted, and that availability of relevant data and information is very low.

In spite of the pronounced vulnerability of communities in the East Melanesian Islands (particularly atoll communities) to climate change, large-scale migration of people between islands or between countries has not yet occurred. Perhaps the first example of climate-change-induced migration in the hotspot has been the relocation of people from the Carteret Islands to Bougainville, in response to sea-level rise, which has made the atolls increasingly uninhabitable. More than 40 families have already been supported to resettle in their new homes, with the introduction of new crops, plants and knowledge in management of marine biodiversity (Duguman 2010). However, under likely scenarios of climate change, this could be the first of many such relocations, placing additional population pressure on land and natural resources in the resettlement areas.

8.4 Climate Change Impacts on Biodiversity

The terrestrial ecosystems of the hotspot continue to be adversely affected by increasing temperatures, rainfall changes, the spread of weeds and pests, bush fires, commercial logging, shifting agriculture and sea-level rise. Higher sea surface temperatures, changes in ocean currents and changes in ocean chemistry combine to affect marine ecosystems. Impacts on natural ecosystems, in turn, affect the delivery of ecosystem services, such as water regulation and provisioning of food and fuel.

Data on the projected impacts of climate change on biodiversity in the East Melanesian Islands Hotspot were collated from a number of sources. Principal among these were a very useful baseline review of climate change vulnerability assessments for biodiversity in Melanesia (Leisz *et al.* 2009) and the first National Communications Reports to the UNFCCC by the three hotspot countries (Government of Vanuatu 1999b, Government of PNG 2000, Government of the Solomon Islands 2001).

Given the serious knowledge gaps that currently exist with regard to the ways in which global climate change will be manifested in the East Melanesian Islands Hotspot, and the impacts these will have on biodiversity, it is difficult to predict with a high degree of

certainty how the hotspot's biodiversity will respond to climate change, and what the most significant impacts will be. It is important to recognize that the current scientific capacity to understand and assess potential climate change impacts in the region has inherent limitations. Furthermore, global climate models are designed to project a range of broad-scale future changes in climate patterns over very large areas. While they are increasingly good at predicting how global or, in some cases, regional changes will take place, they are not sufficiently precise to predict changes on a local (e.g. island) scale. This limits their value as policy inputs for assessing and mitigating climate change impacts on biodiversity for any part of the world, and this is especially true for the East Melanesian Islands, due to its archipelagic nature. With this caveat, there is still much value in looking at global climate models in relation to the hotspot's biodiversity, as broad-scale changes are often reasonably clear, and can provide a meaningful context in which to critically assess how biodiversity will fare at local levels.

In addition, a number of recent reports and studies (Carter *et al*. 1994, Lehodey *et al.* 1997, Hay and Sem 2000, Agence France Press 2001, Hay *et al.* 2003, Dow and Downing 2006, Australian Bureau of Meteorology 2007, Solomon *et al*. 2007, Leisz *et al.* 2009) on the science of climate change and variability impacts and vulnerability assessments on the biodiversity in the Pacific have been qualitative in nature. However, there remains a need for detail investigations into the potential biodiversity impacts of climate change, in the context of other ongoing anthropogenic pressures in the East Melanesian Islands.

8.4.1 Biodiversity Vulnerabilities

Experiences from elsewhere (e.g. Metz *et al.* 2007) provide evidence that relatively modest climatic changes over the past century have already had significant impacts on a wide range of species, including altered global ranges and population sizes, changes in the timing of breeding and migration, length of growing season, and pest and disease outbreaks (Bezuijen *et al.* 2011). Likely future changes may include the movement of individuals to higher latitudes or elevations, changes in the structure, composition and primary productivity of ecosystems, expanded ranges of some species, and the extinction of others (Bezuijen *et al.* 2011). Of particular concern is the potential for large, non-linear threshold responses, in which cascades of changes occur across ecosystems.

Climate change and variability in the East Melanesian Islands region are important factors in determining the past and future distributions of biodiversity. Cheung *et al*. (2009) reported that a changing climate regime will definitely have profound impacts on the species richness and overall biodiversity, including landscape, species diversity, ecosystems and genetic diversities. More resilient species will adjust to the changed conditions, while others may face local or global extinction. Overall, changes in the distribution and relative abundance of individual species, the composition of biotic communities and the delivery of ecosystem services are already occurring due to other human activities. Climate change impacts will not, therefore, occur in isolation but will compound and interact with existing pressures on biodiversity.

As the distributions of many terrestrial species are determined, at least in part, by the climatic conditions, changes in these conditions, even slight ones, can result in the distributions of species shifting. Shifting of plant species depends on successful dispersal into suitable environmental conditions, while shifting of animal species can occur through the movement of individuals. The archipelagic nature of the hotspot, with a low elevation range on many islands and large distances between them, makes it difficult for species distributions to "track" shifts in climate envelopes, either within or between islands.

The impacts of physical changes (i.e. changes in temperature, rainfall patterns, sea level, etc.), which are driven by global-scale processes, are likely to be significantly exacerbated by socio-economic changes (i.e. the response of human communities to climate change, including population shifts, changing agricultural practices and construction of new, climate resilient infrastructure). The combination of these physical and socio-economic changes is expected to significantly increase pressures on species and ecosystems within the East Melanesian Islands Hotspot. Predicted impacts on some of the most vulnerable species and ecosystems are summarized in the following sections.

8.4.2 Impacts on Marine Fishes and Coral Reefs

A recent report by the SPC (2011) provides extensive coverage on the vulnerability of Pacific fisheries to the impacts of climate change and variability. Studies on the impacts of climate oscillation on tuna fisheries in the Pacific Ocean have found that the tuna resource is very closely linked to the position of the West Pacific Warm Pool: an area of low primary production that overlaps with the East Melanesian Islands Hotspot (Lehodey *et al.* 1997, Hay *et al.* 2003). This is surprising, because tuna need to consume 10 percent of their body weight each day. The reason for this surprising association may be the positioning of the convergence zone along the eastern boundary of warm pool, where up-welling enables secondary production, which tuna feed on. Simulation studies indicate that this up-welling enables concentration of tuna in areas of otherwise low productivity. Changes to ocean currents and ENSO signals due to climate change will impact productivity and migration of tunas in the western Pacific region.

In addition to pelagic fishes, such as tunas, climate change is expected to have severe impacts on reef fishes, though coral bleaching and ocean acidification (Church *et al.* 2010, Reid *et al.* 2010, Australian Bureau of Meteorology 2011, SPC 2011). Even accounting for the significant level of uncertainty that attends regional climate projections, if the temperature and acidification conditions projected by the IPCC (Solomon *et al.* 2007) are close to accurate, corals and coral reefs will be severely stressed by the end of the 21st century, and phase shifts to algae-dominated reefs, or even degradation to rubble and sand, will be likely throughout the East Melanesian Islands. Over the long-term, it is likely that erosion of coral reefs from the combined impacts of coral beaching and acidification will exceed accretion rates. This loss of coral reef structure will be accompanied by changes in the structure of reef fish assemblages, with a reduction in species diversity, abundance, or trophic complexity (Sheppard 2006). Adult reef fishes may not necessarily be affected by loss of corals directly but by the loss of

prey associated with corals. This type of cascade effect can lead to the collapse of entire fish communities.

Ocean acidification may also negatively affect fish in their larval stages, leading to greater impact upon fish assemblage structure and abundances on reefs and related systems. Coastal human communities in the East Melanesian Islands are often heavily dependent upon resources associated directly or indirectly with coral reefs. Thus, it is likely that significant aspects of coral reef ecosystem function and services will decline or even, in some cases, be lost to communities and other human users.

It is very important to recognize that coral bleaching and/or ocean acidification effects on reefs will not operate in a vacuum. Any consideration of the effects of climate change upon reef fish diversity and abundance should also factor in additional impacts from other intrinsic and extrinsic factors. Intrinsic factors include over-exploitation of marine resources and destructive fishing practices. Extrinsic factors include pollution, poor land-use practices leading to sedimentation, and physical destruction (i.e. coral mining, dredging and storm effects). The interaction of these factors with the effects of climate change effect will influence extinction risk of individual species. Localized extinctions are expected to proceed at a pace matching the loss of coral reef habitat, coupled with increased pressure from exploitation and other factors (Reid *et al.* 2010).

8.4.3 Impacts on Mangroves

Approximately 50 percent of the global mangrove area has been lost since 1900, and 35 percent has been lost in the past two decades (Gilman *et al.* 2006). The Pacific islands, while containing only 3 percent of the global mangrove area, support unique mangrove community structures that provide valuable site-specific services and products (Gilman *et al.* 2006). Pacific island mangroves decline in diversity from west to east, and the East Melanesian Islands Hotspot has the highest global mangrove diversity and supports over 70 percent of the region's mangrove area.

Small-scale modifications to the physical structure of mangroves can lead to significant effects on the diversity and abundance of macro-benthic organisms in mangrove habitats (Skilleter and Warren 2000). Such modifications have the potential to cause cascading effects at higher trophic levels, resulting in deterioration in the value of these habitats as nursery and feeding grounds (Skilleter and Warren 2000). However, the responses of mangroves to global climate change effects other than sea-level rise, such as increased air and sea-surface temperatures, changes in precipitation and salinity, and changes in extreme weather events are not well understood (Gilman *et al.* 2006).

While mangroves are not expected to be adversely affected by projected increases in sea temperature, increases in air temperature have been shown to impact development, with temperatures above 35°C leading to thermal stress, which affects the establishment of seedlings. Also, decreased precipitation, resulting in increased salinity, can reduce the growth and survival of mangroves, and may lead to changes in species composition and diversity (James 2008).

Mangroves migrate landward as a natural response to a rising sea level. If this natural landward migration is not possible, for example because of the natural physiographic setting or due to the presence of seawalls or other obstructing infrastructure, the mangrove area reduces over time (James 2008). Global sea-level rise is projected to average 3 millimeters per year, whereas the rate in the East Melanesian Islands Hotspot has been measured at approximately 6 millimeters per year over the last two decades, which may reflect bias due to the short period of monitoring (Australian Bureau of Meteorology 2011). Mangroves could experience serious problems due to rising sea level, and those on low islands may already be under stress. By the year 2100, a reduction in area by as much as 13 percent of the mangroves distributed across the 16 Pacific island countries and territories (including the hotspot countries) where they occur naturally is possible (Ellison and Gilman 2004).

8.4.4 Impacts on Terrestrial Forests

Understanding of the complex interrelationship between forests and climate change in the East Melanesian Islands Hotspot is not well developed and thus is currently insufficient for informed policy-making and management strategies. However, the IPCC report (Solomon *et al.* 2007) projects that substantial changes are likely to occur under a scenario of a doubling of CO_2 concentrations. Watson *et al.* (1997) estimated that one-third (one-seventh to two-thirds, depending on the region) of the existing forested areas of the world will undergo major changes in broad vegetation types; the greatest changes are likely to occur in high latitudes, with minor changes in the tropics. Because the rate of climate change is likely to be faster than the rate at which trees grow, reproduce and re-establish themselves, species composition is likely to change. Research is needed to examine how climate change scenarios are likely to impact forests in the East Melanesian Islands Hotspot.

Extending the results of studies from other parts of the world to the East Melanesian Islands, it can be predicted that montane forests will be among the most vulnerable to climate change, in part because, being distributed near the tops of mountains, they have a limited altitudinal range to "shift" into. The high peaks in the PNG islands region are regularly enveloped by trade-wind-derived orographic clouds, resulting in the presence of unique and diverse floral assemblages (James 2008). These cloud forests are adapted to high precipitation and high winds, and their lower limits are determined by moisture availability, with clouds contributing up to one-third of the moisture budgets of these habitats (Bush *et al*. 2004). Climate change simulations suggest an upward shift in the cloud layer, which may exacerbate the effects of longer and more variable dry seasons in these areas (James 2008). Increases in air temperature associated with climate change implies increased evapotranspiration by vegetation which, in combination with reduced cloud contact, could lead to drying out of cloud forests, with serious implications for biodiversity (Still *et al.* 1999).

8.4.5 Impacts on Freshwater Ecosystems

Analysis of the available long-term precipitation data (which are limited to those from eight weather stations, mostly in lowlands) suggests no significant changes in the precipitation regime so far in the PNG islands region. However, projections of future precipitation for the East Melanesian Islands Hotspot by the Australian Bureau of Meteorology (2011) suggest that dry-season rainfall may decrease and ENSO-related prolonged drought events increase, with marked effects on stream discharge, both for base flow as well as total flow. Base flow may alter due to prolonged drought condition.

Water resources remain very critical for many of the islands of Vanuatu and the Solomon Islands. Most low-lying atolls in Manus, East New Britain and New Ireland provinces of PNG rely almost entirely on rainwater, with some storage capacity in the freshwater lens: a layer of freshwater that floats on saline groundwater. Even on high islands, changes in rainfall patterns, either forced by large interannual variations and ENSO, or by a changed climate regime, have contributed to severe shortages of water, which have restricted the growth of coastal vegetation (such as *Pandanus* spp.) and drought-resistant taro.

8.4.6 Impacts on Plant Communities

By modifying the patterns of temperature and humidity that generally delimit species' boundaries, climate change is predicted to result in shifts in species' distributions (Thuiller 2007). Many studies predict that climate change impacts will consist largely of shifts in latitudinal and altitudinal distributions (e.g. Hole *et al.* 2009). Most plant communities in the East Melanesian Islands will probably experience fine-scale shifts in species composition, depending on the tolerance of each species to the changes in climatic variables it is exposed to. Alterations in population size, species distribution, and the geographical extent of habitats and ecosystems, as well as an increase in the rate of species extinction and loss of biodiversity can be expected (Watson *et al.* 1997).

The ability of plant species to respond to climate change will largely depend on their ability to colonize new territory or modify their physiology and seasonal behavior. Species with broad climatic tolerances should be relatively resilient to change but species with narrow ranges may be shifted outside their climatic niche within only one or two plant generations (Bush *et al.* 2004). The ability of plants to "track" movements in their climatic niche could potentially be impeded by a range of factors, including habitat fragmentation, competition from invasive species or absence of a specific soil type or microbial community. The critical point here is that protection of intact continua of natural vegetation across environmental gradients, free from invasive species, will increase the resilience of plant communities.

Many studies predict that overall biodiversity in the tropics is likely to suffer more immediately from deforestation and forest degradation than from climate change (Thuiller 2007). This is likely the case in the East Melanesian Islands, where rates of habitat loss are rapid. However, deforestation and degradation also compounded the effects of climate change on plant communities by making them less able to adapt to

change. Therefore, climate change adaptation strategies for plant (and animal) communities must begin with habitat protection, and, if required, restoration.

8.4.7 Impacts on Animal Communities

Many of the East Melanesian Islands' terrestrial animal communities are potentially vulnerable to climate change, especially those that have limited distributions, are adapted to narrow altitudinal ranges, or have evolved symbiotic relationships with other species. Such species are more vulnerable than widespread species because they generally have smaller overall population sizes, and because their distribution gets smaller as their preferred climate niche increases in elevation, until the species eventually gets "pushed off" the mountain top. This last factor suggests that montane species are more vulnerable than lowland species inhabiting high islands, because they are less well able to "track" shifts in climatic conditions.

Birds are a unique category among terrestrial vertebrates since they include a large proportion on migrant species, which are potentially affected by climate change impacts outside of the hotspot. However, resident bird species are also predicted to be vulnerable to climate change, due to the restricted distributions of many species. In general, species that occupy lowland habitats and species with strong ability to disperse between islands, such as imperial pigeons (*Ducula* spp.), will be less vulnerable to shifts in the distribution of habitats than species with poor dispersal ability, restricted to small islands or montane habitats. Another potential impact on birds is increased mortality from diseases, such as avian malaria, whose spread may be facilitated by new climatic conditions. Numerous studies have demonstrated the susceptibility of native forest birds in Hawaii to avian malaria (e.g. Atkinson *et al.* 1995), and the birds of the East Melanesian Islands may have similar susceptibility to this or other diseases.

Many of the possible climate change-related dynamics discussed earlier for birds may apply to mammals. It is thought that climate change may present enhanced opportunities for non-native species to become invasive (Choat *et al.* 2006), which would increase competition for food resources and/or introduce new predation pressures on native mammal species. Similarly, viruses or other pathogens may exploit opportunities arising from thermal or precipitation changes, or existing diseases such as malaria may move into new areas. When combined with climate-stresses on animal physiology, this could increase the disease risks for the East Melanesia Islands' mammals (Leisz *et al.* 2009).

Patterns of climate change vulnerability of the hotspot's amphibians and reptiles are similar to those for other vertebrate groups. For instance, isolated and restricted-range species are at higher risk, for example Pomugu wrinkled ground frog (*Platymantis akarithymus*), whose known global range is restricted to three mountains in New Britain (Richards and Parker 2004b). If anything, because reptiles and amphibians have weak dispersal ability, compared with birds and bats, they may be the most vulnerable terrestrial vertebrates as a group. Nevertheless, based on current understanding of climate change, it is virtually impossible to predict impacts on particular species; all the more so

because study of distribution and diversity of the East Melanesian Islands' herpetofauna is in its infancy (Leisz *et al.* 2009).

A specific threat to marine turtles as a group is presented by temperature-dependent sex ratios. Elevated temperatures (such as are predicted under climate change models) are known to limit the hatching success of marine turtle eggs, and to skew the sex ration towards females. A similar issue makes crocodiles susceptible to temperature increases, although, in this case, high temperatures bias the sex ratio towards males (Woodward and Murray 1993).

Specific threats to amphibians are presented by their lifecycle, which comprises an aquatic phase and a terrestrial phase. Higher temperatures may desiccate eggs, while warmer waters would hold less oxygen, which may increase tadpole mortality and impact species that require cool water (Bickford *et al.* 2010).

Lastly, consideration of the possible impacts of climate change on insect communities is warranted, due to the significance of many insects for pollination and other ecosystem services. A recent study by Deutsch *et al.* (2008) concluded that warming in the tropics is likely to have a more serious impact on tropical insects because they are relatively sensitive to temperature change and are currently living very close to their physiologically optimum temperature. This implies that the greatest extinction risk to insects from global warming may be in the tropics (Deutsch *et al.* 2008).

8.5 Climate Change Initiatives Relevant to Biodiversity Conservation

8.5.1 International Agreements and National Frameworks

Over the last 20 years since the conclusion of the UNCED process, the signing of the UNFCCC and the integration of its programs with the Convention on Biological Diversity, the three hotspot countries have ratified these agreements and begun to implement them at the national level, albeit with many constraints. Since the overarching agreements signed in 1992, the hotspot countries have become party to a number of subsequent and subsidiary agreements, including the Kyoto Protocol, adopted in 1997, aimed at securing binding reductions in GHG emissions, and the Millennium Development Goals, adopted in 2000, which aim to encourage development by improving social, economic and environmental conditions in developing countries.

The governments of the hotspot countries have developed environmental laws and policies, together with national strategies, such as NBSAPs and National Adaptation Programs of Action, which provide a framework for responding to climate change at the national level (see Chapter 6).

Most importantly, governments, with support from partners in civil society and the international donor community, are providing a leadership role in supporting initiatives that address the impacts of climate change on biodiversity, such as community-based

conservation areas, conservation trust funds and applied research. For example, the establishment of the Mama Graun Conservation Trust Fund (MGCTF) provides a vehicle for channeling resources, including, potentially, global climate finance, to projects that conserve forests and other natural habitats, while ensuring the participation of and benefits for customary landowners.

The national response to climate change has been driven by a combination of global leadership, increasing national awareness of the issue, and a shift of focus by many international donors toward climate initiatives. The countries of the East Melanesian Islands Hotspot are all signatories of the Kyoto Protocol and the UNFCCC, which oblige member countries to develop and implement strategies to address climate change. Each hotspot country has a primary policy document, which outlines its strategy and responses to climate change, and a nominated focal agency and national committee (Table 25). National climate change policies are largely focused on human issues and make little direct reference to biodiversity. However, there are signs that this compartmentalization of biodiversity conservation and climate change may be changing. For example, the PNG government has recently adopted a 40-year strategic plan, whose fifth pillar (climate change and environmental sustainability) envisions sustainable development measures that benefit both biodiversity and local communities (Prime Minister and National Executive Council 2010).

Table 25. International and National Climate Change Frameworks in the East Melanesian Islands Hotspot

Country	CBD	UNFCCC	Kyoto Protocol	National Policy	National Committee	Focal Agency
PNG	1993	1995	2002	PNG Vision 2050	NCCC	DEC
Solomon Islands	1994	1993	2002	NAPA	NCCC	MECDM
Vanuatu	1993	1995	2003	NAPA	NCCC	MLNR

Notes: CBD = Convention on Biological Diversity; UNFCCC = United Nations Framework Convention on Climate Change; NAPA = National Adaptation Program of Action (under UNFCCC); NCCC = National Climate Change Committee; DEC = Department of Environment and Conservation; MEM = Ministry of Environment, Climate Change, Disaster Management and Meteorology; MLNR = Ministry of Lands and Natural Resources.

All hotspot countries are implementing the Pacific Islands Framework for Action on Climate Change 2006-2015 (SPREP 2011), which is linked to an earlier Pacific regional agreement, the Convention on Conservation of Nature in the South Pacific (commonly known as the Apia Convention) signed in 1976. However, the three countries are in the early stages of implementing climate change policies, and these are not yet well integrated into broader national policy frameworks. With the exception of the recently prepared one for the Solomon Islands, the current NBSAPs, for instance, make little mention of climate change.

8.5.2 Mitigation Projects

Reducing Emissions from Deforestation and Forest Degradation (REDD) is a mechanism that has potential to improve and sustain forest management in the East Melanesian

Islands and enhance the conservation of biodiversity in these countries. For example, the PNG Forest Authority has identified several potential REDD projects in Manus, New Ireland, East New Britain, West New Britain and Bougainville. International donors, including AusAID, TNC, USAID and WWF, have shown interest in the East Melanesian Islands as a region in which to develop potential REDD projects.

In the context of climate change in the East Melanesian Islands Hotspot and according to the Pacific Islands Framework for Action on Climate Change 2006-2015 (SPREP 2011), the term "mitigation" encompasses the following:

- Enhanced access to safe, secure, clean, efficient, and affordable energy supplies.
- Enhanced ability to engage in carbon market mechanisms including REDD and REDD+, as measures to reduce GHG emissions.
- Cost-effective renewable energy technologies available and local sources sustainable managed.
- Clean Development Mechanisms initiatives developed and implemented, where appropriate, to reduce GHG emissions.

In the East Melanesian Islands Hotspot, mitigation efforts are underway across most sectors of the urban and rural economy, and include: national GHG inventory and abatement strategies; Clean Development Mechanism initiatives for improving the efficiency of existing lighting and cooking technology; and renewable energy projects.

Among mitigation efforts underway in the hotspot, the most significant approach, in terms of its potential contributions to biodiversity conservation, is REDD. REDD is a mechanism that aims to create financial incentives for developing countries to reduce forest destruction, by creating a monetary value for the carbon stored in forests, which can be sold as carbon offsets to companies in developed countries. The three hotspot countries are members of the Rainforest Coalition, working with 45 other countries around the world to ensure REDD becomes part of global financing mechanisms for climate change mitigation after the Kyoto Protocol.

"REDD+" is a term referring to activities that build on REDD to deliver additional benefits, including enhancement of human wellbeing and biodiversity conservation. If successfully implemented, REDD investments could have significant positive impacts on the hotspot's forest ecosystems and biodiversity. Conversely, if REDD investments encourage plantations of non-native tree species or conversion of natural non-forest habitats to forest, they could have negative implications for biodiversity conservation.

In the marine realm, the concept of "Blue Carbon" was recently adopted by UNFCCC (in Durban in 2011), to ensure that investments in conserving coastal and marine habitats complement REDD and REDD+ investments in terrestrial forests, as well as enhance research and conservation programs.

All three countries in the East Melanesian Islands Hotspot have significant potential for avoided deforestation and degradation of forests, due to currently high rates of forest

degradation and loss. A number of climate change mitigation projects have already been implemented in the hotspot, of which several support biodiversity conservation goals (Table 26). However, these projects also include some with potential negative impacts on biodiversity conservation, particularly a project under the Clean Development Mechanism exploring the potential of hydropower development in PNG's West New Britain province.

Table 26: Active Climate Change Mitigation Projects in the East Melanesian Islands Hotspot Relevant to Biodiversity Conservation

Project Type	Donor	Amount (US$)	Timeframe	Details
REDD	WCS	20,000	2010-2015	Pilot project at the community level in Manus province. Planning and designing a REDD methodology
REDD+	CIFOR/USAID	30,000	2011-2012	Development of REDD+ policy for PNG
REDD	FAO/UNDP	8 million	2011-2016	UN REDD Readiness Project for PNG
REDD+	JICA	not available	2011-2014	National pilot project for voluntary certification.
REDD+	Pacific Rainforest Alliance and GTZ (Fiji)	20,000	2012-2013	REDD+ pilot project on Malakula Island, Vanuatu. Planning and design stages
Clean Energy	ADB, PNG Government and PNG Power	4 million	2011-2013	Clean Development Mechanism project for hydropower. Planning stages continuing in West New Britain
Clean Energy	Newcrest Mining Company	1 million	2000-2011	Clean Development Mechanism project for steam power on Lihir Island, New Ireland

8.5.3 Adaptation Projects

In the context of climate change, "adaptation" refers to human activities aimed at coping with the impacts of a changing climate. With specific regard to the East Melanesian Islands Hotspot, the term encompasses the following principles set out in the Pacific Islands Framework for Action on Climate Change 2006-2015 (SPREP 2011):

- Enhanced resilience to the adverse effects of climate change through the implementation of best practice adaptation and risk reduction measures.
- Improved access to equitable amounts of climate change financing at regional, national and community levels.
- Improved management and dissemination of equitable amounts of climate change financing at regional, national and community levels.

In the hotspot, adaptation projects are underway across most levels of government, as well as in the private sector. A selection of climate change adaptation projects directly relevant to biodiversity conservation are summarized in Table 27. A far greater number of adaptation projects are under implementation in the hotspot but, since they do not directly concern biodiversity, they are not considered further here.

Table 27. Active Climate Change Adaptation Projects in the East Melanesian Islands Hotspot Relevant to Biodiversity Conservation

Project Title	Donor(s)	Amount (US$)	Timeframe	Details
Climate Change and Agriculture	EU; Governments of PNG, Solomon Islands, Vanuatu	7 million	2011-2015	Responding to the impacts of climate change on agriculture and developing adaptation programs
Food Security in Pacific Islands	FAO	2 million	2007-2014	Addressing food security in the 14 countries of the Pacific Islands Forum, including the three hotspot countries
International Climate Change Adaptation Initiative	AusAID; Governments of the Pacific Islands Forum countries	20 million	2010- 2013	Developing and improving the understanding of climate change science in the Pacific region. Application of adaptation projects for coastal zones and small islands
Pacific Adaptation to Climate Change Project	GEF (managed by UNDP)	5 million	2009-2013	SPREP project addressing food security in 14 Pacific countries, including the three hotspot countries
Disaster Risk Reduction in Eight Pacific States Project	EU	14 million	2010-2014	Improving early warning, technology and communications in eight countries, including the three hotspot countries. Assisting with disaster planning and design of infrastructure
South Pacific Sea Level and Climate Monitoring Project	AusAID; Governments of the Pacific Islands Forum countries	40 million	1992-2016	Capacity building, monitoring and research on sea level and climate change in the 14 countries of the Pacific Islands Forum, including the three hotspot countries
National Adaptation Programs of Action	GEF (managed by UNDP)	500,000	2009-2012	Support to governments of the hotspot countries to develop and implement National Adaptation Programs of Action
Edulink Project	EU	3 million	2009-2013	Capacity building and curriculum development to support understanding and awareness of climate change and biodiversity. Involves UPNG and USP

A major adaptation initiative currently under development is the GEF full-sized project, Solomon Islands Water Sector Adaptation Project, for which a Project Preparation Grant was approved by the GEF Council in May 2012. The project will be managed by UNDP, with US$7 million of GEF funding and a further US$40 million in cofinancing. The purpose of the project is to improve the resilience of water resources to the impacts of climate change in order to improve health, sanitation and quality of life, and sustain livelihoods in targeted vulnerable areas, and there could be linkages to biodiversity conservation, particularly if investments in natural infrastructure (forests, riparian vegetation, mangroves, etc.) were considered as part of the overall adaptation strategy.

Another GEF full-sized project on climate change adaptation currently under development is the Increasing Resilience to Climate Change and Natural Hazards project in Vanuatu. This project will be managed by the World Bank, with US$2.7 million in GEF funding and US$3.2 million in cofinancing. The purpose of the project is to increase

the resilience of communities to the impacts of climate variability and change, and geological hazards, on food and water security, as well as livelihoods. Again, if the project promotes resilience strategies that incorporate natural infrastructure, there could be linkages to biodiversity conservation.

Given that one of the most effective strategies to enhance resilience of species and ecosystems to climate change is to alleviate other threats (e.g. habitat loss, overharvesting, invasive alien species, etc.), in a broad sense, most conservation activities in the hotspot may be termed adaptation activities.

Within the hotspot, as elsewhere, ecosystem-based management approaches are increasingly being advocated for adaptation projects, in which the vulnerability of people to climate change is reduced through the conservation, restoration, and management of ecosystems. Examples include mangrove restoration instead of seawalls for shoreline protection (the former can also enhance fish stocks and sequester carbon), and forest restoration instead of agroforestry for catchment protection (the former can also build on traditional ecological knowledge and benefits biodiversity).

Most adaptation projects in the hotspot involving biodiversity conservation are in the early phases of planning or implementation, and it is too early to assess their success. In general, the extent to which adaptation approaches will ultimately be able to offset the impacts of climate change on biodiversity remains unclear.

8.5.4 Current Role of Civil Society

Civil society organizations in the hotspot are playing important roles in climate change research. Some of the key climate modeling work is being undertaken in the region by academic institutions, including UPNG, USP, the National Agriculture Research Institutes in PNG, the National Forestry Institute in PNG and PNG Medical Research Centre. Civil society organizations, both domestic and international, are also helping design and implement many of the REDD and climate change adaptation projects underway in the hotspot (see Table 28).

The massive scale of potential climate change impacts in the hotspot over the next decade, affecting over 1.7 million people, is clearly beyond the power of government agencies to respond to alone, even with support from international donors. Mobilizing the support and active involvement of civil society throughout the hotspot will be necessary for limiting climate change impacts on people and biodiversity. It will also help ensure that community concerns and biodiversity priorities are addressed by climate change mitigation initiatives, including REDD and Blue Carbon schemes.

Although civil society organizations with a focus on environmental issues can be found throughout the hotspot (Chapter 7), and although many of them are working on climate-change-related issues, many civil society organizations face severe capacity constraints. For this reason, organizational capacity building and development of partnerships should form an important part of strategies to facilitate broad engagement of civil society in efforts to address climate change in the East Melanesian Islands.

Table 28: Contributions to Climate Change Mitigation and Adaptation Projects by Selected Civil Society Organizations in the East Melanesian Islands Hotspot

Organization	Geographic Coverage	Relevant Experience
CI	PNG; Solomon Islands	Conservation program in the Pacific region; experience with conservation agreements as a benefit-sharing mechanism
FSPI	Hotspot-wide	Experience in various environmental programs, including climate change, disaster management and biodiversity
Greenpeace	Hotspot-wide	Raising environmental issues at all levels in the East Melanesian Islands
TNC	Hotspot-wide	Addressing conservation and environmental issues at all levels in the East Melanesian Islands
Malakula Village Trust	Vanuatu	Focused on conservation and environmental issues
PNG Eco-forestry Forum	PNG	Primarily focused on forest governance and environmental issues
PusuAsi Trust	PNG	Emphasis on development and environmental issues related to coastal protection in Manus province
VANGO	Vanuatu	Coordinating environmental, social and economic programs within the country and facilitating collaboration among Vanuatu NGOs at international, regional and national levels
Wan Smolbag Theatre	Vanuatu	Significant experience in environmental outreach activities for public and communities, with associated conservation activities
WCS	PNG	Conservation program piloting REDD/REDD+ projects
WWF	Hotspot-wide	Established environmental and conservation projects in PNG, Solomon Islands and Vanuatu

8.6 Factors Influencing Conservation Efforts

Efforts to address the potential impacts of climate change on biodiversity in the hotspot are currently influenced by a number of factors. The following factors were identified from review of relevant literature, combined with discussions with representatives of government, civil society and donor agencies during the ecosystem profiling process. The factors listed below all represent opportunities to invest in addressing the predicted impacts of climate change on biodiversity.

8.6.1 Research and Monitoring

There is a lack of research and monitoring of climate change, variability and sea-level rise within the East Melanesian Islands Hotspot, meaning that changes and their impacts must be predicted based upon global models, which are often too coarse to support the detailed planning that is required for conservation management, land-use planning and policy development at national and sub-national levels. Priorities for research and monitoring include the following:

- Improved forecasting of cyclones, SPCZ and ITCZ for communities and provincial governments.
- More detailed understanding of climate change impacts on species and ecosystems, to identify those at elevated risk due to climate change.

- Lessons learned from demonstration projects to test mitigation approaches, and inform the development of national REDD/REDD+ policy and methodologies.
- Detailed remote sensing maps of land-cover / land-cover change to support implementation of REDD/REDD+.
- Partnerships among governments, academic and research institutions and civil society organizations, within and outside of the hotspot, focused on data sharing and capacity building.

8.6.2 Adaptation Strategies

The lack of practical initiatives, research, capacity and models for climate change adaptation, especially for globally threatened and endemic species and KBAs, is a barrier to successful responses to climate change in the hotspot. Priorities for the development of effective, locally appropriate adaptation strategies include the following:

- Improved understanding of potential climate change impacts on protected areas and other sites of conservation importance, through vulnerability assessments.
- Vulnerability maps for flooding and other natural disasters.
- Comprehensive strategies to conserve intact continua of natural habitats through development of community-managed conservation areas combined with introduction of sustainable management practices into logging concessions and other production landscapes.
- Demonstration of ecosystem-based management approaches to climate change adaptation, especially for coastal protection, integrating traditional ecological knowledge and customary management systems and practices.

8.6.3 Mitigation Measures

Developing mitigation measures and policies is critical at the global level. While the East Melanesian Islands make a marginal contribution to global GHG emissions, it is important that the biodiversity impacts of mitigation initiatives in the hotspot are positive (or at least neutral), and that opportunities for benefit sharing with customary land and resource owners are realized. To this end, priorities for the development of mitigation measures include the following:

- Updated GHG inventory for the East Melanesian Islands region.
- REDD+ field demonstration projects to inform development of climate change policy.
- Alignment of Clean Development Mechanism and REDD approaches at national and local level with biodiversity conservation goals.

8.6.4 Policy and Legislation

The legal framework for climate change responses in the three hotspot countries is provided by the UNFCCC, the Kyoto Protocol and the Convention on Biological Diversity at the global level, and the Apia Convention and the Pacific Islands Framework

for Action on Climate Change at the regional level. At the national level, appropriate climate change policies and legislation are still evolving, and there remain a number of gaps that need to be filled. Priorities for development of climate change policy and legislation include the following:

- Finalization of a national climate change policy for Vanuatu.
- Inclusion of measurable goals for addressing climate change into the NBSAPs for the hotspot countries.
- Mainstreaming of climate change and biodiversity conservation objectives into the policies and plans of each development sector.
- Incorporation of national climate and biodiversity conservation policies into provincial and local regulations and development plans.
- Strengthened implementation of legislation at all levels.

8.6.5 Capacity Building

In their first National Communication Reports to the UNFCCC, all three hotspot countries identified limited capacity as the greatest challenge to addressing climate change. Sufficient, appropriate capacity is a prerequisite to the success of all strategies to address climate change (i.e., mitigation, adaptation, awareness, etc.). Priorities for the development of local capacity to address climate change in the hotspot include the following:

- Strengthened technical capacity of government agencies to plan for, and implement, climate change initiatives.
- Strengthened technical capacity of civil society organizations to monitor climate and respond to its impacts.
- Strengthened capacity of CBOs and the groups that support them in sustainable natural resource management.
- Increased number of domestic civil society organizations addressing climate change issues.
- Active partnerships among government agencies, civil society organizations, donors and communities to implement climate change programs.

8.6.6 Education and Awareness

Although some national agencies in the hotspot countries, particularly in the energy and forestry sectors, have already been the focus of considerable project support with regard to climate change response, most government officials, especially at provincial and local level, have a limited awareness and understanding of climate change and global best practice with regard to monitoring and addressing its impacts. These limitations are not confined to government but can also be found among civil society organizations and communities, even though many people have been impacted by changing weather patterns. Priorities for increasing awareness and understanding of climate change include the following:

- Climate change communication and information strategy for the East Melanesian Islands Hotspot.
- Climate change and biodiversity awareness in communities and schools, supported by incorporation of climate change and biodiversity into school curricula.
- Targeted outreach on REDD+ for communities in areas targeted by these schemes.

9. THREAT ASSESSMENT

9.1 Introduction

The East Melanesian Islands are home to a rich diversity of flora and fauna. However, this biodiversity is seriously threatened largely due to ecosystem degradation, which results in the endangerment or depletion of these species. An analysis of the IUCN Red List reveals the major threats to Pacific plant and animal species to be habitat loss and introduction of invasive species (IUCN 2011). In addition, frequent extreme weather events and natural disasters, coupled with the projected future impacts of climate change and sea-level rise are also significant threats to biodiversity in the Pacific (Thaman 2002). Although the types of threat to Pacific biodiversity are similar to those throughout the tropics, the small size and isolated nature of Pacific islands increases vulnerability to disturbances that would otherwise be minor on large land masses (SPREP 1992).

Since the independence period (1975-1980), a number of factors have led to an escalation in the scale and intensity of threats to biodiversity in the East Melanesian Islands Hotspot. The dominant development paradigm has been one of growth and increased production, with little concern for the environment. The UNCED process in 1992 highlighted the need for a balanced approach to development, based on the three pillars economic, environmental and social sustainability, and Pacific island countries began a process of establishing environment departments and preparing NBSAPs. Nevertheless, these departments remain small and preparation and implementation of NBSAPs has progressed slowly (see Section 6.3.1). There exist a number of constraints to effective protection of the environment in East Melanesia, including lack of information on biodiversity, lack of taxonomic expertise, poor understanding of environmental issues among the general population, and poor integration of environmental issues into national development planning. Addressing these constraints would go a long way towards providing solutions to the root causes of biodiversity loss within the East Melanesian Islands Hotspot.

This chapter provides an overview of the main threats to terrestrial, coastal and nearshore marine biodiversity and ecosystems in the East Melanesian Islands Hotspot, their impacts and their root causes, before going on to propose possible solutions to address or at least mitigate these threats and their root causes. The chapter is based on a review of relevant literature, supplemented by the results of the stakeholder consultations conducted as part of the ecosystem profiling process.

9.2 Main Threats

Historically, traditional land use practices in the hotspot were relatively sustainable, with shifting agriculture of taro, bananas and other crops being used to meet subsistence needs. Many islands in the hotspot have volcanic or composite geology, with steep mountain slopes and a limited amount of flat arable land. During colonial times, small-scale coconut plantations were developed along islands' coasts, with cattle grazing in the interior, especially in Vanuatu. As populations have continued to grow in the post-colonial period, the need for land for subsistence farming has expanded. The advent of the cash economy has also led to the adoption of small-scale plantation agriculture and intensified fishing.

The resources of the East Melanesian Islands have been exploited for centuries to meet demand in overseas markets. During the 19th century, this led to local disappearances of sandalwood, sea-cucumbers and other high value resources. In the late 20th century, extraction pressure has shifted to native hardwoods and tuna, for which the western Pacific represents the major global fishery. Mining has occurred in PNG's islands region for decades, and has recently expanded to the Solomon Islands. The nature of these threats is discussed in detail in the following sections.

9.2.1 Deforestation

Forest cover varies greatly across the hotspot, ranging from 40 to 90 percent of total land area in the high islands. The economic value of these forests to countries of the East Melanesian Islands is high and reasonably well documented. In 2005, PNG's real GDP was about US$3.8 billion, to which the agriculture, forestry and fishing sectors contributed 38.5 percent (PNG Forest Authority 2007). The export of forest products alone represented 4.7 percent of the value of all exports from PNG, making forest products the largest non-mineral export from the country in terms of value (PNG Forest Authority 2007). In the Solomon Islands, timber production was the single most important contributor to growth of the economy in 2007 (Central Bank of Solomon Islands 2008). This growth is also manifested through increased utilization of timber in building construction and furniture-making in Honiara, provincial centers and rural villages (Pauku 2009). In Vanuatu, forestry has traditionally been a major, if not the largest, single source of export income, contributing around 14 percent of the total. In contrast to the other two countries, where round log exports are by far the most important, Vanuatu's timber exports are all in the form of processed timber (Hunt 2001).

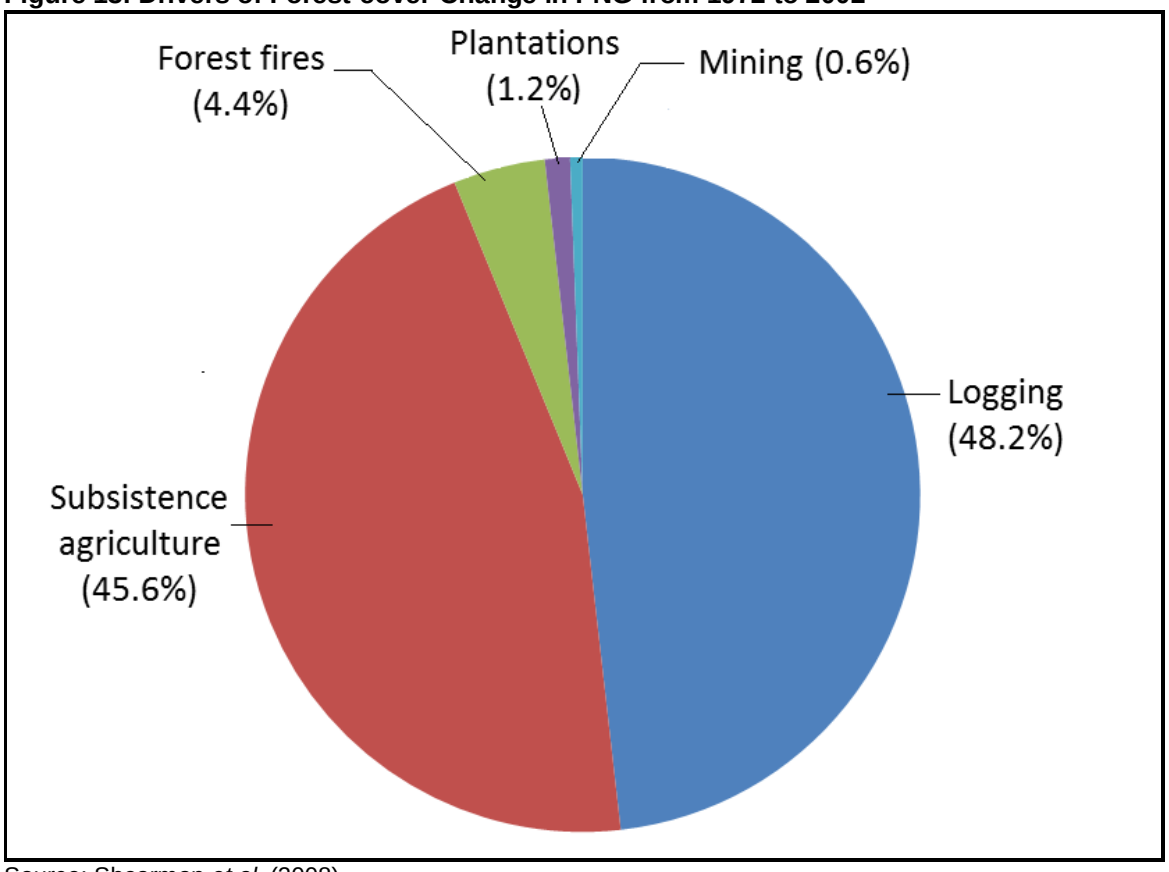
Despite constitutionally recognized customary land ownership, the logging industry continues to wield tremendous influence over natural resources across the hotspot, often taking advantage of the limited capacity of local communities to defend their interests against outside entrepreneurs. Logging rights are issued by the national government, after agreements have been made between logging companies and landowners. In theory, the logging companies and communities then work in partnerships to conserve and manage the forest and its resources sustainably, with oversight from the relevant government department. In practice, however, the balance of power between logging companies and

landowners is often tilted in the companies' favor, because of their tremendous advantages in terms of information, money and political connections. The results are commonly seen in the form of unsustainable logging practices, social conflict and environmental degradation.

In PNG as a whole, Shearman *et al*. (2008) estimated that 1.4 percent of the country's forests were deforested annually over the period between 1972 and 2002, equivalent to 360,000 hectares per year, while the Food and Agriculture Organization of the United Nations (FAO 2011b) calculated a rate 0.5 percent of forests, or 141,000 hectares per year, over the last decade.

For the areas of PNG within the East Melanesian Islands Hotspot, Shearman *et al.* (2008) recorded the following changes in forest cover between 1972 and 2002: the Admiralty islands recorded a 30 to 45 percent loss; the Mussau islands recorded a 30 to 45 percent loss; New Ireland recorded a 30 to 45 percent loss, although losses in upland areas were much lower at 5 to 10 percent; New Britain recorded the highest loss, at between 60 and 70 percent, although, again, upland areas recorded the least change, with a 5 to 10 percent loss; and Bougainville recorded a 30 to 45 percent loss, albeit limited to 5 to 10 percent in inland montane areas. Shearman *et al*. (2008) further conducted an analysis to estimate the contribution of each of the main drivers of forest-cover change between the years 1972 and 2002 in PNG as a whole (Figure 13).

Figure 13. Drivers of Forest-cover Change in PNG from 1972 to 2002



Source: Shearman *et al.* (2008).

The results showed that logging and expansion of subsistence agriculture were the main drivers, although they play down the importance of oil palm plantations, which have been a major cause of forest loss in the lowlands of West New Britain and New Ireland, especially over the last decade.

In 2007, PNG's National Parliament approved an amendment to the 1991 Forestry Act, which permitted the "fast tracking" of logging permits for large tracts of forest under the Forest Clearance Authority. This has enabled forest concession areas to operate under Special Agriculture and Business Leases over an area totalling 5.2 million hectares. In these areas (which overlap greatly with customary land), forestry regulations do not apply, allowing clear-felling of forest and conversion to agriculture. Within the hotspot, Special Agriculture and Business Leases are concentrated in East New Britain and New Ireland, and the affected forest areas include Lavongai and Nakanai Central Pomio KBAs (Winn 2012). While the ostensible economic justification for these leases is expansion of oil palm plantations, they appear to be driven just as much by the profits to be gained from logging, indicating how interlinked the logging and plantation industries can be.

In 2004, it was reported that around 1 million cubic meters of logs were harvested in the Solomon Islands, which compared with a sustainable harvest estimated at around only 200,000 cubic meters. Not only is the current rate of extraction unsustainable, it has continued to rise sharply over the last five years. At the current rate, it is projected that the Solomon Islands' timber resources will be depleted before 2020 (AusAID 2006; Berdach and Llegu 2007). On some major islands (e.g. Isabel), much of the natural forest has already been logged over. Nevertheless, the government has continued to grant "tax holidays" to exporters of round logs, contributing to an escalation in logging activities (Berdach and Llegu 2007).

In the mid-2000s, natural forest cover in Vanuatu was estimated at 444,000 hectares, equivalent to 36 percent of the total land area (UNDP 2005), and at least 40 percent of the commercial forest area was regarded as degraded (King 2007). Most of the high value forests were over-exploited in the 1980s and 1990s, until the government imposed a ban on the export of round logs in 1998.

Many logged areas have lost significant biodiversity and economic value, in terms of their functions as habitats for plant and animal species, sinks for the sequestration of atmospheric carbon, and water catchments. Forest species that are unable to adapt to degraded habitats face possible extinction. A large proportion of the species of the hotspot included on the IUCN Red List are assessed as globally threatened because of threats to their habitats caused by logging, for example Solomon Islands palm frog (*Palmatorappia solomonis*), a monotypic genus restricted to the Solomon Islands plus Bougainville and Buka in PNG, which is assessed as VU (Richards and Parker 2004a).

Despite the extensive deforestation that has taken place across the hotspot, the PNG islands region and, to some extent, the Solomon Islands still have significant stands of relatively undisturbed forest remaining. In general, lowland forests have been more susceptible to deforestation, due to their accessibility to logging operations and suitability

for conversion to small-scale agriculture and large-scale commercial plantations (Swartzendruber 1993). A recent analysis of forest-cover change on New Britain by Buchanan *et al.* (2008) concluded that lowland forest is of most urgent conservation priority because it supports the largest proportion of endemic bird species and is under the greatest pressure from logging and commercial plantations, while forests at higher elevations are important for restricted-range bird species but are less severely threatened by deforestation at present.

9.2.2 Agriculture

The lack of arable flat land for subsistence gardening and artisanal agriculture has forced farmers to cultivate upland and steep-slope areas, which are more prone to erosion and landslides. Agriculture has expanded as human populations have grown and consumption patterns have changed. As cultivated land does not have a sufficient fallow period, soil fertility is lost and new land, often primary forest on hill slopes, is cleared. This results in deterioration in soil fertility, habitat destruction, and eventual loss of biodiversity.

Commercial agriculture within the hotspot includes oil palm, coconut, rubber, coffee and sugar plantations as well as livestock. The increase in demand for these has resulted in the clearing of the original vegetation from large tracts of land resulting in loss of vegetation cover, loss of biodiversity and increased erosion. Oil palm cultivation has increased in recent years in West New Britain and New Ireland (Berdach and Mandeakali 2004). In PNG, there was a total of 149,402 hectares under palm oil and rubber plantations in 2002, with over 90 percent located in West New Britain, Milne Bay, Oro and New Ireland. This led to the clearance of large areas of lowland forest, especially in West New Britain and around Milne Bay. Associated impacts of oil palm development include increased settlement and smallholder agriculture, as a result of people migrating to live around plantations (Shearman *et al.* 2008).

9.2.3 Mining and Mineral Exploration

PNG is currently highly ranked in the world in terms of gold production (11th) and copper production (13th). Nickel, zinc, cobalt and chromite have also been discovered, with huge deposits of undeveloped mineral resources spread across the country, including the islands region. Oil and natural gas deposits are also found in PNG and its territorial waters, and the oil and gas sector currently contributes around 9 percent of GDP. In the PNG islands region, there are two operating gold mines in New Ireland province: Lihir, operated by Newcrest Mining Ltd; and Simberi, operated by Allied Gold. In addition, New Guinea Gold Corporation operates the Sinivit gold mine in East New Britain province, while Nautilus Minerals is planning an experimental deep-sea mining project, called Solwara 1, in the Bismarck Sea.

Poor environmental practices in PNG's mining industry have resulted in a number of environmental problems, including the discharge of heavy metals, cyanide and acids into rivers, streams and coastal waters, sediment loading in rivers, and land degradation and loss of vegetation associated with land clearance for mines (Berdach and Mandeakali

2004). The impacts of mining are particular problems for freshwater ecosystem, triggering collapses in populations of fish and other aquatic biodiversity, and causing die-back of vegetation along rivers and streams. Submarine tailings disposal is also a threat to marine biodiversity, and discharges into the Bismarck Sea are one of the major issues associated with the Ramu nickel mine in Madang province, operated by Metallurgical Corporation of China. The environmental impacts of mining are also manifested in the immediate environs of mine sites, due to deforestation and earth removal for pits, tailings dams and ancillary infrastructure.

In the Solomon Islands, extensive gold deposits have been confirmed for the Gold Ridge area of Guadalcanal, and gold prospecting has been conducted in several areas of Western province, including Fauro, Paraso, Masi Crater and Kele River. Nickel deposits have been found at San Jorge and Tataka on Isabel Island, and diamonds have been found in the seabed around Iron Bottom Sound, Manning Strait, and between Choiseul and the Shortland Islands (Berdach and Llegu 2007).

Significant opportunities exist for further development in the minerals and mining sector but environmental safeguards need to be put in place first, to ensure that adverse environmental impacts are avoided, minimized and offset. Appropriate safeguards include conduct of EIAs for all major mining operations, and regular compliance monitoring (Berdach and Llegu 2007).

9.2.4 Coastal Development

The expansion of coastal settlements and tourism development is often accompanied by habitat loss, particularly of mangroves and other coastal vegetation. Along with logging and plantation establishment, these coastal developments increase the risk of siltation of surrounding reef systems. Siltation kills coral polyps and is capable of altering the community structure of reefs. Other anthropogenic pollution, such as untreated human waste and non-biodegradable plastics, also contribute to coastal degradation (Government of the Solomon Islands 2008). Although perhaps not a current problem in the hotspot, issues that have severely affected coral habitats in other small island developing states include eutrophication and algal overgrowth, due to nutrient runoff (fertilizers and animal and human waste), and degradation, due to live rock and coral extraction and destructive fishing practices.

9.2.5 Overharvesting

Pressures of population growth and enhanced material expectations have also resulted in overharvesting of resources, both terrestrial and marine. The term overharvesting implies gathering for local usage, as opposed to commercial extraction of resources (e.g. timber, tuna, etc.), which may also cause massive overexploitation of natural resources but is discussed separately. In the nearshore marine ecosystems, high-value species, such as sea-cucumbers, trochus and giant clams, have been harvested to local rarity. Larger species, such as dugong and marine turtles, are also under threat. Except in areas accessible to commercial markets for high-value species, the extent of overfishing in the hotspot seems not to be as severe as in many Polynesian countries (FAO 2011a).

Mangrove removal for fuel production and coastal development is happening in many places in the hotspot at a rate faster than regeneration. Harvest of large amounts of natural resources is also common for within the context of certain cultural practices or festivals, such as the collection of seabird eggs during yam festivals.

9.2.6 Invasive Alien Species

Island ecosystems are particularly vulnerable to the effects of invasive alien species. After habitat destruction or modification, invasive species are responsible for more species extinctions globally than any other cause. The rate of extinction of native species has been higher on islands than anywhere else in the world (Nishida and Evenhius 2000), due to the greater vulnerability of these systems to invasives. As well as being implicated in the extinction of many island species, invasive alien species have also degraded native ecosystems, resulting in a reduction in key ecosystem functions. Among the more serious of the invasive alien species introduced to the East Melanesian Islands Hotspot are:

- African tulip tree (*Spathodea campulata*) invades both abandoned agricultural land and closed forest. It is a tree that spreads rapidly in mesic to wet areas and forms dense thickets. Native plants are eliminated by the shading effect of the large leaves, resulting in reduced species richness under the canopy (Institute of Pacific Islands Forestry 2011).
- Mile-a-minute vine (*Mikania micrantha*) is a smothering vine that occurs in disturbed forest, stream banks, roadsides, pastures, plantations and cultivated crops. It is thought to interfere with soil nitrification processes.
- American rope vine (*Merremia peltata*) is a vine that strangles vegetation and invades forest strands, grows in forests and thickets, crawling up and over shrubs and trees. It is prevalent in disturbed areas up to about 300 meters in elevation.
- Spiked pepper (*Piper aduncum*) occurs in disturbed forest and forest margins at low elevations, particularly in moderate to high rainfall areas. It is an aggressive colonizer of clearings, and its dense canopy reduces light and shades out herbaceous species, which suppresses natural forest regeneration.
- West Indian lantana (*Lantana camara*) is a significant weed that impacts severely on agriculture as well as on natural ecosystems. In disturbed native forests, it can become the dominant understory species, disrupting succession and decreasing biodiversity. Its allelopathic qualities can reduce vigor of nearby plant species and reduce productivity in orchards.
- Little fire ant (*Wasmania auropunctata*) is very invasive and has been introduced into the Solomon Islands and Vanuatu. It is blamed for reducing species diversity, reducing overall abundance of flying and tree-dwelling insects, and eliminating arachnid populations. It is also notorious for its painful stings. It is considered to be perhaps the greatest ant species threat in the Pacific region (Invasive Species Specialist Group 2003).
- Giant African land snail (*Achatina fulica*) is an invasive snail with significant impacts on agriculture, biodiversity and human health. The species feeds on a wide variety of crop plants and may present a threat to local flora. It was recently

discovered in Honiara city on the Solomon Islands, and also occurs in the large islands of Vanuatu and PNG.

- Common myna (*Acridotheres tristis*) is a highly commensal song bird that lives in close association with humans. It competes with small mammals and bird for nesting hollows and on some islands it preys on other birds' eggs and chicks (Invasive Species Specialist Group 2003).
- Cane toad (*Bufo marinus*) was introduced to many countries as a biological control agent for various insect pests of sugarcane and other crops, including the large islands of PNG and the Solomon Islands. However, cane toad proved to be a pest itself. It predates almost any terrestrial animal and competes with native amphibians for food and breeding habitats. Its toxic secretions are known to cause illness and death in domestic animals and wildlife, such as snakes and lizards.
- Feral house cat (*Felis catus*) has been introduced to many islands in the hotspot. Small mammals and ground-dwelling and ground-nesting birds are common prey of feral house cats. Several species of giant rodent are believed to have been extirpated from Guadalcanal Island by cat predation. Cats are also responsible for the extirpation of multiple seabird colonies (S. Boudjelas *in litt.* 2012). This is a key threat to endemic species but difficult to manage.
- Black rat (*Rattus rattus*) and brown rat (*R. norvegicus*) are among the most significant threats to island biodiversity in the Pacific in general, particularly brown rat, and extensive evidence supports the wave of extinctions that follow their introduction (S. Boudjelas *in litt.* 2012). Within the East Melanesian Islands, invasive rats are mainly an issue in Vanuatu and the Santa Cruz Islands of the southeastern Solomon Islands, where native rats did not already occur prior to the arrival of humans. Throughout the remainder of the hotspot, the native biota has evolved alongside indigenous rats, and the more recently introduced black and brown rats seem to be restricted to towns and villages, where they can cause crop losses, contaminate food and water and carry diseases.

Invasive alien species are becoming increasingly widespread in the hotspot, especially pigs, feral house cats, rats and little red fire ants, which have reached plague levels on many of the islands. The Global Invasive Species Database lists 85 invasive species for the Solomon Islands, 66 species for Vanuatu and 98 species for PNG (Invasive Species Specialist Group 2003). Two large, ground-dwelling birds endemic to Solomon Islands (Choiseul Crested Pigeon (*Microgoura meeki*), endemic to Choiseul; and thick-billed ground dove (*Gallicolumba salamonis*), endemic to Makira and several outlying islands) have almost certainly been extirpated, their demise likely connected to the spread of feral house cats. However, the impacts on local fauna and flora of many other invasive species that do occur in the Solomons remain undocumented, e.g. cane toad, American rope vine, and *Mimosa* sp. (Filardi *et al*. 2007).

Arthropods, in particular ants, present one of the greatest threats to many native species in the Pacific. They may affect whole communities at once, and may dramatically and irreversibly change these through their ability to cause much local extinction. Within the East Melanesian Islands Hotspot, the following invasive ant species present a grave threat to conservation values because of their tendency to invade native communities and affect

many of the animals and plants in that community: long-legged ant (*Anoplolepsis longipes*); crazy ant (*Paratrechina longicornis*); Argentine ant (*Linepithema humile*); tropical fire ant (*Solenopsis geminate*) and little fire ant. The latter species may be one of the biggest threats to the conservation of native communities because of its aggressive behavior, pervasive effects on all sectors of biotic communities, and ease of spread to new islands. It has also been noted to decrease local arthropod diversity. Greenslade (1971) noted that species diversity in coconut plantations decreased wherever long-legged ant populations flourished in the Solomon Islands; an observation that should also hold true for native forests (Nishida and Evenhius 2000). Tropical fire ant is known to reduce populations of native butterfly eggs and larvae.

The snail fauna on many Pacific islands is being destroyed very quickly by invasive snails, resulting in a loss of diversity between and within island groups. Introduced land snails may be extremely efficient predators, causing the relatively rapid extinction of native land snail species, while other introduced land snails may be extremely efficient at feeding on plants and may destroy the native habitat. Of particular concern, giant African land snail is found in the hotspot; it feeds on a wide variety of crop plants and may present a threat to local flora (Nishida and Evenhius 2000).

Currently, emphasis is being placed on controlling the import of invasive species at national borders, recognizing that control of the spread of species (like the fire ant) from island to island is difficult to control without additional human and financial resources (King 2007). However, this strategy may underemphasize the importance of enhancing internal biosecurity measures. The major challenge now is not only prevent new introductions into the hotspot and their spread among islands but also to control populations of existing invasive species.

9.2.7 Climate Change and Sea Level Rise

Climate change and variability are predicted to have severe impacts on Pacific countries due to the characteristics of many islands, such as low-lying topography and limited buffering from sea-level rise and extreme weather events. While the cooperative social systems of Pacific islanders are considered to offer improved resilience to climate change, Pacific countries are typically described as highly vulnerable to climate change due to their developing country status and small island nature (ADB 2010, Hills *et al*. 2011).

Climate change is predicted to have significant impacts on marine, terrestrial and freshwater ecosystems; these are covered in greater detail in Chapter 8. In response to sea-level rise, mangroves may migrate landward and, where migration is not possible, mangrove species and ecosystem area will decline or be lost (Hills *et al*. 2011). Terrestrial ecosystems will also be threatened by climate change in a number of ways, including by weakening their natural adaptive capacity through disturbance. With the changes in precipitation and temperature patterns that are predicted to occur, forests will become more susceptible to invasive species or fire, resulting in broad ecosystem shifts, loss of ecosystem services, and loss of habitat for certain species. Terrestrial ecosystems

that are already degraded by non-climatic factors (e.g. logging and invasive species), are fragmented, have highly specialized species or have narrow climatic tolerances will likely be the most vulnerable to climate changes (Hills *et al.* 2011). Also, because of the strong co-evolutionary interactions between species and strong linkages between marine and terrestrial ecosystems typical of small islands, adverse impacts to one ecosystem will impact other linked ecosystems and species, and may result in a decoupling of species linkages that may lead to failure of reproduction and biodiversity loss (Hills *et al.* 2011).

Coral reef ecosystems are expected to be highly threatened by the cumulative impacts of ocean acidification, rising sea temperature, sea-level rise and increased storm activity that are projected to be experienced over the coming decade. With projected increases in sea-surface temperatures, the thermal tolerances of reef-building corals are likely to be exceeded within the next few decades. Climate change effects include coral bleaching, with major bleaching events reported in the last decade in Fiji and PNG (Davies *et al.* 1997). An episode of coral bleaching in 1998 is known to have led to a loss of 16 percent of the world's coral reefs (All *et al.* 2009).

Climate change impacts are also expected for mangrove areas, wetlands and terrestrial forests. Major shifts in temperature and rainfall may result in the disappearance of fragile ecosystems, such as montane cloud forests and their associated biodiversity, which exist within a very narrow envelope of physical, topographic and climatologically parameters (Berdach and Mandeakali 2004, Berdach and Llegu 2007, King 2007). Forests will also be more susceptible to invasive species or fire and may undergo ecosystem shifts, loss of services or loss in habitat completely (Hills *et al*. 2011). Loss of forest cover would undoubted have dramatic impacts on a wide range of forest-dependent plant and animal species.

Between 1994 and 2011, sea levels in the hotspot rose by between 3.3 and 6.3 millimeters per year (Australian Bureau of Meteorology 2011). The best estimate for future sea-level rise is about 50 millimeters by 2100 (Solomon *et al.* 2007). Temperatures in the Pacific are projected to increase between 1.4 and 3.1°C with sea levels projected to rise by a total of 0.35 meters by the end of the 21st century (Global Facility for Disaster Reduction and Recovery 2011).

9.2.8 Natural Phenomena

Cyclones, floods, drought and volcanic eruptions are some potential contributing factors to the stochastic extirpation of isolated populations of species throughout the hotspot. Cyclones, in particular, can have devastating effects on faunal populations, habitats and ecosystem health. In PNG, for example, Cyclone Justine caused an estimated loss of more than 400,000 cubic meters of timber in 1996 (Brinton 1998). Volcanic eruptions are worth mentioning as threats to biodiversity within the hotspot, especially given the large number of active volcanoes, such as Tinakula in Temotu province of the Solomon Islands, and Gaua in Torba province of Vanuatu.

9.2.9 Pollution

Indiscriminate land clearing is resulting in sedimentation of rivers, streams and coral reefs. Pollution problems in river catchments are also increasing with rapid population growth, and this poses a threat to coastal marine resources. Pollution of the coastal and marine environment emanates from land-based sources, such as towns (via sewage and solid waste disposal), logging concessions (via soil erosion), oil palm plantations (via run-off of agrochemicals) and mines (via submarine tailings disposal), as well as sea-based sources, such as marine shipping and fishing vessels.

Pollution from sewage, animal waste and plantation agriculture has led to elevated nutrient levels in nearshore and coastal ecosystems. In 2011, for example, Morava Lagoon had a massive fish kill that was linked to eutrophication and high nutrient levels. In Honiara city, at least 75 percent of sewage flows directly into the sea through a piped collection system without treatment. Discharges from ships in the form of garbage, bilge water and other pollutants are a major source of sea-based pollution and, potentially, invasive species (Government of the Solomon Islands 2008).

Chemical pollution from pesticides and heavy metals is believed to be a widespread issue in the hotspot, although it is locally significant at locations where pesticides are stored or where heavy metals have been released from mine waste. Cyanide, used in gold processing has also been spilled into rivers. Poisons (bleach, pesticides and rotenone) are used in streams and coral reefs to catch fish.

9.3 Drivers

9.3.1 Population Growth

The most important natural resource in the East Melanesian Islands is land. The constitutions of the three countries in the hotspot all recognize and guarantee ownership of land by the local indigenous population, apart from land alienated by the state (mainly by the former colonial administrations). Communities in the East Melanesian Islands, therefore, rely heavily on land to support their livelihoods through traditional subsistence agriculture, hunting and gathering. The high population growth rates in the hotspot (2.3 percent in Vanuatu, 2.8 percent in the Solomon Islands and 2.3 percent in the PNG islands region) is putting pressure on how local communities utilize the land and affecting the agriculture sector's contribution to the economy. In the small and remote atolls, the major economic resource is marine resources, and these are what the primary economic activities and social structures are based around.

Population pressure is a driver of forest loss for a number of reasons. Most obviously, population growth can lead to expansion of the area under cultivation, as more land is needed to feed more mouths. Population pressure is also changing the way communities use their land for cultivation. Much food is grown in fields (commonly known as "gardens") cleared from the forest and cultivated on a rotational system. Because of population growth, use of land for cash crops and land conflicts, many communities face

a shortage of land. This has led to a shortening of fallow periods in many areas, resulting in land degradation, reduced crop yields, and pressure to open up new areas of forest to cultivation.

For communities in coastal areas and on small islands, as population grows the area available to them remains stay the same. This is because of customary tenure, which restricts the area in which a community can harvest marine resources, and which cannot be expanded without causing conflicts with neighboring communities. Faced with this situation, the response of many communities is to intensify catch effort within the same, limited area, which can rapidly deplete stock of reef fish and other marine resources.

9.3.2 Urbanization

The East Melanesian Islands, like almost everywhere else in the world, are experiencing a population shift from rural to urban areas (see Section 5.2.1). With the expansion of urban centers there comes a greater need for more space for settlements, more timber and natural raw materials for buildings, more resources for food and fuel and more energy, as well as more pollution. The ecological footprint of towns and cities falls most heavily on surrounding marine and terrestrial ecosystems, although it can stretch further afield. For instance, the need for urban electrification is being used as a justification for proposed hydropower dams on Guadalcanal and New Britain. Unless they are accompanied by a shift towards more sustainable patterns of land and resource use, population increases will inevitably lead to greater pressure upon the natural ecosystems of the East Melanesian Islands, and will cause significant damage to the hotspot's unique and globally important natural resources (Berdach and Mandeakali 2004, Berdach and Llegu 2007, King 2007).

9.3.3 Lack of Awareness

There is a widespread of lack of understanding of the biodiversity values of natural ecosystems and the ecosystem services that they provide. Although rural people rely heavily on natural ecosystems for tens of uses in their everyday lives, the value of any given resource is generally not appreciated until it becomes scarce. In addition, the intrinsic values and ecological functions of organisms not of direct use to humans are not generally appreciated. In addition, people have a tendency to consider their short-term needs rather than the long-term consequences of their actions, which has resulted in the East Melanesian Islands in biodiversity exploitation to meet financial or tradition obligations.

At the national level, the focus has largely been on economic development and growth. UNCED in 1992 began a process of considering the ecological and sociocultural impacts of development, which resulted in the establishment of environment departments by the government of the hotspot countries and the development of environmental laws, including EIA regulations for development projects. The application and enforcement of these laws are still evolving, and some are more honored in the breach than in the observance.

Awareness is a complex term. People who have grown up in a rural village, and have had the experience of utilizing natural resources for food, fuel, medicine, construction materials and other uses, must be aware of at least the utilitarian values of biodiversity. However, understanding the non-use values of biodiversity, projecting the effects of over-exploitation or anticipating the impacts of logging, mining or other development activities may require a level of understanding that is beyond people's direct experience. Therefore, there is a widespread need for a fuller understanding of the values of biodiversity and the potential impacts of different land-use and resource management practices on them, so that resource owners can make more informed decisions over different options available to them. Similarly, there is a need for a greater awareness of the value of biodiversity and ecosystem services among government decision-makers at national and provincial levels, so that they are considered more fully when evaluating development options.

9.3.4 Unsustainable Economic Development Models

Population growth and the pressure to grow cash crops has driven the introduction of harmful farming practices, such as extensive land clearing, reduction in fallow periods and inappropriate soil cultivation. The occupation of most flat arable lands by cash cropping is also pushing subsistence cropping (gardening) onto marginal areas, especially steep slopes. About 63 percent of the total land area in the Solomon Islands comprises steep lands (slopes greater than 20 percent), which are increasingly being used for shifting cultivation by smallholders; the pattern in the other countries is similar. Intensified and constant cultivation of marginal sloping lands is unsustainable, and is responsible for soil erosion, loss of soil fertility, increase in pest and diseases, declines in crop yields, and widespread land degradation (Cheatle 1987, Government of the Solomon Islands 2008).

Such unsustainable development practices are encouraged by a combination of increased individual material expectations and cash needs, international market demand for valuable commodities and the need of the national government to generate foreign exchange. In particular, the promotion of the logging, mining and plantation agriculture industries is displacing and undermining traditional subsistence lifestyles and leading, directly and indirectly, to biodiversity loss. The development of value addition efforts in the natural resource sectors is also lagging, leading to an over-reliance on production of raw materials that are exported for processing elsewhere.

9.3.5 Weak Governance

Governance at the national level is weak in PNG and the Solomon Islands as a result of frequent changes in Prime Ministers. Vanuatu has also experienced political instability recently, as a result of an increased number of political parties. In general, the large number of political parties and the absence of stable coalitions is a contributing factor to the instability of national governments in East Melanesian Islands. International reviews have highlighted a high level of corruption in all three hotspot countries. Vanuatu, the Solomon Islands and PNG have scores of 3.5, 2.7 and 2.2, respectively, on Transparency

International's (2012) Corruption Perceptions Index, where a score below five indicates extensive corruption.

Weak governance creates conditions under which companies can access and or acquire rights to natural resources irrespective of environmental or social impacts. For example, in the Solomon Islands, the forest policy and law specify the number of licenses and forest blocks that can be logged but weak governance and corruption have resulted in large tracts of forest being logged at intensities far higher than plans allowed for (Pauku 2009). Additionally, poor to non-existant enforcement of forestry regulations has resulted in the vast majority of customary landholders being excluded from processes of consent and negotiation of terms of engagement and benefit-sharing. This has left a minority of "landowners", often illegitimate and physically residing outside of customary lands (in provincial centers or national capitols), in large part controlling the distribution of benefits from timber. In turn, lack of meaningful regulation or clear implementation of forestry policies, and resulting social and monetary inequities, have created conditions ripe for graft and social conflict (e.g. AUSAID 2006, C. Filardi *in litt.* 2012). All too frequently, the environmental impacts from logging and other forms of natural resource exploitation are not adequately mitigated, and the compensation for landowners and government in the form of royalties, taxes and other payments is well below international norms.

9.3.6 Sociocultural Factors

Melanesian society is built on a complex web of social connection and responsibility. Weddings, funerals and births are times of extensive exchange of goods among interrelated groups. Groups from certain areas will be noted for certain goods, such as plantains, taro or yams, and huge mounds of these will be harvested and presented at important ceremonies. Major social occasions increasingly feature store-bought goods, such as kerosene and bolts of cloth, and generating cash to buy these goods often requires harvesting of natural resources for sale.

Besides ritual ceremonies around weddings, funerals and births, there are also exchange ceremonies, by which a coastal and an inland group might exchange goods rare to one but common to the other. Certain traditional festivals may involve products from threatened plant and animal species, although these are only a threat in a small number of cases, they can be significant where the species involved is already rare and under pressure from other factors. Examples include such sing-sings in PNG, which can involve costumes featuring wild bird feathers, and yam festivals in Vanuatu, which may require the harvest of seabird chicks.

Social obligations and duties as a clan and family member determine a person's standing in society, and will often take precedence over longer-term economic or environmental consequences. These same obligations, however, can have a positive influence, because conservation measures are often justified in terms of safeguarding future generations' access to the natural resources needed to maintain a traditional lifestyle.

A related form of social pressure to accumulate wealth is created by the "Big Man System", where accumulation of monetary wealth can used to influence community decision making (see Section 6.2.1). One implication of this is that the economic interests of traditional leaders may differ from those of fellow villagers when decisions regarding access to land and resources by companies are being made.

Socially generated aspirations are also an important social driver of biodiversity loss. Seeing that someone is making money from fishing or agriculture puts social pressure on others to do the same. If people are seen to make money and send their children to school, this rapidly becomes the local norm. In Manus province, for example, most families aspire to send their children to further their education and find paid employment so that they can remit money to their family. Seeing other families collect these funds from the post office or the bank places great social pressure on other families to be in the same position. Increased expectations and aspirations with regard to cash generation can lead directly to intensification of agriculture and fisheries, and create conditions under which companies are able to access land and resources.

Providing a backdrop to these trends is a gradual evolution of the traditional values system throughout the East Melanesian Islands. These changes are exhibited in the increasing use of cash in traditional ceremonies and events. This is because pigs, store-bought goods, transport and bride price now often involve some form of cash transaction, in contrast with the past, when transactions involved barter or other customary forms of exchange.

Furthermore, cash contributions to community projects, such as the building of classrooms, housing for teachers and churches, are almost obligatory, due to strong social pressure on individuals and families. It is very common in the East Melanesian Islands for the church to be the most expensive and impressive building in the community. Finance for church construction comes mainly from community contributions and such projects can take years to complete.

Despite the political, economic and environmental pressures brought about by the region's increasing exposure to a globalized world, local communities in East Melanesia have responded in ways that augment and enhance their cultural identity and uniqueness. The constitutional protection afforded by recognition of communities' customs remains the most secure bulwark against threats to their cultural survival (Weiner and Glaskin 2007).

9.4 Solutions

In response to the identified threats and their drivers, there is an urgent need for an overall amplification of conservation activity in the East Melanesian Islands Hotspot, based on the identification of effective, locally appropriate approaches, and their replication. In each case, this may involve some combination of research (to understand the issue and evaluate the effectiveness of existing responses), pilot projects (to further test and refine approaches, and demonstrate their effectiveness to governments, donors

and communities), legal reform (to facilitate amplification of approaches), capacity building (to build stronger institutions and networks, capable of implementing effective approaches at scale), and long-term financing (to ensure sustainability). The specific conservation approaches that form the basis of the CEPF investment strategy for the hotspot are described in Chapter 12. This section captures some of the general considerations that should be taken into account by conservation initiatives, as identified through the stakeholder consultations held during the ecosystem profiling process.

The first consideration, strongly emphasized by stakeholders throughout the hotspot, is the need for conservation approaches to build upon existing traditional and customary knowledge and practices. In particular, it is essential for initiatives to recognize customary land ownership and resource tenure, and support traditional land and resource owners to asset their rights. In this regard, there exists a growing body of good practice in community-based conservation that could be replicated, for instance with LMMAs across the hotspot and with Tetepare Community Conservation Area in the Solomon Islands.

The next consideration is that, in order to enable governments and customary landowners make appropriate management decisions, it is necessary to build up a body of knowledge on biodiversity. Basic information gaps exist with regard to species' conservation status, distribution and taxonomy, distribution of critical habitats, rates of habitat loss, value of ecosystem services and much more, and extensive research and fieldwork are required to fill them. In all these initiatives, there is a need to engage local communities to incorporate traditional knowledge on biodiversity (Government of Vanuatu 1999a).

Related to filling information gaps, there is also a need to strengthen the capacity of civil society (i.e. at individual, organizational and network levels). At the individual level, specialized skills in participatory tools and community engagement are especially important. There is a need for training in organizational management and leadership, to help the development of the next generation of leaders for the nascent conservation movements in the hotspot countries. There are few formally trained taxonomists in the region, and their numbers need to be increased as do opportunities for them to work with international experts. Skills in research design, monitoring and evaluation, data management and statistical analysis are also needed.

At the grassroots level, organizational capacity building on financial management, governance and environmental legislation are important for CBOs. Local and national conservation NGOs require these plus a wider range of skills to become established and operate successfully and sustainably (see Section 7.9). There is a need for systematic assessment of the capacity needs of domestic civil society organizations at all levels, to identify priorities for capacity building and highlight shared requirements across groups so they can be met through effective, shared initiatives.

Effective conservation of the hotspot's biodiversity requires integrated efforts across a range of sectors and disciplines. This calls for strong networks and partnerships at local, national and regional levels. For example, networks among neighboring CBOs can allow more effective and coordinated management of KBAs at a scale sufficient to maintain

populations of threatened species and other key components of biodiversity. Networks among domestic and international NGOs can facilitate exchange of information and experience about conservation issues and approaches, leading to the development of a shared body of information on good practice. Partnerships between NGOs and private companies can help to introduce new business practices that improve environmental and social performance and bring business benefits, in terms of reduced reputational risk, improved social license to operate, or reduction in costs.

Integration across institutions is also required for more effective management and protection of biodiversity. This means that government agencies will need to work more closely with NGOs and customary resource owners, to develop effective mechanisms for management. Dealing with customary ownership and tenure issues will be especially challenging, and will require innovative solutions and significant investments in trust building. Ultimately, effective management will probably need to combine elements of conventional approaches (such as formal designation of conservation areas), together with community-based management by customary resource owners. Better coordination and information sharing among government departments with responsibilities related to biodiversity conservation will also be required, although it is largely outside the scope of CEPF's mission, which focuses on engaging civil society in biodiversity conservation.

Capacity constraints are not limited to civil society organizations, and there is also a need for institutional strengthening of environment departments and other concerned agencies, to provide them with adequate staffing, equipment and budgets to manage biodiversity. There is a need to identify sustainable and sufficient funding streams for biodiversity management. Support from government budgets and the international donor community needs to increase, while, at the same time, there is a need for policies and demonstration projects that encourage private sector investment in biodiversity conservation. For example, in 1998, the Government of Vanuatu established the Vanuatu Biodiversity Conservation Trust Fund (VBCTF) to finance biodiversity research and conservation work.

Education and awareness-raising, targeting both government representatives and resource owners alike, will need to be an integral part of effective conservation strategies. Awareness raising should focus on the value and importance of biodiversity, as well as on conservation issues, such as movement of invasive species among islands. There is also a need to promote the awareness of environmental laws and regulations related to sustainable biodiversity management, so that communities have a better understanding of their provisions and the rationale behind them. The formal education sector should also review and enhance national curricula, to place emphasis on nature, biodiversity, environment and conservation (Government of PNG 2007).

Integrating conservation efforts into mainstream economic development will also play an integral part of successful conservation strategies. The protection and management of biodiversity cannot be carried out in isolation from other activities. If economic benefits are tied to conserving biodiversity, then stakeholders will better appreciate the value of these resources, and conservation efforts will be more sustainable. With the extensive

biodiversity resources present within the East Melanesian Islands Hotspot, there are numerous opportunities to capitalize on biodiversity for sustainable economic development in ways that enhance rather than deplete natural capital. Examples include ecotourism, production of certified forest and marine products, forest carbon payments under REDD+ schemes, or payments for hydrological services. To avoid irreversible damage to biodiversity resources, efforts should be made to substitute such activities for current, high-impact, extractive activities, which are causing extensive damage to ecosystems and depleting populations of key species.

A key sector in which more environmentally sustainable practices are required is forestry. There have been some initial efforts to introduce sustainable forestry practices to commercial logging concessions and to shift towards small-scale exploitation of natural forest by landowners, which may present more sustainable models, in terms of reduced degradation and loss of natural forest, than the current dominant model. In PNG, for instance, reforestation has begun in some areas, albeit on a relatively small scale, and a five-year logging plan that emphasizes the practice of selective logging has been introduced. Indeed, the logging codes of practice for all three hotspot countries have been designed to attain sustainability of timber resources and the natural environment (Government of PNG 2010, Government of the Solomon Islands 2011). However, there is a need for a major overhaul of taxation policies and licensing regulations if unsustainable logging practices are to be eliminated.

Regulation of the forestry industry is but one area in which there is a need for stronger and more effective policy and legislation to support biodiversity conservation. Work on improving forestry, fisheries and land-use policy and legislation is progressing slowly in the region, and serious constraints remain regarding the implementation and enforcement of existing regulations. Economic development strategies in the hotspot countries continue to emphasize extractive logging practices, with only limited attention to improving management systems so that they can become sustainable. In some cases, new legislation, particularly laws promoting the establishment of community-managed conservation areas, are keeping extractive logging in check, if only locally. Less attention is being paid to broader management of forests outside these areas, however. Despite some limited efforts to improve implementation of land-use planning, this remains very weak across the majority of Pacific developing member countries (ADB 2003). Thus efforts to integrate biodiversity considerations into policy and legislation remain paramount.

Finally, in addressing problems associated with climate change, considerations for future conservation strategies include pursuing support for reduction of GHGs through the Kyoto Protocol, developing working models for REDD+ financing for forest conservation that emphasize biodiversity conservation and benefit sharing for customary resource owners, and mainstreaming adaptation measures into conservation strategies, to enhance resilience to the future effects of climate change.

10. ASSESSMENT OF CURRENT CONSERVATION INVESTMENT

10.1 Introduction

This chapter presents an assessment of recent conservation investments in the East Melanesian Islands Hotspot. Investments for which biodiversity conservation is a primary objective are included in the assessment, together with a small number of investments in rural development, civil society capacity building and climate change that are expected to have significant indirect benefits for biodiversity conservation. The purpose of this assessment is to assist in identifying funding gaps and opportunities for conservation investment in the East Melanesian Islands, and thereby help define a niche for CEPF investment that aligns well with investments by government and other donors.

Quantitative data on conservation investments were compiled from web searches, direct inquiries to donors and grantees, and discussions with stakeholders during the consultation workshops. To provide focus for data collection efforts, and to ensure that results were current, the assessment was restricted to conservation investment in the hotspot over a five-year period from July 1, 2007 to June 30, 2012. For each grant, data on the country of implementation, donor, total award, duration of implementation and project title were obtained. Wherever possible, additional information was collected about the recipient and main objectives of each grant. Several of the assessed grants started or finished outside of the period of analysis. Unless detailed information on annual budgets was available, the amount of investment during the period of analysis was calculated on a *pro rata* basis, based on the proportion of the grant period falling within the period of analysis. Similarly, for multi-country projects, the amount of investment within the hotspot was calculated based on the proportion of project countries within the hotspot.

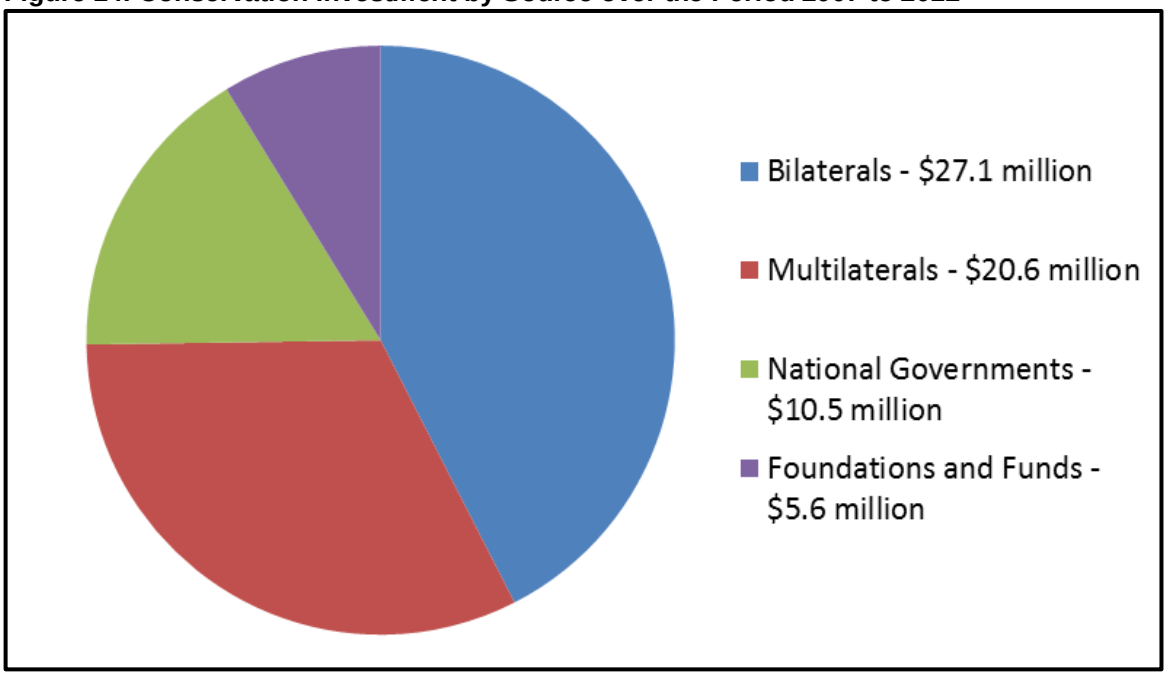
Quantitative data for the period before 2007 were not readily available for many donors. Hence, it was decided to focus the quantitative analysis on a period for which relatively complete data were available, and to analyze trends prior to July 1, 2007 qualitatively. Even for the period 2007-2012, the quantitative data collated during the ecosystem profiling process were not comprehensive. They are useful insofar as they illustrate key patterns of conservation investment in the hotspot but they most likely underestimate the total amount.

The quantitative data were complemented by a qualitative analysis of trends in funding over the last decade (2002-2012). This analysis was based upon review of relevant published and unpublished literature, email correspondence and interviews with selected donors, and discussions with government and civil society recipients of conservation investment at the consultation workshops. The qualitative analysis focused on identifying the main trends and gaps in conservation investment, as well as success factors and barriers to success for conservation projects in the hotspot.

10.2 Major Sources of Investment in the Hotspot

The results of the thematic study provide a picture of conservation investment in the hotspot between 2007 and 2012. At least US$53.4 million was invested in biodiversity conservation by international donors over this period, plus an estimated US$10.5 million by national governments (Figure 14). This is equivalent to an annual investment of around US$12.8 million in biodiversity conservation across the hotspot, which is a very small amount considering the scale of threats to biodiversity (see Chapter 9).

Figure 14. Conservation Investment by Source over the Period 2007 to 2012



Of the at least US$53.4 million invested by international donors over the period of analysis, bilateral agencies provided the largest share, accounting for around half of the total, while multilateral agencies provided a further two-fifths. Investment from private foundations and funds was relatively less, accounting for a little over one-tenth of international donor investment. However, stakeholders consulted during the preparation of the ecosystem profile considered that this was a particularly important source of funding for civil society organizations, especially local and grassroots groups, as it was flexible and relatively accessible. Similar characteristics were credited to the GEF Small Grants Programme, which is managed by UNDP.

10.2.1 National Government Investment

Biodiversity conservation has to compete for national government funding with other budgetary priorities, such as health, education and law and order. Hence, few governments are able to allocate sufficient funding to address even the most pressing biodiversity conservation needs. This is especially true in developing countries, where overall government budgets tend to be low, pressures on biodiversity tend to be high, and

financing conservation is frequently seen as the responsibility of the international community.

Accurate information on national government investment in biodiversity conservation is hard to come by. The governments of the hotspot countries do not report on their expenditure on biodiversity conservation as a line item, and it is frequently difficult to disaggregate biodiversity expenditure from spending on other forms of environmental protection. Therefore, the figures presented in this chapter are estimates based upon an annual expenditure on biodiversity of 0.05 percent of GDP. For PNG, this estimate is further reduced by 80 percent, to account for the fact that only part of the country is located within the hotspot. These calculations give estimates for annual government expenditure on biodiversity conservation of US$1.3 million, US$400,000 and US$400,000 in the PNG islands region, the Solomon Islands and Vanuatu, respectively.

There is clearly a need to conduct more detailed research into patterns and effectiveness of national government investment in biodiversity conservation. For the purposes of the ecosystem profile (which defines an investment strategy for civil society organizations), however, national government investment is excluded from the remaining analyses in this chapter.

10.2.2 Multilateral Donors

The total amount of conservation investment in the East Melanesian Islands Hotspot made by multilateral funding agencies between 2007 and 2012 was at least US$20.6 million (Table 29). The main source of multilateral donor investment over the period of analysis was the GEF, with at least two medium and three full-sized projects implemented, not including the Small Grants Programme. The total budget for these five projects over the period of analysis was more than US$50 million, of which around US$15 million was invested in the hotspot, with the remainder being invested in other countries (and parts of PNG) as part of regional projects. ADB (one) and UNDP (four) were the GEF implementing agencies for these projects, while the World Bank, a major GEF implementing agency in other parts of the world, did not hold any biodiversity projects during the period of analysis. Two of the GEF projects were major regional initiatives with a focus on marine conservation. The other three focused on community-based conservation, including piloting approaches to community-managed conservation areas.

In addition to these five projects, the GEF Small Grants Programme, implemented by UNDP, operates in the three countries of the hotspot. The program provides grants of up to US$50,000 to local communities and NGOs for projects in the following focal areas: biodiversity; climate change mitigation and adaptation; land degradation and sustainable forest management; international waters; and chemicals. In Vanuatu, the Small Grants Programme has been in operation since 2007, over which time around US$470,000 has been awarded under the biodiversity focal area to a range of CBOs and NGOs. In the Solomon Islands, the program has been in operation since 2008, and around US$340,000 has been awarded under the biodiversity focal area. In PNG, the program is much longer

established, having begun in 1994. Since this time, more than US$1.9 million in grants has been awarded for biodiversity projects, although only a small amount (US$55,000) was in the PNG islands region during the period of analysis (UNDP 2012). Additional support for implementation of the Small Grants Programme in the Solomon Islands has been provided by the New Zealand Agency for International Development (NZAID) and AusAID.

Table 29: Overview of Conservation Investment by Multilateral Agencies, 2007-2012

Donor	Main Countries of Intervention	Main Areas of Intervention	Estimated Total Investment 2007-2012 (US$)
GEF (managed by ADB)	PNG, Solomon Islands	Supporting the largest marine conservation initiative in the region: the Coral Triangle Initiative. Total investment via ADB is around US$40 million spread across six countries, including two in the hotspot.	13.3 million
GEF (managed by UNDP)	PNG, Solomon Islands, Vanuatu	Three projects supporting community-based conservation activities in coastal and forest ecosystems. Locations targeted by these projects include Whiteman Range in PNG, Isabel Island in the Solomon Islands and various sites in Vanuatu. A major regional project supporting ocean fisheries management covers the three hotspot countries.	2.7 million
European Union	PNG, Solomon Islands, Vanuatu	Four projects supporting civil society capacity building and social participation in the Solomon Islands and Vanuatu. Several of the beneficiary groups have a focus on biodiversity conservation. An offshore marine conservation project focused on development of sustainable tuna fisheries in the Pacific covers three hotspot countries.	2.5 million
UNDP	Solomon Islands	Strengthening capacity at the Ministry of Environment, Climate Change, Disaster Management and Meteorology and supporting environmental mainstreaming through the Strengthening Environment Management and Reducing the Impact of Climate Change in Solomon Islands project. Project includes community-based activities delivered via the GEF Small Grants Programme.	2.1 million
Total			**20.6 million**

Implementation of the GEF Small Grants Programme at the national level is overseen by National Steering Committees, comprising representatives of government agencies and domestic and international NGOs. These partners provide technical backstopping and support grantees, especially CBOs, with project implementation. In each hotspot country, the program addresses the following two biodiversity objectives of GEF Phase 5: improve the sustainability of protected areas and indigenous and community conservation areas through community-based actions; and mainstream biodiversity conservation into production landscapes, seascapes and sectors. The CEPF investment strategy for the hotspot (Chapter 12) aligns closely with these objectives, and there will be a need for

close coordination at the national level to identify opportunities for synergy and avoid duplication of investment with regard to supporting local civil society.

The indicative allocations for the biodiversity focal area in GEF Phase 5 for the three hotspot countries are provided in Table 30. These allocations are not guaranteed to be invested but the actual figures are likely to be close to the indicative allocations in the table. PNG has by far the largest national allocation under the biodiversity focal area but only a proportion of these funds are expected to be invested in the PNG islands region, with the majority focusing on activities on the mainland or at the national level.

Table 30. GEF-5 Allocations for Countries in the East Melanesian Islands Hotspot

Country	Biodiversity Focal Area ($)	Total Allocation ($)
PNG*	13,320,000	16,490,000
Solomon Islands	3,600,000	6,250,000
Vanuatu	2,550,000	5,440,000

Note: * = figures for the whole country.

The largest GEF investment in the East Melanesian Islands Hotspot under the biodiversity focal area over the next five years will be the full-sized project PAS Community-Based Forest and Coastal Conservation and Resource Management in PNG, implemented by UNDP and supported with US$6,900,000 of GEF funding plus US$12,000,000 in cofinancing. The objective of this project is to develop effective natural resource management and financing systems for community conservation areas. To this end, it will work at the national level to help establish a suitable national enabling environment. This will be complemented by field activities, including at Whiteman Range and other sites in West New Britain, to demonstrate community-based conservation areas and pilot payment for ecosystem services in other complementary sustainable financing systems. In this way, the project will adopt a set of approaches in West New Britain that are similar to those CEPF plans to support in other parts of the hotspot (Chapter 12).

The EU has also been a major investor in biodiversity-conservation-related activities in the hotspot over the last five years. The EU has been a strong supporter of capacity building for civil society organizations in PNG, the Solomon Islands and Vanuatu. These investments have focused variously on CBOs and domestic NGOs. While none of them have had an explicit focus on biodiversity conservation, many of the beneficiary organizations have a conservation-related mission, such as Marovo Island Natural Biodiversity and Livelihood Trust and Kastom Garden Association. One capacity-building initiative not included in Table 29 is the EU-funded Support for Non-State Actors in PNG project, implemented by the Department of Community Development with a budget of US$8 million. This project did not focus explicitly on biodiversity conservation and was nationwide in focus; hence it is unclear to what degree, if at all, support was provided to conservation-focused civil society organizations active in the hotspot. Like the GEF, the EU is also supporting a major regional marine fisheries project. This project, entitled Development of Sustainable Tuna Fisheries in Pacific ACP

Countries Phase 2, has a total budget of more than US$11 million, and focuses on 14 Pacific countries, including the three in the East Melanesian Islands Hotspot. The project is implemented by two key regional institutions: FFA; and the Secretariat of the Pacific Community.

The EU and other multilateral donors are also making major investments in climate change adaptation and mitigation in the hotspot. Examples from the EU include a US$7 million investment in climate change adaptation for the agriculture sector, covering the three hotspot countries, and the US$14 million Disaster Risk Reduction for Eight Pacific States Project, which also covers the hotspot countries (Table 27). Meanwhile, FAO and UNDP are supporting a REDD readiness project in PNG with a budget of US$8 million (Table 26). Bilateral investments in climate change mitigation and adaptation are increasing in number, and already far exceed those in biodiversity conservation. This trend does not necessarily mean a reduction in funding opportunities for conservation-focused civil society organizations. However, representatives of several organizations report that conservation projects increasingly have to be framed in terms of climate change mitigation or adaptation in order to align with donor priorities. As discussed in Chapter 8, most conservation activities in the hotspot may be labeled as climate change adaptation. Because of the high dependence of human communities on natural ecosystems, and the vulnerability of both to climate change, there is large area of overlap between biodiversity, climate change and human well-being goals.

10.2.3 Bilateral Donors

Bilateral donors comprise the second largest category of international conservation donor in the hotspot, investing at least US$27.1 million over the period 2007 to 2012 (Table 31). The majority of the bilateral investment in biodiversity conservation over this period came from two countries: United States ($20.1 million), primarily in the form of support to the Coral Triangle Initiative; and Japan ($5.9 million), for two nationally executed conservation initiatives. One of these, the Project for Promotion of the Grace of the Sea in Coastal Villages, is supporting the Department of Fisheries to implement community-based natural resources management. The other, the Forest Preservation Program, provides institutional support to the PNG Forest Authority. This project is nationwide in scope but includes a forestry inventory for three provinces, including West New Britain.

The Government of France is a major supporter of marine conservation efforts in the Pacific region, most notably through AFD and Fonds Français pour l'Environnement Mondial (FFEM) support to the Coral Reef Initiative for the South Pacific. Total AFD and FFEM investment was €5 million (US$6.2 million), spread across 13 countries, including the Solomon Islands and Vanuatu. The main focus of French development assistance in the hotspot is Vanuatu, where the main priorities are education and rural development/food security. By addressing food security and increasing education levels, these investments are helping establish an enabling environment for biodiversity conservation, although few of them have explicit biodiversity objectives, and are thus not included in this analysis. One exception was the FFEM-funded project Preserving and

Using the Agro-biodiversity of Root and Tuber Crops in Vanuatu, which ran from 2004 to 2009.

The Government of New Zealand, through NZAID, is another major bilateral donor to Vanuatu. Again, many of its projects, while not having direct biodiversity goals, help establish an enabling environment for conservation. An example is ongoing NZAID funding to the Ministry of Lands and Natural Resources for improved security of land ownership and more rapid resolution of land disputes. Investments with more explicit biodiversity goals include a grant to the Forestry Department for a project entitled Enhancing Rural Livelihood Development through Establishment of Community Forestry Nurseries.

Table 31: Overview of Conservation Investment by Bilateral Agencies, 2007-2012

Donor	Main Countries of Intervention	Main Areas of Intervention	Estimated Total Investment 2007-2012 (US$)
United States (USAID, Peace Corps)	PNG, Solomon Islands, Vanuatu	Supporting the largest marine conservation initiative in the region: the Coral Triangle Initiative. Total investment via USAID is around US$60 million spread across six countries, including two in the hotspot. Peace Corps volunteers supporting various projects, including a GEF medium-sized project on community-based conservation in Vanuatu, managed by UNDP.	20.1 million
Japan (JICA)	PNG, Vanuatu	Extensive support for institutional capacity building of PNG Forest Authority through the Forest Preservation Program. Supporting the Vanuatu Department of Fisheries to implemented community-based conservation in coastal communities.	5.9 million
France (AFD, FFEM)	Solomon Islands, Vanuatu	AFD and FFEM supported a major marine conservation initiative: the Coral Reef Initiative for the South Pacific. FFEM also supported an initiative to conserve agro-biodiversity in Vanuatu.	0.8 million
New Zealand (NZAID)	Vanuatu	Supporting various sustainable livelihoods and civil society capacity building initiatives in Vanuatu.	0.3 million
Total			**27.1 million**

As with multilateral donors, bilateral funding for climate change adaption and mitigation is increasing. The Australian Government, in particular, is a major supporter of climate change research and adaptation work in the Pacific region, including the hotspot (Table 27). One example is the International Climate Change Adaptation Initiative, supported with US$20 million of AusAID funding to the Pacific Island Forum countries. This project is improving the understanding of climate change science, and piloting adaptation approaches for coastal zones and small islands. A related initiative, also with the Pacific Islands Forum countries, is the South Pacific Sea Level and Climate Monitoring Project,

financed with US$40 million of AusAID funding. This project is building capacity and conducting climate-change and sea-level monitoring across the 14 Pacific Islands Forum countries. Because biodiversity conservation is not a direct objective of these projects, they are not included in the analysis of conservation investment presented in this chapter.

10.2.4 Foundations and Funds

The third main source of conservation investment in the East Melanesian Islands Hotspot is private foundations and funds. Grants from foundations and funds totaled at least US$5.6 million over the period of analysis (Table 32). This figure is likely an underestimate of the total investment by foundations and funds, as it was not possible to collate the many (often small) grants made by foundations and funds.

Table 32. Overview of Conservation Investment by Foundations and Funds, 2007-2012

Donor	Main Countries of Intervention	Main Areas of Intervention	Estimated Total Investment 2007-2012 (US$)
MacArthur Foundation	PNG, Solomon Islands, Vanuatu	More than 20 grants awarded, supporting a range of initiatives. Particular focus on community-based conservation through the LMMA approach, community rights in the face of development projects, and marine conservation.	3.6 million
Packard Foundation	PNG, Solomon Islands	Sixteen grants awarded, supporting a similar set of grantees and range of initiatives to those supported by the MacArthur Foundation.	2.0 million
Global Greengrants Fund	PNG, Solomon Islands, Vanuatu	More than 10 small grants to domestic NGOs and CBOs for a range of initiatives, with a particular focus on community rights and capacity building for grassroots civil society.	<0.1 million
Mohamed bin Zayed Species Conservation Fund	PNG	Small grant for research on Beck's petrel	<0.1 million
Total			5.6 million

Compared with other biodiversity hotspots, relatively few private foundations are actively supporting conservation efforts in the East Melanesian Islands. The two main foundations are the John D. and Catherine T. MacArthur Foundation and the David and Lucile Packard Foundation, which, together, invested around US$5.6 million in biodiversity conservation projects in the hotspot over the study period. In contrast to most bilateral and multilateral donors, private foundations make civil society organizations the main focus of their grantmaking, and thus the significance of the MacArthur and Packard Foundations to civil-society-led conservation efforts in the hotspot is greater than proportionate contribution to overall conservation investment (approximately 9 percent) would imply.

The two foundations have closely aligned grant portfolios in the East Melanesian Islands (although the Packard Foundation does not directly support activities in Vanuatu), supporting a similar suite of grantees, comprising mostly international and regional civil society organizations, plus a few domestic NGOs, such as FSPI and PNG Centre for LMMAs. The two foundations' grant-making is concentrated in the areas of marine conservation, strengthening land and resource rights of local communities, and community-based conservation, especially in coastal and nearshore marine ecosystems. The two foundations have been instrumental in supporting the establishment of LMMAs across the hotspot (and beyond), and the development of networks among communities and practitioners involved in piloting the LMMA approach. These investments provide a strong foundation for further expansion and strengthening of LMMA networks in the hotspot, and a model for similar networks of community-managed conservation areas in terrestrial ecosystems.

In addition to the two foundations, there are a number of global, regional and national funds supporting biodiversity conservation efforts in the region. An example of a global fund is the Mohammed bin Zayed Species Conservation Fund, which makes available small grants for targeted species conservation efforts. Since its establishment in 2009, the fund has awarded more than US$7 million to over 600 conservation projects globally. Within the East Melanesian Islands Hotspot, however, only a single grant has been awarded to date. Given that other global funds focused on species conservation, such as the Rufford Small Grants Foundation, and the GEF-funded Save Our Species fund, managed by the World Bank, did not support any projects in the hotspot over the period of analysis, the demand for species-focused conservation investment remains largely unmet.

Another example of a fund with global scope is the Global Greengrants Fund, a US-registered nonprofit organization that channels funds from various donors to civil society organizations in developing countries. Since its establishment in 1993, the fund has awarded more than 7,000 small grants around the world, with a focus on global environmental sustainability and social justice. While not all grants directly address conservation issues, by building capacity for research and action among grassroots groups engaged in environmental issues, they help put in place a key enabling condition for effective and dynamic local conservation movements. In the East Melanesian Islands Hotspot, relatively few grants were awarded over the period of analysis, although a large number were awarded on the PNG mainland, which is the main focus of the fund's grantmaking in the Pacific. A particular feature of the Global Greengrants Fund is its use of local advisory bodies to recommend grantee organizations. In the East Melanesia Islands, the responsible body is the Regional Advisory Board for the Pacific Islands, which is composed of representatives of local and international civil society organizations, including Pacific Environment Consultants Ltd, FSPI, PNG Centre for LMMAs and TNC.

At the regional level, the key fund investing in biodiversity conservation is the MGCTF. Established in 2000, with and initial focus on PNG, the fund's mission was extended in 2008 to include Fiji, New Caledonia, the Solomon Islands, Timor-Leste and Vanuatu.

Registered in PNG as a private charitable trust, the MGCTF is working to mobilize funding from a variety of public and private sources to build an endowment of at least US$30 million, which can be used to provide long-term support for sustainable management of the biodiversity resources of the Melanesian Region (MGCTF 2009). The fund is currently supporting numerous conservation areas across PNG, including five within the East Melanesian Islands Hotspot. Elsewhere in the hotspot, the fund has recently established pilot projects in both the Solomon Islands and Vanuatu. The fund has tremendous potential to become a mechanism for sustainably financing civil-society-led conservation efforts in the hotspot. However, the fund is not listed in Table 32 because financial data about its grant portfolio could not be obtained during the ecosystem profiling process.

10.2.5 Other Donors

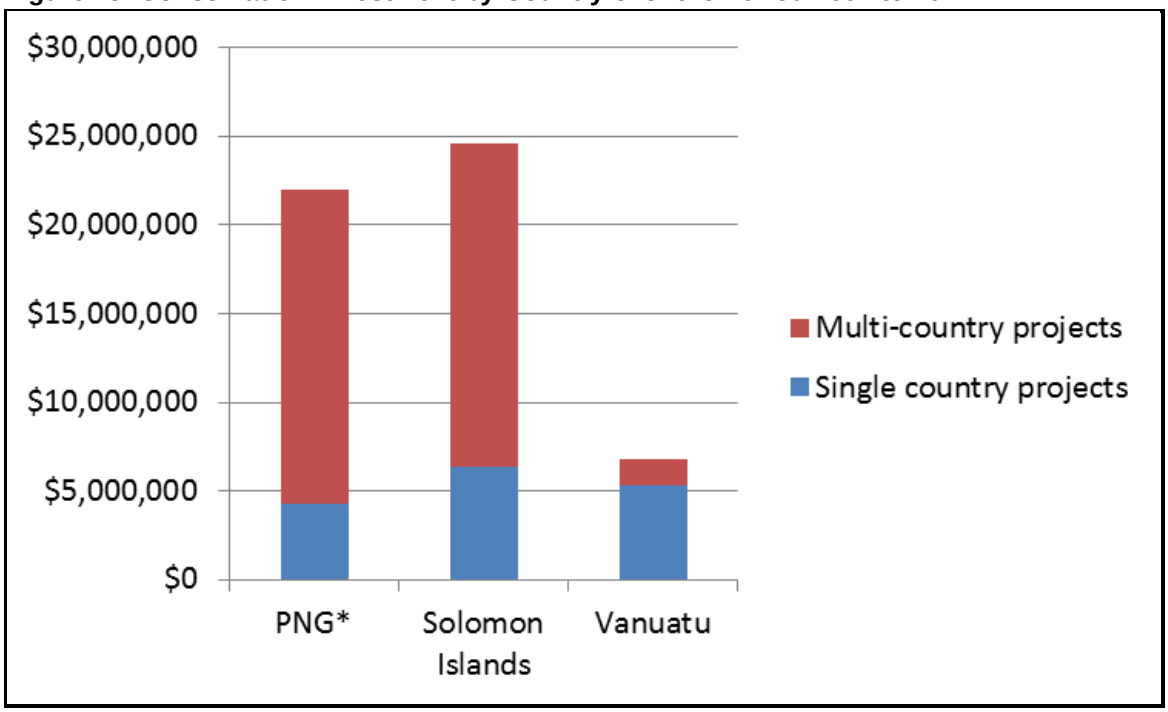
Although detailed financial information could not be obtained about them, a number of other donors are known to be supporting conservation efforts in the hotspot. These include contributions for members of the WWF Network, which are an important source of funding for the WWF West Melanesia Programme, which covers PNG and the Solomon Islands. They also include investments by private companies in biodiversity conservation. For instance, New Britain Palm Oil Ltd has entered into a partnership with the Business and Biodiversity Offsets Program to ensure that there is no net loss of biodiversity associated with any of the company's operations (New Britain Palm Oil Ltd 2011). Other investments are made by tourism operators, to support conservation of coral reefs and other ecosystems that attract tourists.

10.3 Summary of Investment by Country

The data on international donor funding (i.e. excluding investments by national governments) reveal an apparent disparity in the level of investment in each county. The Solomon Islands and the part of PNG within the hotspot both received significantly more conservation investment over the period of analysis than did Vanuatu (Figure 15).

These disparities are largely accounted for by the involvement of PNG and the Solomon Islands in a number of major regional projects, most notably the Coral Triangle Initiative, which singlehanded accounted for more than three-fifths of international conservation investment over the period of analysis. If multi-country projects such as these are excluded from the analysis, then it can be seen that the three parts of the hotspot received roughly similar amounts of investment over the period, with US$4.2 million in PNG, US$6.4 million in the Solomon Islands and US$5.3 million in Vanuatu (Figure 15). These sums, which amount to only around US$1 million per country per year, highlight the tremendous shortfall in conservation investment faced by the three countries, especially for domestic civil society organizations, which rarely access funding for regional initiatives, at least not directly.

Figure 15. Conservation Investment by Country over the Period 2007 to 2012



Note: * = figures for the East Melanesian Islands Hotspot only.

10.3.1 PNG

PNG received very large sums of conservation investment over the period of analysis, of which at least US$22 million was invested in activities within or related to the PNG islands region. The largest conservation investments in the PNG part of the hotspot were three large, multi-country initiatives focused on marine conservation: an EU-funded project on development of sustainable tuna fisheries; a GEF full-sized project on ocean fisheries management, managed by UNDP; and the Coral Triangle Initiative. Once these three initiatives are excluded, PNG only received around US$4.6 million from other sources (less than US$1 million per year), mostly in the form of medium and small grants to civil society organizations from private foundations plus the JICA-supported Forest Preservation Program, which has activities in West New Britain. This is a remarkably small amount, given that the PNG islands region contains more than half the land area and half the human population of the hotspot.

Considering that the three multi-country initiatives that contributed the lion's share of conservation investment in the PNG part of the hotspot over the last five years focused on marine conservation, the conservation investment gap is most pronounced with regard to terrestrial ecosystems. Over the next five years, this gap will be addressed to some degree by the full-sized GEF project, PAS Community-Based Forest and Coastal Conservation and Resource Management in PNG, which began in 2012. However, this project only focuses on West New Britain province within the PNG islands region, and the gap in investment for terrestrial conservation is expected to persist for the other three provinces and Bougainville Autonomous Region. One opportunity to address this gap might be

created if forest carbon financing mechanisms can be successfully established for the country.

10.3.2 Solomon Islands

The Solomon Islands received at least US$24.6 million in conservation investment over the period of analysis. Once again, a large portion of this investment was accounted for by large, multi-country initiatives focused on marine conservation. These included the three projects mentioned under PNG, plus the Coral Reef Initiative for the South Pacific, funded by AFD and FFEM. Once these four initiatives are excluded, the Solomon Islands received at least US$7 million from other sources (around US$1.4 million per year). The largest contributions were made by: UNDP's support to the Ministry of Environment, Conservation, Disaster Management and Meteorology under the Solomon Islands Environment Management and Climate Change Project; a Packard Foundation grant to TNC for development of a marine protected areas network; and a GEF medium-sized project on Isabel Island, managed by UNDP.

As with PNG, the marine realm was the main focus of conservation investment in the Solomon Islands over the period of analysis, with a mix of initiatives covering nearshore and offshore marine ecosystems. Several grants did address the conservation of terrestrial ecosystems, including a number of KBAs. For instance, a suite of MacArthur Foundation grants to AMNH, TNC and the University of Queensland piloted community-managed conservation areas in Gizo, Marovo, Kolombangara Upland Forest and Mount Maetambe - Kolombangara River, spanning natural ecosystems from ridge to reef. Nevertheless, as with PNG, there is a particular gap in conservation investment with regard to terrestrial forest in the Solomon Islands.

10.3.3 Vanuatu

Vanuatu received more than US$6.8 million in conservation investment between 2007 and 2012, which was relatively low compared with the other hotspot countries. Vanuatu was included in three of the large, multi-country marine conservation initiatives (namely the EU-funded project on sustainable tuna fisheries, the GEF project on ocean fisheries management, and the Coral Reef Initiative for the South Pacific) but was not included in the Coral Triangle Initiative, because it lies outside of the areas of highest coral diversity. Excluding these initiatives, Vanuatu received at least US$5.8 million from other sources (around US$1.2 million per year). The largest single contribution was made by the JICA-funded Project for Promotion of the Grace of the Sea in Coastal Villages, which accounted for almost half. The project is implementing integrated community development and sustainable natural resource management activities in pilot villages located within three KBAs: Aneityum; Neck of Malakula-Crab Bay; and North Efate.

Vanuatu has benefited from several projects focused on capacity building for domestic civil society. One example is the Helping People Take Their Destiny in Their Hands in Remote Islands in Vanuatu project, supported by the EU, which reinforced CBOs across the country. Another example is ongoing NZAID support to VANGO, which is helping

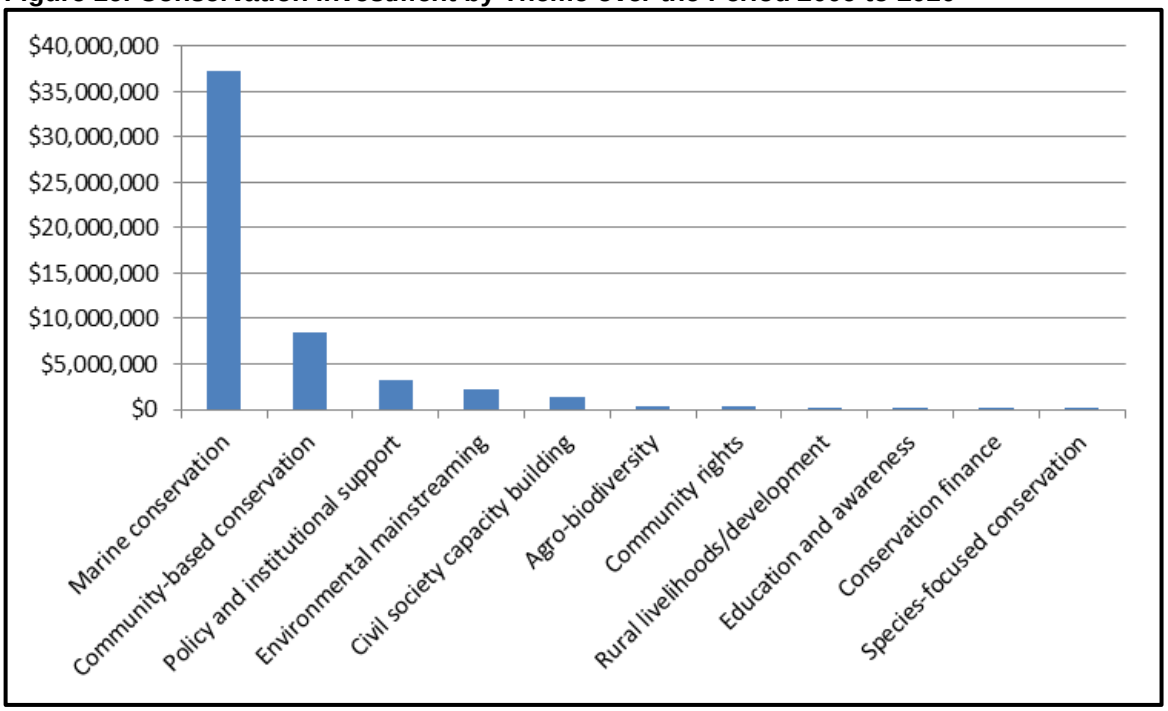
the organization facilitate networking and capacity building for other domestic civil society organizations in the country.

The analysis of conservation investments presented here does not seem to indicate as great a gap with regard to terrestrial ecosystems in Vanuatu compared with the other countries. Major investments to have benefitted the conservation of terrestrial ecosystems include a GEF medium-sized project, managed by UNDP, entitled Facilitating and Strengthening the Conservation Initiatives of Traditional Landholders and their Communities to Achieve Biodiversity Conservation Objectives. This project supported local communities to undertake priority conservation actions at three KBAs, including regulating the coconut crab (*Birgus latro*) harvest in Santo Mountain Chain, initiating permanent biological monitoring sites of Sirity Lagoon on Gaua, and implementing sustainable NRM at Green Hill. Another example is the NZAID-funded Enhancing Rural Livelihood Development through Establishment of Community Forestry Nurseries project, which is supporting activities at these three KBAs plus Ambrym, Epi, Erromango and South Maewo.

10.4 Thematic Distribution of Investment

Each grant collated as part of this analysis was assigned to a conservation theme, based on its objectives. In many cases, particularly for larger grants with multiple components, assignment to a single theme was difficult and relatively subjective. Many grants cover a wide range of issues, and there is some overlap between themes. Nevertheless, several clear patterns emerge (Figure 16).

Figure 16. Conservation Investment by Theme over the Period 2006 to 2010



Note: Significant investments in climate change adaptation and mitigation were made over this period but are not included in the analysis because biodiversity conservation was not a primary objective.

The first is a clear trend towards marine conservation. This is in large part due to the largest single conservation initiative in the hotspot over the period of analysis being the Coral Triangle Initiative. Current funding commitments by ADB, GEF and USAID are scheduled to end during 2012, and stakeholders interviewed were unclear about the future form and scale of the initiative. Nevertheless, even excluding the Coral Triangle Initiative, marine conservation continues to feature strongly in conservation efforts in the region, not least because the focus of most of the investment under the theme of community-based conservation is targeted towards the conservation of coastal and nearshore marine ecosystems, through LMMAs and similar initiatives.

The next trend is towards community-based approaches to biodiversity conservation and away from conventional protected area approaches, which feature strongly among conservation responses to biodiversity loss elsewhere in the world. As discussed in Section 6.6, there are limitations to the applicability and effectiveness of conventional protected areas in countries where customary land ownership predominates and government capacity to enforce management regulations on the ground is extremely limited. As mentioned above, the predominant approach to date has been LMMAs, focusing on coral reefs and other nearshore marine ecosystems. A number of models for community-based conservation of terrestrial habitats have also been piloted, and, at least in Vanuatu, a legislative framework for them put in place.

The other clear trend that emerges from the analysis of conservation investment by theme is that there is an almost complete lack of conservation investment in most thematic areas. The only exceptions are marine conservation, community-based conservation, policy and institutional support (PNG only), environmental mainstreaming (the Solomon Islands only), and civil society capacity building (Vanuatu only). Even for these themes, a strong case could be made that additional funding is needed to respond to even the highest priority conservation issues. For other themes, conservation investment is limited to non-existent. For instance, education and awareness received only around US$100,000 of international donor investment over the period of analysis, while species-focused conservation received less than this in targeted funding. Certain important conservation themes, including invasive species management, did not appear to receive any targeted investment over the period of analysis, although this may partly reflect limitations in data collation.

10.5 Strategic Funding Initiatives

10.5.1 Conservation Trust Funds

Successful and enduring conservation results may require years if not decades of work, and are not ideally suited to short-term, project-by-project financing. Indeed, uncertain and irregular funding is a major constraint to conservation initiatives across the globe. To overcome this constraint, sustainable financing mechanisms provide reliable funding to meet the costs of conservation initiatives over many years, through debt swaps, endowment funds, or other financing mechanisms, such as dedicated conservation taxes and levies. One popular approach has been to establish conservation trust funds, which

can take the form of endowment funds, where only the interest is spent; sinking funds, where the income and part of the capital is spent; and revolving funds, which continually receive and spend new revenues (WWF 2012).

The development of sustainable financing mechanisms for biodiversity conservation is most advanced in PNG and Vanuatu, where there are enabling policies and laws in place governing environmental trust funds, as well as some forms of taxes levied in relation to environmental damage. For instance, PNG's 1991 National Forest Policy (Government of PNG 1991) requires logging companies to pay a fixed reforestation levy based upon the volume of timber extracted. A considerable amount of investment has been collected by the Department of National Planning and Monitoring, as the recipient agency for the levies, and used to establish Reforestation Trust Funds. However, concerns have been raised by the provincial governments in the PNG islands region regarding disbursement from these funds, which are supposed to be used for restoring degraded forest in the impacted provinces.

While delivery and sustainability of the Reforestation Trust Funds is unclear at present, a more effective model appears to be the MGCTF. A national conservation needs assessment undertaken in 1993 recommended the establishment of a conservation trust fund for PNG (Swartzendruber 1993). Following this recommendation, the MGCTF was set up in 2000, with support from a GEF project managed by the World Bank, and has been sustained by support from a wide range of donor organizations, including the Packard Foundation, TNC, WWF, USAID and the German Government. The fund's mission is to provide long-term sustained conservation funding through a grants program. Grant support is complemented by capacity building for landowners, resource users and civil society organizations to design and implement conservation programs. The MGCTF is registered as a private charitable trust and governed by a board of 12 trustees, representing all sectors of national, regional and international civil society.

In 2008, the MGCTF's trustees voted to expand its grants program to cover other countries in Melanesia, including the Solomon Islands and Vanuatu. The expanded mission of the fund has four strategies (MGCTF 2009):

- Promote initiatives by people living in and around selected conservation areas to increase the value and better evaluate the livelihood benefits of natural resources.
- Empower people from the communities to assume responsibility for the long-term management of their natural resources.
- Encourage the creation of innovative partnerships between nonprofit organizations, the private sector and government agencies.
- Develop the technical, financial and management capability of natural resource managers in targeted conservation areas.

The VBCTF was established by the Vanuatu government under the auspices of the Forestry Department in September 1998. The VBCTF was principally established to provide a continuous source of funding for the retention of forests in Vanuatu and related biological conservation. A trustee (Pacific Integrated Trust Company) was appointed to

oversee the management of the fund, and a technical advisory board was established, made up of representatives from the Forestry Department, the Department of Environment and Conservation, the National Council of Chiefs, and Vanuatu Cultural Center (Government of Vanuatu 2002). In contrast with the MGCTF, the VBCTF has a representative from the National Council of Chiefs to ensure a voice for customary landowners in the decision-making processes.

10.5.2 Payments for Ecosystem Services

Payments for ecosystem services are another rapidly developing field, and one with great potential to provide long-term funding for biodiversity conservation. These payments may be made directly to landowners to incentivize certain actions or compensate them for the opportunity costs of conservation, or used to capitalize trust funds. The main area currently receiving attention is payments for avoided deforestation, through REDD+ mechanisms. There is one national-level REDD+ pilot in West New Britain province, PNG, at the design stage, as well as pilot projects in PNG's Manus province and on Vanuatu's Malakula Island at the initial planning stage. Other areas with potential for the development of payments for ecosystem services include hydrological services, for hydropower dams or municipal water utilities, for instance.

10.6 Success Factors and Barriers to Success

As the analysis in this chapter shows, the level of investment in conservation by national governments and international donors is insufficient to address the threats to biodiversity outlined in Chapter 9. It is all the more important, therefore, to ensure that those resources that are available are used as effectively and efficiently as possible. To this end, particular emphasis was paid, during the stakeholder consultation workshops, to capturing lessons learned from past conservation initiatives in the hotspot in order to identify success factors and barriers to success. The factors influencing success of conservation projects that were identified are, inevitably, subjective. However, they draw on the combined experience of a broad spectrum of conservation practitioners from government, civil society and donor agencies involved in initiatives across the hotspot.

10.6.1 Project Design

Barriers to Success

Too often, poor results of conservation initiatives can be traced back to shortcomings in project design. While all projects and, thus, their specific designs are different, there are general features of the design process that are common to most. Stakeholders identified four main barriers to success related to project design: focus; expectations; power dynamics; and scale. These are discussed in turn.

A weakness of the design of many projects is that they focus on issues of concern to conservationists but not to communities. This may reflect lack of understanding of the socioeconomic environment or a preoccupation with conservation goals. Focusing too narrowly on the focal species or habitat can become a barrier to success if it results in

projects that do not take account of communities' needs, have goals that appear esoteric to them, or adopt approaches that are inconsistent with custom and traditional practices.

Another shortcoming of the project design process can be unrealistic expectations about the goals of the project. Conservationists may think about a project in terms of the conservation outcomes it is expected to deliver, while communities are more likely to think in terms of the development benefits they will receive. Trade-offs between these two overlapping but separate sets of objectives can lead to disillusionment and tensions down the road. Moreover, some conservation organizations have reportedly inflated communities' expectations during the design phase in order to build support and enthusiasm for their projects, for instance in regard to incentive payments. This pattern of over-promising and under-delivering has undermined trust between conservation groups and the communities they purport to be supporting.

The greater access to resources, information and political influence of national and international civil society organizations creates power imbalances in their relationships with local communities. These are compounded by the ability of civil society organizations to "walk away from" a project if implementation goes awry, whereas community members are left to deal with problems that have arisen. Where civil society organizations are unaware of power inequalities or do not mitigate them, a lack of trust can ensue, and a top-down, patron-client relationship can develop.

The fourth key barrier to success arising from project design is that of scale. Many projects are too large and too complicated, with complex institutional arrangements, and over-ambitious goals. These problems are compounded by short timeframes, which do not allow time to build relationships with project partners, reach a common understanding of project approach and goals, or respond to inevitable unforeseen delays in implementation. Short project periods also constraint the sustainability of new approaches, because these typically require time to demonstrate benefits and may require additional funding to maintain.

Success Factors

Stakeholders reported that successful projects were ones that concentrated on local people's priorities, and found ways to match existing community interests or initiatives to conservation goals. It was mentioned that there are some good examples from the work of TNC with communities on Choiseul and Isabel Islands that could be drawn on, for instance using three-dimensional participatory mapping as a means to develop a common understanding of resource management issues and identify areas of overlap between community interests and those of conservationists. This is consistent with the Principles for Nature Conservation in the Pacific developed by the Roundtable for Nature Conservation in the Pacific Islands Region, which state that *"international and national partners will actively recognise, respect and support community aspirations for development and well-being"* (SPREP and IUCN 2007).

To ensure realistic community expectations about projects, a key ingredient of project design is open discussions, involving all sections of the community. These should be

spaced out to allow the community to discuss internally between each round of discussion. Ideally, the timeline for project design should be open ended, so that the final design is based on a shared understanding between all project partners, and the process is not truncated to fit with an externally imposed deadline. Also, the design process should result in a clear definition of the roles and responsibilities of all partners to manage expectations of who will contribute what to implementation. This is in line with the Principles for Nature Conservation in the Pacific, under which partners commit to *"reinforcing participatory approaches by involving all stakeholders, particularly community representatives when designing, implementing and assessing conservation programmes"* (SPREP and IUCN 2007).

Projects that have successfully addressed power dynamics in project design, such as TNC's work with the Lauru Land Conference of Tribal Chiefs on Choiseul Island, have been preceded by an extensive period of awareness raising and trust building. This has allowed project partners to understand each other's goals, establish equitable benefit sharing and understand land ownership conditions. One suggestion, to operationalize such an approach within a grants program, was to make provision for planning grants, which would allow conservation groups to work with a community for one to three years, to build relationships and a shared understanding of issues, without pressure to deliver outputs. It was noted, however, that there would be a need to manage the community's expectations so that they were aware that the planning grant may not necessarily lead to a project.

Finally, regarding scale, there was broad consensus that, at least for projects led by civil society, small and medium-sized projects (i.e. under US$1 million) were most cost effective, and least likely to encounter implementation delays due to complexity. Moreover, there was complete consensus that longer timeframes were a key success factor for conservation projects. As mentioned in Section 5.2.2, all on-the-ground conservation activities in the hotspot must be implemented with the participation and consent of local communities, and this requires considerable upfront investment in relationship building, followed by community capacity building, and finally by establishment of structures and financial mechanisms for sustainability. For instance, before WCS commits to working at a site in PNG, it asks whether it would be reasonable to work there for at least 20 years (R. Sinclair verbally 2012). Many stakeholders advocated for project periods of seven to eight years, and some for as long as possible. This is consistent with the Principles for Nature Conservation in the Pacific, under which partners commit to *"ensuring their conservation programmes are of a scale and budget appropriate to the local context"* (SPREP and IUCN 2007).

10.6.2 Project Implementation

Barriers to Success

Although the shortcomings of conservation projects can sometimes be attributed to the project design process, more often the design of projects is relatively sound but they fail due to problems encountered during implementation. Some of these problems are specific to the enabling environment for conservation in the East Melanesian Islands, whereas

some are common to conservation projects globally. Stakeholders identified four main barriers to success related to project implementation: relationships with communities; government support; implementation capacity; and donor requirements. These are considered in turn.

A weakness with the implementation of many projects is that, even when relationships based on trust and shared goals have been developed between civil society organizations and communities, these break down over time due to staffing turnover, delays and miscommunication. Another reason for breakdown in relationships with communities is that, once project implementation begins, there may be an unequal distribution of costs and benefits among community members, for instance if people are not adequately compensated for loss of income from natural resource exploitation.

In some cases, this weakness is compounded by civil society organizations establishing or engaging with inappropriate governance structures at the community level. Simply being composed of its members does not necessarily make a CBO representative of a community or act in its best interests. Conservationists are not always sensitive to the fact that CBOs may be composed of local elites with vested interest and conflicting agendas, limited gender representation, and issues of authenticity and legitimacy.

Another problem commonly encountered during project implementation is weak government support. With limited capacity and financial resources, and, in some cases, without a clear mandate to support biodiversity conservation efforts, relevant government agencies may be unwilling or unable to support a particular conservation project. Indeed, in the absence of clear policy directives and appropriate performance incentives, government officials may have very little motivation to support conservation initiatives, particularly ones initiated by civil society organizations.

Another barrier to success encountered during project implementation is that conservation groups do not always have the capacity to implement the projects they develop. For international and domestic civil society organizations alike, the need to cover staff salaries and other recurrent costs in their headquarters and field offices creates an imperative to continually raise project funding. However, the persons responsible for designing projects are often not the people implementing them, and the former are not always conscious of the constraints and conflicting time demands on the latter. This problem can be compounded by turnover in staff or failure to communicate the project rationale and vision from designers to implementers.

Several stakeholders reported that capacity limitations were compounded by the administrative and reporting requirements of conservation donors, which overwhelm staff to the point that they cannot focus on implementing activities. It was observed that this was a particular problem for domestic civil society organizations, which tend to be less familiar with donor requirements, but also applied to INGOs. This barrier is linked to the heavy dependence of civil society organizations on grant funding, with short project cycles and frequent reporting. A related issue, identified by Hay and Schuster (2009) in their review of NZAID's support to the GEF Small Grants Programme in the Pacific, is

that delays in disbursement of project funds from donor to implementer have major implications for the effectiveness of project implementation, such as creating difficulties with the recruitment and retention of project staff.

Success Factors

Stakeholders participating in consultation workshops observed that successful projects build strong, lasting relationship with communities. One way of achieving this is by developing a good understanding of the social and cultural landscape, through making a long-term commitment to working at a project site. Another means of building trust is to invest in social capital, especially at the front end of an initiative, for instance by providing scholarships to students from the community, such as AMNH has done in its work on Kolombangara and Tetepare Islands. Yet another means is through instituting a systematic process of participatory planning and monitoring, leading to the creation of shared knowledge between conservation group and community, which can be used to inform transparent decisions about project implementation. This is consistent with the Principles for Nature Conservation in the Pacific, under which partners commit to *"actively recognise, respect and support community decision-making practices"* (SPREP and IUCN 2007).

Participatory planning and monitoring was also identified as a means of ensuring government support for project objectives, as was establishing active links between projects and government structures at local and provincial levels. The importance of aligning project objectives to the goals of NBSAPs and other national conservation and development strategies was emphasized as a requirement for building government support at the national level. This is consistent with the Principles for Nature Conservation in the Pacific, under which international partners commit to *"working within the legislation, policies, strategies, programmes and priorities established by national partners"* (SPREP and IUCN 2007).

Implementation capacity is related to the broader issue of civil society capacity, which is discussed in the following section. As a general principle for conservation donors to abide by, the following recommendation by Hay and Schuster (2009) is deserving of attention: grantee capacity should be systematically assessed early in the grantmaking process; it is insufficient to assess funding applications based upon their technical merit alone. Beyond this recommendation, stakeholders emphasized the significant potential of partnering as a means for overcoming capacity limitations, whereby a high-capacity international or regional civil society organization regrants funds to local partners, accompanied by strong technical and administrative support. It was observed that some conservation donors insist upon such arrangements as a means of mitigating the risk of funding local groups. This is consistent with the Principles for Nature Conservation in the Pacific, under which international partners commit to *"supporting national partners in their efforts to build effective and sustainable national institutions"* (SPREP and IUCN 2007).

With regard to donor requirements, private foundations and funds were cited as having the least onerous application and reporting requirements, and, therefore, being accessible

to the widest range of civil society organizations. However, it was recognized that accountability is a key requirement of all international donors, particularly where public funds are concerned, and that partnership arrangements with larger organizations may represent a good model for channeling resources to smaller, local groups.

10.6.3 Civil Society Capacity

Barriers to Success

Of the estimated US$53.4 million invested in biodiversity conservation in the hotspot by international donors over the last five years, only US$1.2 million (2 percent of the total) was granted directly to domestic civil society organizations. Although a larger amount may have reached them indirectly, via subgrants under other projects, this low level of funding is at once a symptom and a cause of limited capacity among domestic civil society organizations working on biodiversity conservation in the hotspot. Stakeholders identified three main barriers to success related to civil society capacity: human resources; sustainable financing; and financial controls. These are considered in turn.

Human resources limitations are a barrier to conservation success because they constrain civil society organizations' ability to design and implement effective conservation projects, and reduce their credibility with government as an independent source of advice on conservation issues. One reason why civil society organizations face human resources limitations is that there is a scarcity of appropriately qualified and experienced people in the conservation field in each of the hotspot countries. A second reason is that recruitment and retention of suitable staff is a challenge for organizations because reliance on grant funding prevents them from offering permanent contracts or investing in professional development. Domestic NGOs also report that they cannot compete with INGOs and private sector companies in terms of the salary and benefit packages they can offer employees.

Due to the human resource limitations outlined above, combined with a lack of access to conservation donors based outside of the region, domestic NGOs report difficulties in covering their core operating costs. Many NGOs are dependent upon securing grants to sustain themselves over the long term. However, these grants typically place a cap on the percentage of funds that can be used to cover general operating costs, such as rent, utility bills and administrative staff. Inability to employ administrative staff or cover core costs further limits the ability to raise new funding. Reliance on grant funding also creates uncertainty and leads to "stop-start" project implementation, which can be damaging for relationships with local communities.

Another barrier to accessing international donor funding faced by domestic NGOs is that their financial controls are typically not at a standard that bilateral and multilateral donors are comfortable with. In part, this relates back to the inability to recruit full-time accountants and other administrative staff. As a result, domestic NGOs have access to a limited number of funding sources, mainly private foundations and funds, plus the GEF Small Grants Programme. There is often strong competition for grants from these sources, which are, in any case, often of short duration (one to three years). Finally, in the

context of financial controls, the issue of weak civil society governance, which can create opportunities for fraud and corruption, should not be overlooked.

Success Factors

A successful approach to addressing the barrier created by human resource constraints has been investing in individual capacity development through courses at universities in the region. A good model was the Strengthening Conservation Capacity Project at UPNG, which ran a module-based course on conservation for NGO and CBO staff. This course was funded by international donors, including the MacArthur Foundation, and ran from 2002 until 2012, when the funding ran out. A similar example is provided by the Pacific Islands Community-based Conservation Course, at USP, funded through a combination of fees and scholarships. While such courses can increase the pool of talent that domestic civil society organizations can draw on, they do nothing to address the challenge of retaining qualified staff in the face of competition from INGOs and the private sector. This requires the financial constraints facing civil society organizations to be overcome. This is consistent with the Principles for Nature Conservation in the Pacific, which emphasize *"building effective and sustainable conservation capability and organisations through on-going capacity development"* (SPREP and IUCN 2007).

One approach to doing this is to make available unrestricted core funding to domestic civil society organizations to enable them to invest in recruitment and professional development of a small core of staff who can steer the development of the organization. While all stakeholders agreed with the need to invest in the emergence of domestic civil society organizations as a prerequisite for the long-term sustainability of conservation efforts, a number pointed out the challenges inherent in awarding unrestricted funds, including in relation to accountability in the use of funding and transparency in the selection of recipient organizations.

With regard to the barrier presented by inadequate financial controls, partnering between domestic NGOs and INGOs was pointed to as an approach with demonstrated success. Another suggestion was to invest in a centralized accounting capacity that could be shared among several organizations unable to hire full-time accountants. Such centralized capacity would strengthen the financial controls of domestic NGOs without making them dependent on INGOs as conduits for funding. It was further suggested that centralized capacity could be considered as a solution for other capacity needs as well. This is consistent with the Principles for Nature Conservation in the Pacific, which state that *"international partners will commit to strengthening national and local partners as an alternative to establishing their own institutions and infrastructure"* (SPREP and IUCN 2007).

10.6.4 Community Participation

Barriers to Success

In the East Melanesian Islands, communities and their organizations are critical to the success and sustainability of conservation efforts on the ground. There was strong agreement among stakeholders that strong and effective community participation was a

prerequisite of conservation success, although they identified four main barriers to achieving this: land disputes; alternatives to resource exploitation; partnership effectiveness; and delivery. This section discusses each barrier in turn.

Land disputes were considered by several stakeholders to be the number one barrier to success, because of their negative impact on community cohesion, and their tendency to impede collective action. Land disputes arise from competing claims of ownership over land, and are sometimes exacerbated by outside interests taking advantage of them to gain access to land for commercial resource extraction. In some cases, one of more of the disputing parties may not actually be resident on or near the land in question but be pursuing claims based upon ancestry.

Another obstacle to effective community participation is lack of alternatives to unsustainable resource extraction. Several community-based conservation approaches have been piloted in the hotspot, based upon models of sustainable natural resources management within traditional governance frameworks. Some of these pilots have met with success at the level of individual sites, such as with LMMAs in PNG and community conservation areas in Vanuatu. However, these approaches have not always been easy to replicate, particularly in places where commercial exploitation of natural resources promises immediate income and employment generation (albeit short term). In large part, this is because sustainable management of natural resources does not often deliver comparable short-term returns to communities, especially ones living in remote areas with limited market access. Indeed, it was observed for PNG that conservationists have been unable to develop realistic economic alternatives to commercial logging, mining and plantations, and have thus targeted areas that are not threatened by such developments. PES mechanisms, especially REDD, do have the potential to provide economically viable alternatives to commercial logging, plantations and (arguably) mining. However, communities typically lack the information about costs and benefits to make informed decisions, and are often dependent upon information provided by parties with a vested interest in the development proceeding.

Lack of effective, equitable partnerships between communities and the NGOs and other civil society organizations that work with them is another barrier to effective community participation in conservation. It was reported that some civil society organizations working at the community level pay lip service to the ideals of partnership but are quick to walk away from their relationships with communities once funding dries up. At the other extreme, it was mentioned that some NGOs, by working with particular communities for too long, create dependency, inhibit grassroots capacity building, and create confusion about ownership of the project. In both cases, top-down management, with decisions being made in remote headquarters determining the direction of relationships on the ground, was cited as an obstacle to equitable partnerships.

Even where communities are united, supportive of sustainable management of their land and resources, and supported by equitable partnerships, the inability of communities and their organizations to deliver on conservation commitments can be a major barrier to success. Only a minority of CBOs in the hotspot are legally registered, with a bank account, and therefore in a position to receive donor funding. For the ones that are not,

financial and technical support may be provided to them by NGO partners but the record of delivery is mixed. For the ones that are legally entitled to receive grants, donor reporting requirements may be quite alien to them, and activities may get sidelined as CBO members attend to other priorities.

Success Factors

Addressing land disputes is a challenging undertaking, requiring expertise in dispute resolution and trust on all sides. Projects that have been successful in this regard have paid attention to including all sections of the community in design and implementation of project activities. They have also invested time in developing a good understanding of the social and cultural context of the project.

There are no simple solutions to the lack of viable alternatives to unsustainable resource extraction. REDD mechanisms may provide a viable alternative in some contexts but development of the necessary legislation and implementation frameworks at national and sub-national levels is predicted to take years, and, even then, roll out of benefit-sharing mechanisms at the community level is unlikely to be rapid. One successful approach proposed by stakeholders was to focus on awareness raising for customary landowners to help them understand the costs and benefits of different land-use options. In this regard, the power of successful demonstration projects as a means of stimulating emulation and replication was emphasized. Some stakeholders highlighted the potential of direct financial incentives as a mechanism to compensate landowners for the opportunity costs of foregone income from unsustainable resource extraction, such as the conservation agreements piloted for Tetepare Island. It was added that, within the cultural context of East Melanesia, social contracts can be powerful engines for reinforcing certain types of behavior.

Stakeholders were clear about the success factors for effective, equitable partnerships between conservation-focused civil society organizations and local communities: a partnership should be long-term, based on a relationship of mutual trust; both parties should invest in the partnership, so there is shared ownership, respect and pride; and both parties should be accountable to one another. This is consistent with the Principles for Nature Conservation in the Pacific, under which partners commit to *"ensuring systems are in place to enable full accountability to the people affected by conservation programme implementation"* (SPREP and IUCN 2007).

Successful approaches for enhancing the delivery of CBOs include partnering arrangements with a domestic NGO. For example, Makira Community Conservation Foundation, as a legal registered NGO, channels international donor funding, such as a GEF small grants, to community groups, and helps them with their financial reporting. A refinement of this approach is to build the capacity of CBOs to the point at which they can apply for small grants directly, paying particular emphasis to governance arrangements. This approach has been adopted with some success by BirdLife, SICCP and TNC, and it is consistent with the Principles for Nature Conservation in the Pacific, under which international partners commit to *"supporting national partners and*

communities in their efforts to develop leadership, project directing and management skills" (SPREP and IUCN 2007).

10.6.5 Conservation Areas

Barriers to Success

As discussed in Section 6.6, there are limitations to the application of conventional protected area approaches in the East Melanesian Islands, due to the context of customary ownership of land and resources and limited government capacity. There a few formal protected areas, mostly established on alienated land under state ownership, and with little or no management capacity. Various community-based conservation areas have been established by communities across the hotspot, often with external support. However, despite some promising results from pilot projects, these have also encountered barriers to success, particularly in relation to scale, formal recognition and management planning.

With regard to scale, the key barrier is that ownership of areas of land or sea large enough to support functioning ecological units and support viable populations of plant and animal species is usually shared among multiple communities with little or no history of cooperation. There is thus a mismatch between the scale at which conservation interventions are practical from a social perspective and the scale at which they are meaningful from an ecological perspective. Conservation-focused civil society organizations that overlook this end up either supporting the establishment of conservation areas that would not be viable if degradation of adjacent areas left them isolated, or attempting to create management structures for which there is no basis in traditional community institutions.

The legislative framework governing the establishment of community-based conservation areas varies among the hotspot countries, and only in Vanuatu can it be considered enabling of conservation of entire ecosystems. In the absence of a clear legislative framework, some communities have established informal conservation areas under their own initiative. While these can provide a framework for sustainable community-based management of natural resources, the lack of formal recognition affords them no protection from incompatible developments, such as logging concessions, mines or hydropower dams. Even conservation areas that are formally recognized by one government department are unlikely to be incorporated into plans developed by other departments, due to limited inter-sectoral cooperation. Hence, conservation areas are at risk of being undermined by developments in other sectors.

With the exception of Vanuatu, conservation areas are not required, under statutory law, to develop management plans. Without development of management plans that are reviewed and approved by a technical department responsible for biodiversity conservation, communities are at liberty to introduce management regimes based on unsustainable or destructive practices. This shortcoming was recognized by a recent assessment of protected area management in PNG, conducted by WWF (2009), which

found most community-managed conservation areas to lack appropriate management plans.

Success Factors

A successful approach to responding to the challenge of establishing conservation areas at an appropriate social and ecological scale has been for civil society organizations to work with all communities with customary ownership or tenure rights over an ecologically meaningful unit (such as a river catchment) but to establish separate management structures at the community level. An additional important consideration, emphasized by stakeholders, is that communities are defined by genealogy, not geography, and it may be important to engage groups that are located in urban areas, on different islands or otherwise removed from the site in question.

Regarding formal recognition, there was consensus among stakeholders that registering community-based conservation areas with government can provide benefits and create a foundation for mainstreaming their conservation objectives into other sectors. However, it was stressed that formal recognition is only the first stage in the mainstreaming process, and there is a need to proactively engage with other sectors to ensure that these areas are integrated into development plans and given adequate safeguards in processes to clear applications for mining leases, special agriculture and business leases, etc. It was also emphasized that registration of protected areas should be a tool not the endpoint of a project, as it should be followed by support to the concerned communities with development and implementation of management regimes and benefit sharing mechanisms.

Stakeholders emphasized the value of clear and simple management plans with descriptive rules, such as the one for Pere LMMA in Manus province, PNG. The importance of building on customary conservation practices was also stressed, as was the need to incorporate traditional knowledge into management plans, so that they are relevant to local people. This is in line with the Principles for Nature Conservation in the Pacific, under which partners commit to *"actively recognise, respect and support community property rights, including traditional rights over natural resources, indigenous intellectual property relating to natural resources, and cultural knowledge"* (SPREP and IUCN 2007).

10.7 Recommendations

At more than US$10 million per year, conservation investment in the East Melanesian Islands Hotspot over the period 2007 to 2012 has been substantial, albeit insufficient to address the growing pressures on biodiversity from deforestation, agricultural expansion, mining, coastal development, overexploitation and other threats. Apart from the overall shortage of conservation investment in the hotspot, the investment that has been made over the last five years has been skewed heavily towards marine conservation. Recent, major investments in terrestrial conservation will go some way toward redressing this imbalance, although these, in turn, are concentrated heavily in PNG's West New Britain province, leaving most other terrestrial areas severely lacking in conservation investment.

In terms of thematic distribution of investment, besides marine conservation, which has been relatively well funded, the bulk of conservation investment has been directed towards community-based conservation initiatives, such as the establishment of a network of LMMAs across the western Pacific region. For all other thematic areas, investments have either been minimal or concentrated in a single country, leaving gaps in the other two.

Although not reviewed in detail in this chapter, climate change research, adaptation and mitigation are attracting increasing amounts of investment from international donors. Conservation-focused civil society organizations are increasingly framing their programs in terms of reducing GHG emissions from deforestation and forest degradation, and building resilience to climate change among communities and ecosystems. It is as yet unclear how effective climate changing funding will be at conserving the biodiversity values of the hotspot but it is unlikely to be an adequate substitute for dedicated conservation funding focused on globally significant biodiversity.

Key areas that would benefit from CEPF investment and lead to maximum impact in the East Melanesian Islands Hotspot include:

- Conservation approaches that empower local communities to protect and manage globally significant biodiversity, with a principal focus on terrestrial habitats but also including contiguous coastal and nearshore marine habitats where opportunities for ridge-to-reef conservation exist.
- Targeted conservation efforts for globally threatened species that are not well addressed by habitat conservation alone.
- Strategic investment in civil society capacity building at individual, organization and network scales, to support the emergence of local conservation movements that can sustain and expand conservation efforts beyond the CEPF investment period.
- Use of a regional implementation team to coordinate CEPF investments into a coherent grant portfolio, increase their accessibility to local groups, and align them with investments by other donors active in the hotspot.
- Extension of the investment period from five to eight years, to allow sufficient time to invest in partnership and capacity building, and achieve durable results.

11. CEPF INVESTMENT NICHE

Over the last five years, governments, international donors and civil society organizations (including the private sector) have made a collective investment of at least US$63 million in biodiversity conservation in the East Melanesian Islands Hotspot (see Chapter 10). Compared with many other hotspots, this baseline level of conservation investment is low, and is projected to diminish further, as a number of traditional supporters of biodiversity conservation scale down their activities in the hotspot or shift towards climate change and other priorities. At the same time, pressures on biodiversity are increasing, as population growth and urbanization proceed rapidly, and economic development remains on an unsustainable path. Consequently, there is a large and

growing shortfall between the baseline level of conservation investment, and the level required to address threats facing all globally significant biodiversity (i.e. species, site and corridor outcomes) in the hotspot. With the level of resources typically available, the incremental investment by CEPF will only be partly able to meet this shortfall. Thus, there is a need to allocate this investment wisely, towards the highest priorities for civil-society-led conservation action.

The purpose of the investment niche is to define where CEPF investment can make the greatest and most sustained contribution to the conservation of globally important biodiversity within the East Melanesian Islands Hotspot, within the context of other investments made by government, donors and civil society. To this end, the CEPF niche avoids duplicating other investments, while realizing opportunities for synergy, where possible. The niche is informed by the conservation outcomes defined in Chapter 4, the capacities and needs of civil society organizations reviewed in Chapter 7, the threats to biodiversity assessed in Chapter 9, the patterns and trends in conservation investment by other actors set out in Chapter 10, and the other thematic analyses presented in the profile. The precise scope of the niche was established during the stakeholder consultation workshops, at which draft results from desk studies were presented and verified, and participants were invited to propose priorities for CEPF investment.

The CEPF investment niche was defined in three dimensions. Taxonomic priorities for investment were defined as a set of "priority species", by selecting priorities from among the list of species outcomes (Appendix 1). Geographic priorities for investment were defined as a set of "priority sites" by selecting priorities from among the list of site outcomes (Appendix 2). Thematic priorities for investment were defined as a set of investment priorities grouped under broad strategic directions by identifying fields of work that: contribute to the conservation of priority species and sites; fill gaps in existing conservation investment; address high priority threats; focus where civil society can make the most effective contribution to conservation; and, where appropriate, deliver human well-being benefits.

The ecosystem profile presents a common vision for action, formulated through an inclusive, participatory process that engaged more than 150 representatives of civil society, donor and government organizations in the East Melanesian Islands Hotspot. The profile articulates an investment strategy (Chapter 12) that focuses on those taxonomic, geographic and thematic priorities where additional resources can be used most effectively in support of civil society initiatives that complement and better target investments by national governments and other donors. At the same time, the profile focuses attention on activities that can contribute to protection of the rights and assets of the rural poor while addressing biodiversity conservation. The basic premise underlying the investment niche is that conservation investment should be targeted where it can have the maximum impact on the highest conservation priorities, while providing opportunities to strengthen and engage civil society, and support the livelihoods of poor communities. In this way, the investment niche complements funding provided by other organizations while playing to CEPF's unique strengths and contributing to the fund's global objectives.

Specifically, the CEPF niche recognizes the unique conditions that prevail in the East Melanesian Islands Hotspot. First, constitutionally guaranteed customary land and resource tenure, with more than 90 percent of the rural population remaining on customary land and retaining traditional belief systems and resource management practices, creates a particular set of challenges and opportunities. Conventional, government-managed protected areas are generally not an effective or widely applicable conservation tool, whereas community-managed conservation areas are better suited to the local context, and a growing body of good practice exists, particularly with LMMAs. Nevertheless, where there is a lack of community cohesion, customary ownership and tenure arrangements can be vulnerable to exploitation by commercial logging, mining or plantation interests.

Second, overall levels of capacity among civil society are relatively low, especially among those sections that are best placed to conserve biodiversity on customary land. It was widely recognized during the stakeholder consultations that conservation actions need to be understood, owned and implemented by local communities themselves, if they are to be sustained and effective. However, these conditions are rarely met by communities in the hotspot, and very few have the necessary capacity and legal status to receive CEPF funding directly. International and regional NGOs and universities generally have much greater capacity to develop and manage conservation projects than communities, with national NGOs being intermediate between the two. There are some good examples of partnerships that draw on the relative strengths of civil society at different levels but more needs to be done in this area.

Third, as an archipelagic hotspot, the East Melanesian Islands support high levels of localized endemism. Coupled with this, the region has been the focus of relatively little primary research, particularly in recent decades, meaning that reliable information on the biodiversity values of many sites is either lacking or outdated. Moreover, traditional ecological knowledge is rarely documented or integrated with western scientific tradition, to develop a shared understanding of biodiversity values between local communities and outside conservationists and researchers.

With these considerations in mind, the CEPF niche recognizes local communities and their organizations as the ultimate custodians of the biodiversity of the East Melanesian Islands Hotspot, with support from national and international NGOs, universities and private companies, and within an enabling regulatory and institutional context established by national, provincial and local government. The complementary capacities of different sections of civil society will be leveraged in support of local communities by catalyzing partnerships. Through these partnerships, communities and civil society organizations at different levels will jointly explore the conservation status of priority species and sites, develop a common understanding of the values of and threats facing them, drawing on traditional ecological knowledge as well as western science, and develop and implement conservation actions that are led by and relevant to local communities. To respond to threats originating outside of the community, such as commercial logging and plantations, civil society will be supported to integrate biodiversity conservation into local land-use and development planning. Drawing on lessons learned from past

conservation programs in the region, conservation interventions for priority species and sites will be developed gradually, to allow sufficient time for trust and understanding to be built among partners, for capacity and knowledge to be transferred, and for long-term funding to be identified and secured. Central to the sustainability strategy of the CEPF investment program in the East Melanesian Islands Hotspot will be an explicit focus on capacity building for local and national civil society, through partnerships, networks and mentoring. To allow sufficient time for effective partnerships, enduring capacity and sustained on-the-ground results to be achieved, an investment period of eight years (rather than the usual five) is proposed.

12. CEPF INVESTMENT STRATEGY AND PROGRAM FOCUS

12.1 Geographic Priorities

To ensure that CEPF investments deliver significant, sustained impacts, it is important that they are not spread too thinly across the hotspot. For this reason, a set of priority geographies was selected from among the full list of site outcomes (KBAs) and corridor outcomes (islandscapes) in the hotspot. These geographic priorities allow investments by CEPF to focus on geographic areas of high global biodiversity value that present good opportunities to engage civil society in conservation.

The CEPF niche prioritizes community-led conservation actions, facilitated through active civil society partnerships. Within the context of the East Melanesian Islands Hotspot, this is approach is eminently suitable for species and site conservation, although less so for conservation actions at larger spatial scales, which present fewer opportunities to engage local communities. For this reason, it was felt that islandscapes did not provide a useful lens through which to select geographic proprieties for CEPF investment, and emphasis was placed on setting site-level priorities.

Two exercises were conducted to identify priority sites from among the full list of KBAs in the hotspot. First, an initial biological prioritization was conducted, to identify sites of the highest biological importance, based on the principles of irreplaceability and vulnerability (Langhammer *et al.* 2007). Second, during the stakeholder consultation workshops, expert opinion was used to identify sites that presented the greatest opportunity for CEPF investment, based upon the application of a set of standard criteria. Finally, the results of the two exercises were combined, to produce a final prioritization that took into account both biological importance (according to narrow set of global criteria) and expert opinion.

Four standard criteria were used to guide deliberations among stakeholders regarding selection of priority sites for CEPF investment. The first criterion was importance for globally threatened species. This recognizes that, while all KBAs meet a minimum set of biological criteria, they are not all of equal importance in terms of the contribution they make to the conservation of globally threatened species. For instance, some KBAs support highly threatened species found at few or no other sites, and are thus higher

priorities for conservation, all else being equal, than KBAs that support globally threatened species that are less highly threatened or occur at many other sites.

The second criterion, importance for delivering ecosystem services of value to human communities, recognizes that intrinsic biodiversity values (e.g. occurrence of globally threatened and locally endemic species) are not the only nor, in many cases, the most important values to local communities and government. KBAs that deliver valuable ecosystem services (e.g. provisioning of food, regulation of stream flow, protection against tropical storms, etc.) are, all things being equal, likely to have greater support for their conservation, and to present greater opportunities to engage local communities in conservation efforts.

The third criterion was urgency for conservation action. This criterion was used to distinguish between sites that have high intrinsic or utilitarian biodiversity values but are not imminently threatened from those under more immediate threat. The rationale for this was that highly threatened sites are more likely to lose their biodiversity values without conservation intervention, and thus, where resources are limited, their conservation should be addressed first.

The fourth criterion, need for additional donor investment above the existing baseline level, was used to minimize overlaps and duplication between CEPF investments and those of government and other donors. Recognizing that additional investment by CEPF could complement or improve the targeting of other investments, the mere presence of investment from other sources was not sufficient reason to exclude a KBA from the list of CEPF priority sites. Rather, an assessment was made of the gap between the presumed investment needs of the site and the expected resources from non-CEPF sources.

Based on the results of the initial biological prioritization, seven KBAs were assigned to the highest priority level (level 1). These sites are the highest biological priorities for conservation in the hotspot, because the loss of any of them would result in the global extinction of at least one species (Table 15). Six of these sites were proposed as priorities during the stakeholder consultations. The only exception was Nendö KBA in the Solomon Islands; the only known site for the EN Temotu flying-fox (*Pteropus nitendiensis*) and the EN Santa Cruz shrikebill (*Clytorhynchus sanctaecrucis*). Because of these values, Nendö was also included in the list of priority sites.

In addition to all seven level 1 KBAs, six of the 11 KBAs assigned to level 2 under the initial biological prioritization were proposed as priorities during the stakeholder consultations. There was a concentration of seven level 2 KBAs in the Bukida islandscape (i.e. Bougainville province of PNG and Choiseul and Isabel provinces of the Solomon Islands). There is considerable redundancy among these seven KBAs with regard to the coverage of globally threatened and restricted-range species, and the two identified priority sites support, between them, populations of all the most highly threatened species: Bougainville monkey-faced bat (*Pteralopex anceps*); greater monkey-faced bat; Poncelet's giant rat; Bougainville giant rat (*Solomys salebrosus*); and white-eyed starling (*Aplonis bruneicapillus*).

A further 13 KBAs were proposed as priority sites during the stakeholder consultations, comprising four level 3 KBAs, five level 4 KBAs and four level 5 KBAs. In order to keep the number of priority sites to a level commensurate to the expected level of CEPF investment, the four level 5 KBAs and one of the level 4 KBAs were not included on the final list of priority sites. In every case, the globally threatened and restricted-range species that these KBAs were triggered by occur at other KBAs that were selected as priority sites. Finally, a second level 4 KBA (Whiteman Range) was dropped from the list of priority sites because it was included within the full-sized GEF project PAS Community-Based Forest and Coastal Conservation and Resource Management in PNG, which focuses on West New Britain and the Owen Stanley Range, and adopts a similar set of strategies as those proposed by CEPF. Consequently, the final list of priority sites contained 20 KBAs, comprising five in PNG, nine in the Solomon Islands and six in Vanuatu, and covering a total area of 1,549,009 hectares (Table 33 and Figures 17 to 19).

Table 33. Priority Sites for CEPF Investment in the East Melanesian Islands Hotspot

Priority Site	Province	Total Area in Hectares	Land Area in Hectares	Biological Priority	Other Investments
PAPUA NEW GUINEA					
Baining Mountains	East New Britain	137,140	135,864	3	None known
Cape Saint George	New Ireland	90,246	86,398	2	Kansas University and PNG Institute for Biological Research survey planned for 2013
Central Manus	Manus	106,565	82,529	3	Land-use planning and LMMAs facilitated by WCS, TNC and local CBOs, with support from Packard Foundation and other donors
Kunua Plains and Mount Balbi	Bougainville	75,558	74,325	2	Some of the many development NGOs on Bougainville dabbling in marine conservation and climate change adaptation
Mussau	New Ireland	34,071	31,756	4	None known
SOLOMON ISLANDS					
East Makira	Makira Ulawa	182,550	150,774	1	Awareness raising and community outreach being conducted by the Kahua Association with support from the EU
East Rennell	Rennell Bellona	33,306	17,073	3	A lot of work done under UNESCO World Heritage process, raising expectations of communities, but none has been sustained
Gizo	Western	12,862	3,782	1	Existing community-based conservation initiative supported by the MacArthur and Prince Albert II of Monaco Foundations

Priority Site	Province	Total Area in Hectares	Land Area in Hectares	Biological Priority	Other Investments
Guadalcanal Watersheds	Guadalcanal	376,146	363,032	1	Planned expedition funded by AMNH
Kolombangara Upland Forest	Western	30,963	30,717	2	Existing community-based conservation initiative supported by the MacArthur and Prince Albert II of Monaco Foundations
Marovo Kavachi	Western	155,741	65,708	3	Existing community-based conservation initiative supported by the MacArthur and Prince Albert II of Monaco Foundations
Mount Maetambe - Kolombangara River	Choiseul	78,399	78,396	2	Various community engagement initiatives supported by the MacArthur Foundation
Nendö	Temotu	20,172	19,869	1	None known
Vanikoro	Temotu	17,807	17,628	1	None known
VANUATU					
Aneityum	Tafea	3,850	3,850	1	Mystery Island Marine Protected Area designated with previous support from the GEF International Waters Project Community-based conservation initiatives supported by JICA
Futuna	Tafea	1,077	1,042	2	None known
Gaua	Torba	18,725	18,725	4	Previous community-based conservation activities under a GEF medium-sized project
Green Hill	Tafea	2,030	2,030	2	Previous community-based conservation activities under a GEF medium-sized project
Santo Mountain Chain	Sanma	168,360	167,482	1	Previous multidisciplinary expedition by MNHN Paris, IRD and Pro-Natura International Ongoing REDD readiness activity supported by GIZ
Tongoa-Laika	Shefa	3,441	3,246	4	None known

Figure 17. Priority Sites for CEPF Investment in PNG

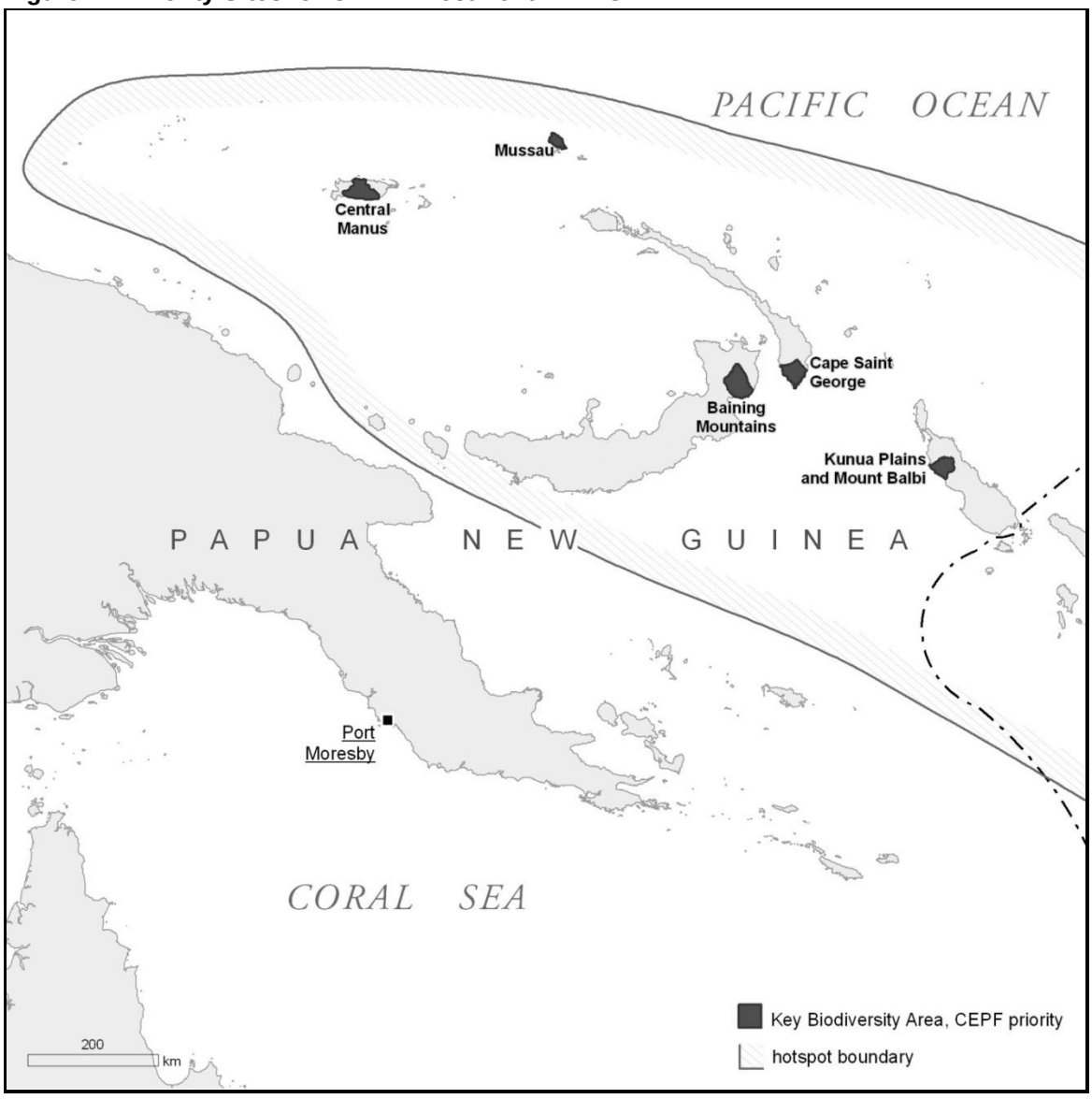


Figure 18. Priority Sites for CEPF Investment in the Solomon Islands

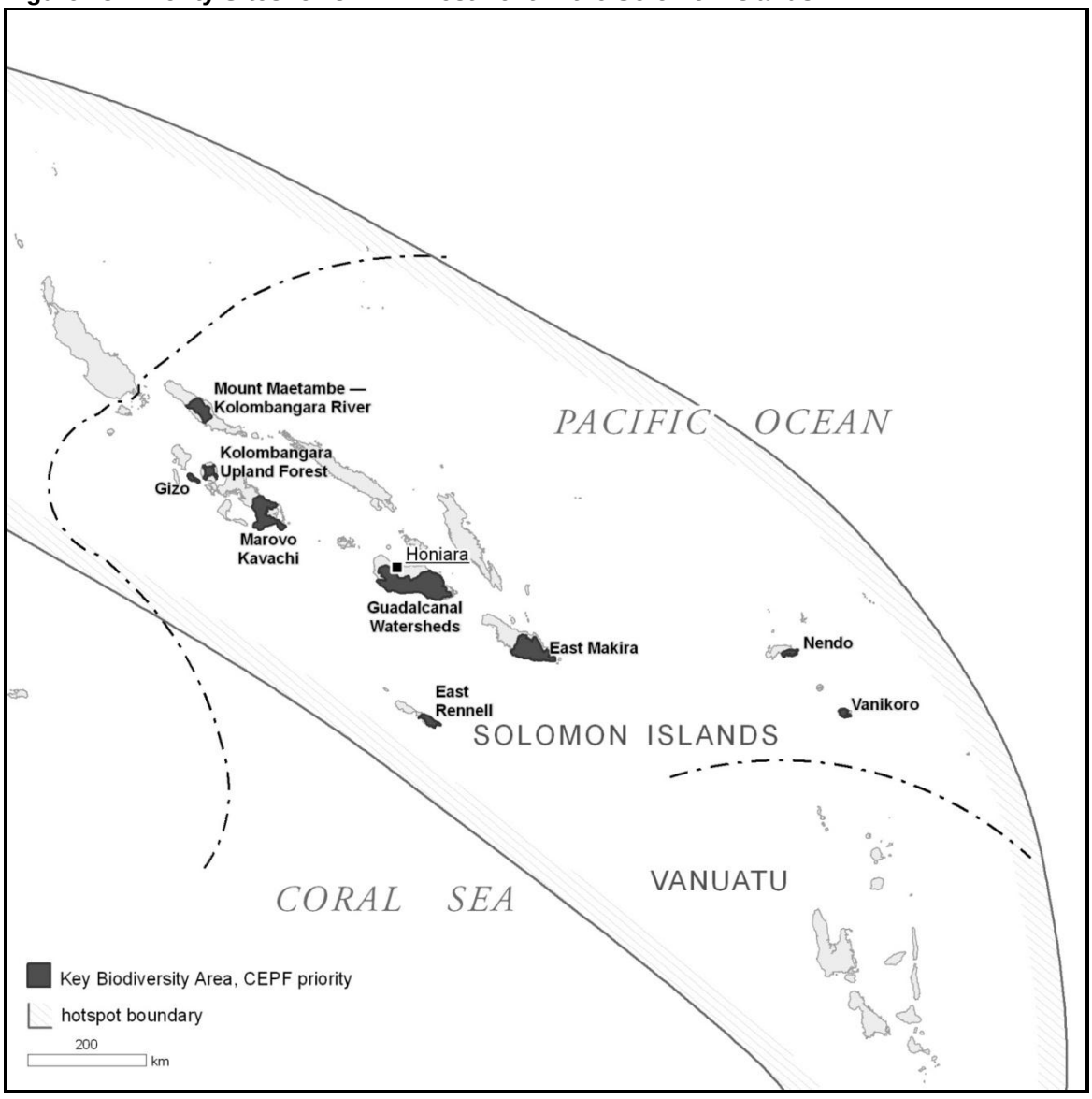
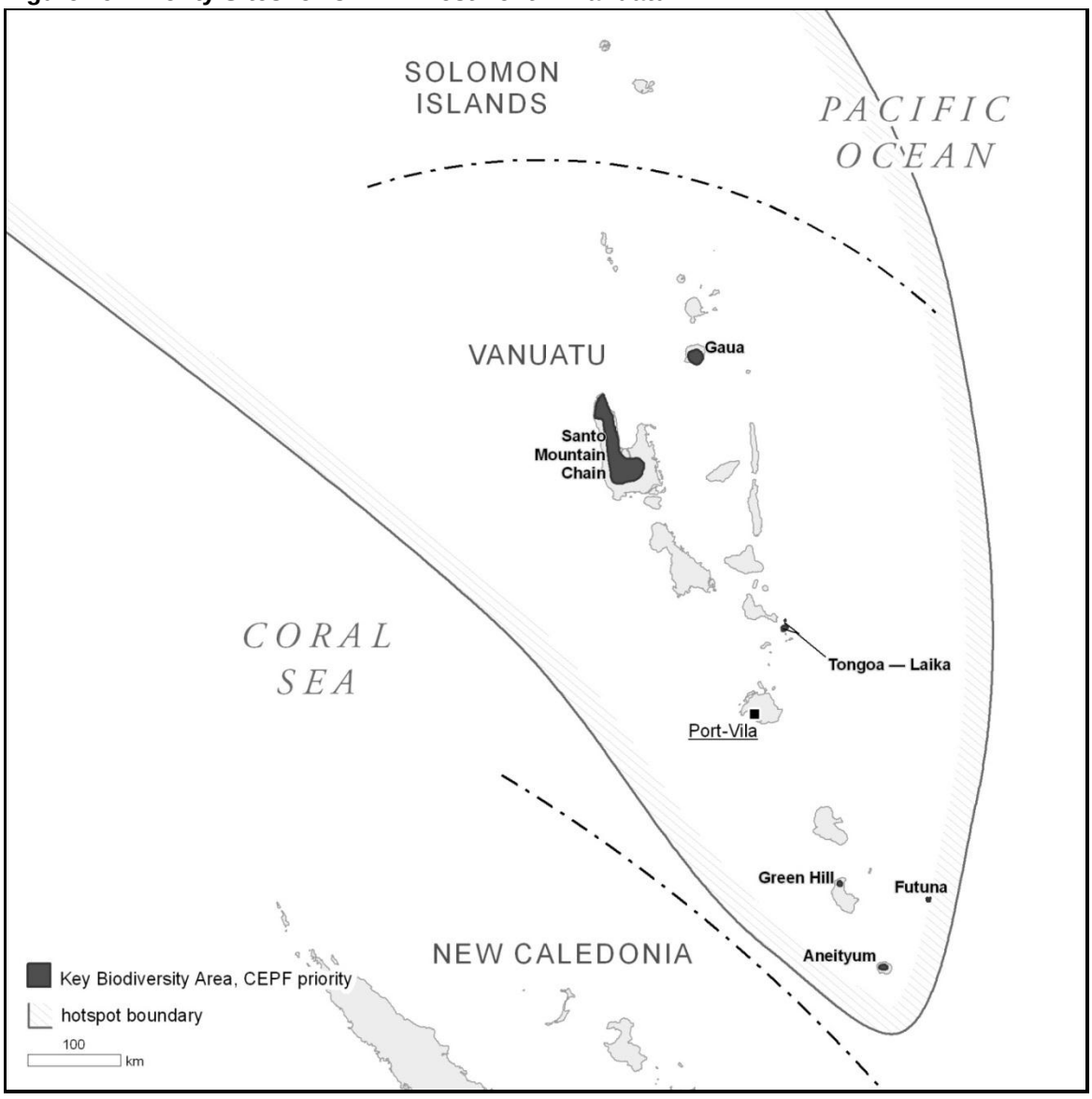


Figure 19. Priority Sites for CEPF Investment in Vanuatu



12.2 Taxonomic Priorities

To maximize the contribution of CEPF investment in the East Melanesian Islands Hotspot to the conservation of globally significant biodiversity, it was necessary to refine the full list of globally threatened species (or "species outcomes") into a focused list of priority species for investment over an eight-year period. The purpose of selecting priority species was to enable investments in species-focused conservation action to be directed at those globally threatened species whose conservation needs cannot adequately be addressed by general habitat protection at the site or islandscape scale alone.

In order to identify priority species from among the full list of globally threatened species, a set of standard criteria were applied by participants at the regional stakeholder consultation meeting. Separate prioritizations were conducted by groups of stakeholders

familiar with the biodiversity of PNG, the Solomon Islands and Vanuatu, with species identified by one or more groups being included on the overall list of priorities for the hotspot. Due to limitations of time and available expertise, the prioritization criteria were not applied comprehensively to all species during the workshop. Gaps in the assessment were filled subsequently, through reference to available secondary information, especially the species accounts on the IUCN Red List (IUCN 2011).

There were five criteria for selecting priority species from among the full list of globally threatened species in the hotspot. The first criterion was the global threat status of the species. Reflecting their status as the species most urgently in need of conservation action, all CR species were automatically identified as priorities, unless the hotspot did not support a globally significant population. EN and VU species were only selected as priorities if the other four criteria were met.

The second criterion was whether the hotspot population is significant for conservation of the species, relative to the global population; or, in other words, whether actions in the East Melanesian Islands are an essential part of a successful global conservation strategy for the species. The idea here was to exclude species for which the great majority of their global population occurs outside of the hotspot, and for which conservation investment should, therefore, be directed elsewhere.

The third criterion for selecting priority species was the need for species-focused conservation action. Such species have conservation needs that cannot adequately be addressed by general habitat protection alone. The purpose of this criterion was to exclude species for which conservation of adequate areas of suitable habitat would be sufficient to support viable populations into the long term and which could, therefore, be conserved through investments in site conservation. Above and beyond habitat protection, the main species-focused action required to conserve globally threatened species in the East Melanesian Islands Hotspot was considered to be control of over-exploitation, followed by control of invasive species. In addition, a small number of globally threatened species are so little known that the priority action is research to locate a viable population that can become the focus of conservation action.

The fourth criterion, urgency of conservation action, was intended to focus attention on those species that, in the absence of targeted conservation action, would be at greatest risk of extinction within the hotspot. This criterion was used in addition to Red List status, to take account of the fact that the populations of some species within the hotspot may be more threatened than their global threat status implies. For instance, dugong, one of the most highly threatened mammals in the hotspot, is assessed as VU on the Red List, because it has large, possibly stable populations along the coasts of Northern Territory and Western Australia (Marsh 2008).

The fifth criterion, need for additional donor investment, was the most subjective and the one most likely to undergo abrupt change in future. Nonetheless, it was important to apply it, to ensure that, as far as possible, CEPF investments do not duplicate those of other donors. In actual fact, there is relatively little investment in species conservation in

the East Melanesian Islands Hotspot (hence the need for CEPF investment to address this gap), and, consequently, very few globally threatened species were considered to have adequate funding relative to their conservation needs.

Out of the full list of 308 globally threatened species in the hotspot, 48 species (16 percent) were selected as priorities for CEPF investment by applying the above criteria (Table 34). The priority species comprise 20 mammals (69 percent of the globally threatened mammals in the hotspot), 11 birds (27 percent), five reptiles (50 percent), two amphibians (40 percent) and 10 plants (26 percent). No globally threatened fishes or invertebrates were selected as priority species, reflecting, in part, the fact that many are marine species, with wide distributions, for which the hotspot is not necessarily significant for their global conservation and that many (e.g. most corals and insects) are chiefly threatened by habitat loss, and are not, therefore, high priorities for species-focused conservation action. However, the absence of fish and invertebrate species from the list of priority species may also be reflective, to some degree, of the distribution of taxonomic expertise among the stakeholders involved in the consultation process, and it may be necessary to supplement the priority species list with respect to these groups at a later date.

There is a fairly even distribution of the priority species across the hotspot, with 18 occurring in PNG, 27 in the Solomon Islands and 23 in Vanuatu. Twelve of the 13 CR species in the hotspot were identified as priority species, together with 23 of the 40 EN species. The remaining 14 priority species are assessed by IUCN (2011) as VU but all were considered to be in urgent need of conservation action within the hotspot.

Table 34. Priority Species for CEPF Investment in the East Melanesian Islands Hotspot

Priority Species	English Name	Species-Focused Conservation Action Needed
MAMMALS		
Dugong dugon	Dugong	Control of overexploitation
Emballonura semicaudata	Polynesian Sheathtail Bat	Control of overexploitation
Melomys matambuai	Manus Melomys	Control of overexploitation
Pteralopex anceps	Bougainville Monkey-faced Bat	Control of overexploitation
Pteralopex atrata	Guadalcanal Monkey-faced Bat	Control of overexploitation
Pteralopex flanneryi	Greater Monkey-faced Bat	Control of overexploitation
Pteralopex pulchra	Montane Monkey-faced Bat	Control of overexploitation
Pteralopex taki	New Georgia Monkey-faced Bat	Control of overexploitation
Pteropus anetianus	Vanuatu Flying-fox	Control of overexploitation
Pteropus cognatus	Makira Flying-fox	Control of overexploitation
Pteropus fundatus	Banks Flying-fox	Control of overexploitation
Pteropus nitendiensis	Temotu Flying-fox	Control of overexploitation
Pteropus tuberculatus	Vanikoro Flying-fox	Location of viable population
Solomys ponceleti	Poncelet's Giant Rat	Control of overexploitation
Solomys salebrosus	Bougainville Giant Rat	Control of overexploitation

Priority Species	English Name	Species-Focused Conservation Action Needed
Solomys sapientis	Isabel Giant Rat	Control of overexploitation
Tadarida bregullae	Fijian Mastiff Bat	Control of overexploitation
Uromys imperator	Emperor Rat	Location of viable population
Uromys porculus	Guadalcanal Rat	Location of viable population
Uromys rex	King Rat	Location of viable population
BIRDS		
Aplonis santovestris	Santo Mountain Starling	Control of invasive species
Charmosyna palmarum	Palm Lorikeet	Control of invasive species
Ducula bakeri	Vanuatu Imperial Pigeon	Control of invasive species
Erythrura regia	Royal Parrotfinch	Control of overexploitation
Gallicolumba sanctaecrucis	Santa Cruz Ground-dove	Control of invasive species
Gallinula silvestris	Makira Moorhen	Location of viable population
Megapodius layardi	Vanuatu Megapode	Control of overexploitation
Nesofregetta fuliginosa	Polynesian Storm-Petrel	Control of invasive species
Pseudobulweria becki	Beck's Petrel	Location of viable population
Pterodroma brevipes	Collared Petrel	Control of invasive species
Pterodroma cervicalis	White-necked Petrel	Control of invasive species
REPTILES		
Caretta caretta	Loggerhead Turtle	Control of overexploitation
Chelonia mydas	Green Turtle	Control of overexploitation
Dermochelys coriacea	Leatherback Turtle	Control of overexploitation
Emoia aneityumensis	Anatom Skink	Control of overexploitation
Eretmochelys imbricata	Hawksbill Turtle	Control of overexploitation
AMPHIBIANS		
Litoria lutea	Solomon Islands Treefrog	Resolution of species limits
Palmatorappia solomonis	Solomon Islands Palm Frog	Resolution of species limits
PLANTS		
Agathis silbae		Control of overexploitation
Calophyllum waliense		Control of overexploitation
Carpoxylon macrospermum	Carpoxylon Palm	Population management
Cyphosperma voutmelense	Voutmélé Palm	Population management
Diospyros insularis	New Guinea Ebony	Control of overexploitation
Drymophloeus hentyi		Population management
Helicia polyosmoides		Population management
Intsia bijuga	Moluccan Ironwood	Control of overexploitation
Ptychosperma gracile		Population management
Veitchia montgomeryana		Population management

In addition to the species in Table 34, 19 species or groups of species of elevated conservation concern were identified that cannot presently be assessed as priority species because they are not currently assessed as globally threatened. Two are listed on the IUCN Red List as Data Deficient, while the others have not yet been evaluated. The stakeholders proposed these species as candidate priority species because, apart from not being assessed as globally threatened, they were considered to meet the other selection criteria for priority species; in particular, they all require species-focused conservation action. They were, therefore, included on a list of provisional priority species, which could become eligible for CEPF investment if their global threat status is reassessed in the future (Appendix 4). However, because whatever new information allows their categorization as globally threatened may also affect their eligibility as priority species, they will not automatically become priorities for CEPF investment; further review will be needed at that stage.

12.3 Strategic Directions and Investment Priorities

This section presents an eight-year investment strategy for CEPF in the East Melanesian Islands Hotspot, aimed at engaging civil society in the conservation of globally significant biodiversity. The strategy comprises 15 investment priorities, grouped into five strategic directions. The strategic directions define the major thrusts of expected CEPF investment in the hotspot, while the investment priorities outline the particular types of activities that will be eligible for support. The strategic directions and investment priorities are summarized in Table 35, and described in more detail afterwards.

The investment strategy for the East Melanesian Islands Hotspot is based upon the stakeholder consultation workshops conducted between January and May 2012, and also draws on the findings of the thematic chapters, prepared through desk studies, with a particular emphasis on alignment with NBSAPs and other national, regional and international strategies for biodiversity conservation in the hotspot countries (Chapter 6). At each workshop, stakeholders were asked to identify activities likely to address the highest priority threats to biodiversity in the hotspot, where civil society could play a leading role in their implementation (in collaboration with government, where appropriate), and where additional funding would make a significant difference compared with baseline levels of conservation investment from governments and international donors. The suggested activities were then grouped under similar themes to derive draft investment priorities. The investment strategy addresses many of the priorities identified by stakeholders during the consultations but to incorporate them all would have been unrealistic, given the level of funding that is likely to be available for the strategy. Priority was given to investment priorities that formed a coherent strategy, and that provided the greatest opportunity to deliver lasting results in terms of delivery of conservation outcomes on the ground supported by strong and engaged civil society partnerships.

Table 35. CEPF Strategic Directions and Investment Priorities in the East Melanesian Islands Hotspot

Strategic Directions	Investment Priorities
1. Empower local communities to protect and manage globally significant biodiversity at priority Key Biodiversity Areas under-served by current conservation efforts	1.1 Conduct baseline surveys of priority sites that build government-civil society partnerships and bridge political boundaries
	1.2 Raise awareness about the values of biodiversity and the nature of threats and drivers among local communities at priority sites
	1.3 Support local communities to design and implement locally relevant conservation actions that respond to major threats at priority sites
	1.4 Demonstrate conservation incentives (ecotourism, payments for ecosystem services, conservation agreements, etc.) at priority sites
2. Integrate biodiversity conservation into local land-use and development planning	2.1 Conduct participatory ownership and tenure mapping of resources within customary lands at priority sites
	2.2 Provide legal training and support to communities for effective enforcement of environmental protection regulations
	2.3 Explore partnerships with private companies to promote sustainable development through better environmental and social practices in key natural resource sectors
3. Safeguard priority globally threatened species by addressing major threats and information gaps	3.1 Conduct research on six globally threatened species for which there is a need for greatly improved information on their status and distribution
	3.2 Develop, implement and monitor species recovery plans for species most at risk, where their status and distribution are known
	3.3 Introduce science-based harvest management of priority species important to local food security
4. Increase local, national and regional capacity to conserve biodiversity through catalyzing civil society partnerships	4.1 Strengthen the capacity of local and national civil society organizations in financial management, project management and organizational governance
	4.2 Provide core support for the development of civil society organizations into national and regional conservation leaders
	4.3 Strengthen civil society capacity in conservation management, science and leadership, through short-term training courses at domestic academic institutions
5. Provide strategic leadership and effective coordination of conservation investment through a Regional Implementation Team	5.1 Operationalize and coordinate CEPF's grant-making processes and procedures to ensure effective implementation of the investment strategy throughout the hotspot
	5.2 Build a broad constituency of civil society groups working across institutional and political boundaries towards achieving the shared conservation goals described in the ecosystem profile

Strategic Direction 1: Empower local communities to protect and manage globally significant biodiversity at priority Key Biodiversity Areas under-served by current conservation efforts

The socio-cultural and policy context in the East Melanesian Islands Hotspot, particularly the prevalence of customary land ownership and resource tenure, coupled with limited government resources and capacity, means that conventional protected area approaches are not widely applicable or effective tools for conservation. This is clearly evident at the few formal protected areas that have been established in the hotspot, such as Queen Elizabeth National Park on Guadalcanal, which is unmanaged and heavily degraded. On the other hand, due to their strong cultural links to land, traditional ecological knowledge, and economic dependence upon natural resources, local communities, if appropriately organized and supported, are well placed to manage marine and terrestrial resources for conservation. In addition to being effective tools for conservation, community-based approaches also provide greater opportunities to engage civil society at all levels in conservation efforts than do formal protected areas. In particular, by empowering local communities to make decisions regarding the management of natural resources, they can help strengthen and maintain community institutions, preserve traditional knowledge, and contribute to improved livelihoods.

Over the last decade, several approaches to community-based conservation have been piloted in the hotspot, most notably for nearshore marine ecosystems. As part of a broader movement across the western Pacific, a network of LMMAs has been established in the Solomon Islands, with coordination from the Ministry of Fisheries and support from USP and the MacArthur and Packard foundations. In PNG, TNC and other partners recently established an LMMA network, which includes sites in the islands region. As neither network is fully established yet, it is too early to draw lessons but experience from elsewhere in the western Pacific suggests that LMMAs can contribute to enhanced food security and livelihood options through the maintenance of healthy marine ecosystems (Rowe 2007).

Stakeholders consulted during the preparation of the ecosystem profile considered it a priority to consolidate and amplify the LMMA approach, and demonstrate similar models for terrestrial ecosystems. Tetepare Community Conservation Area was held up as a good example of community-based conservation for a terrestrial forest. This site is managed by the Tetepare Descendents Association, under a community conservation agreement with SICCP, which compensates landowners for foregone income due to their choice of conservation over logging.

Investment Priority 1.1 Conduct baseline surveys of priority sites that build government-civil society partnerships and bridge political boundaries

Twenty priority sites have been identified for CEPF investment (Table 33), of which 11 contain significant areas (> 500 hectares) of marine habitat, and nine are predominantly terrestrial. A very small number of priority sites (e.g. Santo Mountain Chain) have benefited from recent, extensive, multidisciplinary biodiversity surveys, which have confirmed the continued presence of key elements of biodiversity, and determined the

distribution and status of key species populations. For the majority of priority sites, such information is lacking, and this presents a barrier to effective, science-based management of natural resources, including design of community-managed conservation areas, introduction of sustainable harvesting regimes for natural resources, and establishment of long-term monitoring programs to assess the effectiveness of conservation interventions.

This investment priority will provide support for baseline surveys of priority sites that fill gaps in knowledge with regard to target species. In addition to globally threatened and restricted-range species, these surveys should also cover species of cultural and economic importance to local people, and indicators of ecosystem health. The surveys should involve relevant government institutions and community members, and provide opportunities for capacity building in taxonomy and ethnobiology. This will help to build relationships and establish a foundation for longer-term collaboration for site conservation. Each project supported under this investment priority must demonstrate that the survey results, and any subsequent conservation actions, will be published in an appropriate form so they are freely available to other groups wanting to work at the site in the future. Each project must also demonstrate that the survey is a means to an end, in terms of developing a foundation of knowledge and relationships for future support to communities at the site.

Investment Priority 1.2 Raise awareness about the values of biodiversity and the nature of threats and drivers among local communities at priority sites

During the consultation workshops, low awareness of biodiversity conservation among local communities, compounded by mixed, inappropriate and, often, confusing messages from conservation organizations, was identified as a major factor contributing to biodiversity loss. The consensus was that local communities are generally not motivated to conserve biodiversity by notions of vulnerability or endemism but by a mixture of utilitarian and cultural values. Therefore, there is a need to raise awareness about the values of biodiversity and the need for conservation, and to frame messages in terms of local communities' motivation. To be eligible for support under this investment priority, projects must focus on one or more priority sites, employ locally relevant media and messaging, and include an evaluation component to assess the effectiveness of the approach at changing attitudes and awareness.

Investment Priority 1.3 Support local communities to design and implement locally relevant conservation actions that respond to major threats at priority sites

Building on the foundations of shared knowledge, understanding and trust that will be established under Investment Priorities 1.1 and 1.2 (or that pre-exist, in a few cases), this investment priority will provide support to local communities to design and implement locally relevant conservation actions that respond to major conservation issues that they have identified. Where communities have the necessary capacity and legal standing (e.g. through officially registered CBOs), this support could be provided directly. More commonly, however, it will need to be provided indirectly, via a national or international civil society partner, combined with mentoring and capacity building.

The stakeholder consultations identified a number of common success factors among existing community-based conservation initiatives in the hotspot, and projects should take these into account. First, there should be strong community involvement and ownership in design and implementation of conservation actions from inception, based on good awareness of the issues. Second, conservation actions should address local people's priorities, including livelihoods and food security, but communities should have realistic expectations about project benefits. Third, management plans for community-managed conservation areas should be clear and simple, with descriptive rules. Fourth, management should incorporate traditional ecological knowledge and customary and religious conservation practices, with scientific support where relevant. Fifth, projects should be based on long-term partnerships, with clearly defined roles and responsibilities for all partners. Sixth, projects should align closely with provincial or local government initiatives for resource management in key sectors.

Investment Priority 1.4 Demonstrate conservation incentives (ecotourism, payments for ecosystem services, conservation agreements, etc.) at priority sites

Almost without exception, the marine and terrestrial resources within the priority sites make a major contribution to the livelihoods and food security of local communities. In many cases, however, population growth, increased material expectations and household cash needs are driving unsustainable exploitation of these resources, undermining the natural resource base that supports the traditional economy. The contribution of biodiversity to livelihoods and food security can provide a strong motivation for local people to engage in conservation. However, simply providing benefits to local communities may not be sufficient to catalyze behavioral change; to be effective, there need to be clear linkages between livelihood benefits and conservation goals.

Under this investment priority, support will be given to projects that demonstrate conservation incentives at priority sites. Some approaches may be adapted from existing experience in the hotspot. For instance, establishment of LMMAs can provide direct livelihood benefits in terms of increased fisheries production. Other approaches may be based on experience from elsewhere. For instance, there is growing body of experience that negotiated agreements provide an effective tool for linking livelihood support to conservation actions (e.g. Conservation Stewards Program 2012). It must be recognized, however, that there a suite of drivers that motivate communities to take conservation action, and that each approach must be tailored to the specific community and developed with its full participation and consent.

Strategic Direction 2: Integrate biodiversity conservation into local land-use and development planning

Natural ecosystems across the hotspot are being degraded and fragmented, with a consequent loss of biodiversity and diminution of the essential goods and services they provide. Some threats are local in origin, arising from population growth and rising expectations and need for cash generation among local communities; these are addressed by Strategic Direction 1. Other threats originate from provincial, national and global development trends, and require different strategies to address.

Community-based conservation efforts risk being undermined by incompatible development and land-use decisions, such as expansion of commercial logging, plantations or mining. At some priority sites, these threats are already evident. For instance, there is an active logging concession within East Makira KBA and an operating gold mine within Guadalcanal Watersheds KBA, while part of Gaua KBA is leased to a foreign company for cattle ranching. Elsewhere, these threats are imminent. For example, hydropower dams are proposed in Guadalcanal, and most of the Solomon Islands are under mineral exploration licenses. These threats are being driven by international market demand for timber, metals and agricultural commodities, and national governments' need to generate foreign exchange. These drivers are compounded by a lack of integration of the economic values of biodiversity and ecosystem services into land-use and development planning. Consequently, there is a pressing need to support such integration, particularly at the local level, where national policies and development trends are played out.

This strategic direction is in line with Millennium Development Goal No. 7 of the United Nations, which sets a target for the global community to *"integrate the principles of sustainable development into country policies and programs and reverse the loss of environmental resources"*. It also addresses Aichi Biodiversity Targets 2, that *"by 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes"*, and 7, that *"by 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity"* (SCBD 2010).

Investment Priority 2.1 Conduct participatory ownership and tenure mapping of resources within customary lands at priority sites

In theory, customary ownership and tenure should make access to land and resources for companies operating in the timber, mining or agro-industry sectors extremely difficult, as consent from the community as a whole would be a prerequisite for operations. In reality however, unclear or contested ownership and tenure arrangements over land and natural resources enable companies to gain temporary access, by circumventing collective decision-making processes and working directly with local elites. This investment priority will strengthen the voice and legal rights of local communities in land-use and development decision making at priority sites by clarifying ownership and tenure arrangements over natural resources within customary lands. This activity will only be relevant to some priority sites, and will involve some form of dispute resolution/grievance mechanism, whereby overlapping claims among or within communities can be resolved. As well as empowering communities to engage in discussions with natural resource companies wishing to operate on their customary lands, mapping tenure rights over natural resources can also contribute to subsequent development of management plans for priority sites under Investment Priority 1.3.

Investment Priority 2.2 Provide legal training and support to communities for effective enforcement of environmental protection regulations

The traditional rights of communities over land and natural resources are enshrined in the constitutions of the three hotspot countries. In theory, most natural resources are under

the custody of the local communities who own them, and the national government should only issue extraction rights after agreements have been made between natural resources companies and landowners. In reality, however, the formal regulations governing commercial agriculture, timber rights acquisition and mine licensing are often not well understood by affected communities or not consistently applied by the concerned authorities. As a result, natural resource companies are able to gain access to land and resources without following due process, communities are losing access to their traditional lands, and biodiversity is being eroded.

This investment priority will support civil society organizations to provide training and outreach to communities affected by logging, mining, commercial agriculture and other development projects incompatible with the goal of biodiversity conservation. The purpose of this support will be to ensure that communities understand due process in environmental licensing for development projects, and have access to legal redress if it is not followed.

Investment Priority 2.3 Explore partnerships with private companies to promote sustainable development through better environmental and social practices in key natural resource sectors

Not all development projects in the natural resource sectors are necessarily detrimental to biodiversity or the interests of local communities. Provided that adequate safeguards are in place to minimize and mitigate environmental and social impacts, logging, mining, commercial agriculture and hydropower projects can all deliver significant net benefits at local, sub-national and national levels. For example, the impacts of existing logging concessions could be greatly reduced by introducing sustainable harvesting practices, such as longer inter-harvest intervals, back-felling and preservation of riparian strips. This investment priority will support civil society organizations to explore and develop partnerships with private companies operating in the key natural resources sectors of forestry, fisheries, agriculture, mining and energy to develop and pilot better environmental and social practices. These practices could draw on global standards for sustainable business practices, such as the Forest Stewardship Council Principles and Criteria for Forest Stewardship (FSC 1996), but should be adapted to the local context in the East Melanesian Islands Hotspot.

Strategic Direction 3: Safeguard priority globally threatened species by addressing major threats and information gaps

The East Melanesian Islands Hotspot is typical for a tropical archipelago in that it supports high levels of plant and animal endemism. The restricted distributions of the hotspot's endemic species make them vulnerable to localized threats, and a significant proportion are assessed as globally threatened (Section 3.5). The most common threat affecting globally threatened species in the hotspot is habitat degradation and loss, and this is addressed by Strategic Directions 1 and 2. However, a number of globally threatened species have conservation needs that are not fully addressed by habitat protection, especially control of over-exploitation and control of invasive species. It is for such species that this strategic direction is included.

Despite supporting 308 globally threatened species (Appendix 1) plus a large number of locally endemic species that have not yet been evaluated under the Red List criteria, the East Melanesian Islands Hotspot currently receives almost no funding for species-focused conservation, whether from national governments or international donors (Chapter 10). In part, this reflects an overall lack of resources for conservation in the hotspot, and in part this reflects a focus on ecosystem approaches, which take an integrated approach to the conservation of whole ecosystems. While the conservation of many species can be addressed through conservation of representative examples of natural ecosystems, certain species require focused conservation action to avert their extinction. This strategic direction addresses Aichi Biodiversity Target 12, that *"by 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained"* (SCBC 2010). This strategic direction is restricted to the 48 priority species listed in Table 34 but is not geographically restricted to the priority sites.

Investment Priority 3.1 Conduct research on six globally threatened species for which there is a need for greatly improved information on their status and distribution

Six priority species require greatly improved information on their status and distribution before conservation action can be taken in any meaningful way (Table 34). These comprise four mammals (Vanikoro flying-fox, emperor rat, Guadalcanal rat and king rat (*Uromys rex*)) and one bird (Makira moorhen) with no confirmed records from the last 25 years, plus one bird (Beck's petrel) that was recently discovered after a gap of almost 80 years but whose breeding grounds (where the main threats are thought to operate) are unknown. Under this investment priority, civil society organizations will be supported to undertake applied research on the status, abundance, ecology and distribution of these species, evaluate the threats facing any remnant populations found, and disseminate the results through freely accessible journal articles or other open media.

Although the conservation of all globally threatened species would benefit from improved information, this investment priority is reserved for just six species that are not confirmed to persist at any site. If potentially viable populations of any of the six species are located during the CEPF investment period, they will automatically become eligible for support under Investment Priorities 3.2 and 3.3.

Investment Priority 3.2 Develop, implement and monitor species recovery plans for species most at risk, where their status and distribution are known

For the other 42 priority species (Table 34), there is sufficient knowledge about their status and distribution to commence conservation action to address the most urgent threats facing them. For many species, the most urgent threat is over-exploitation. For instance, many bats are vulnerable to hunting because of their communal roosting habits, while marine turtles are vulnerable to egg collection at their nesting beaches. For other species, invasive species present the most urgent threat. For example, Pacific rats and feral house cats are a major threat to seabird colonies, such as around the Banks Islands in Vanuatu. For some plant species, their population is so reduced that active population management is required to avert extinction. This is the case for carpoxylon palm

(*Carpoxylon macrospermum*), for example, whose wild population numbers around 40 individuals.

Under this investment priority, civil society organizations will be resourced to develop, implement and monitor recovery plans for priority species. These plans must be developed in collaboration with relevant government institutions, and with the full participation of local communities. The bulk of CEPF funding under this investment priority will be made available for implementation of conservation actions, although some resources will be made available for the development of species recovery plans where they do not already exist and where there is a clear commitment to turn planning into action.

Investment Priority 3.3 Introduce science-based harvest management of priority species important to local food security

As mentioned above, over-exploitation is the most common issue requiring species-focused conservation action for the priority species. In some cases, the species in question is of marginal significance to local livelihoods or food security, and a complete moratorium on off-take is straightforward. In other cases, the status of the species is simply too fragile to permit any off-take, and a complete moratorium is the only alternative to extinction. For some priority species, however, the species is of importance to local food security, and has populations that can support regulated harvest. These species potentially include Vanuatu megapode (*Megapodius layardi*) and several seabirds whose eggs are widely harvested, as well as several species of bat that are hunted for food.

Under this investment priority, civil society organizations will establish sustainable yields for priority species *where appropriate to do so*, develop science-based harvesting plans, and integrate these into community-based management plans for populations of the species. All projects should be conducted on a pilot basis, in line with government regulations on harvest of natural resources, and results should be documented and disseminated in open-access formats. Where relevant, projects should be based upon existing customary management practices, such as the taboo governing collection of megapode eggs on Ambrym, which may have significantly reduced human disturbance (O'Brien *et al.* 2003). Research into sustainable yields and harvesting practices will only be eligible for support as part of projects that lead to the development *and introduction* of science-based harvesting plans.

Strategic Direction 4: Increase local, national and regional capacity to conserve biodiversity through catalyzing civil society partnerships

Capacity building for civil society in one form or another was identified as a thematic priority for CEPF investment at all of the stakeholder consultations. Capacity building is required to ensure the effective delivery of Strategic Directions 1, 2 and 3, at three levels: (i) individual, in terms of conservation practitioners and researchers with necessary skills in biodiversity survey, community engagement and outreach, and biodiversity management; (ii) organizational, in terms of skilled, authoritative and accountable civil

society organizations; and (iii) network, in terms of strong and active partnerships facilitating exchange of skills and knowledge, and providing mutual support. Beyond the immediate delivery of the investment strategy, a stronger civil society sector, led by conservation leaders drawn from within the hotspot, will also be central to securing the impacts of CEPF projects into the long term, in the face of new pressures emerging from future social, political, economic and climatic changes.

Prior to awarding grants under this strategic direction, the Regional Implementation Team (see Strategic Direction 5) should map out the landscape of CBOs and local NGOs active at the 20 priority sites, and explore mentoring or partnership opportunities with national civil society organizations. The aim will be to facilitate the development of partnerships or networks of civil society organizations at different levels, with complementary skills, resources and relationships, which are able to address threats to biodiversity originating at local, provincial or national levels.

CEPF support will not, however, be limited to civil society organizations working at priority sites or on the conservation of priority species. Where engaging civil society organizations working in other areas would create opportunities to build stronger civil society partnerships, these will also be eligible for support. Moreover, CEPF support will not necessarily by limited to groups currently working on conservation but will be available to other civil society organizations with the potential to contribute positively to biodiversity conservation. For example, there are several NGOs focused on human rights in the PNG islands that could focus on community outreach and training on environmental law, while, throughout the hotspot, churches and other faith-based organizations have a major influence on people's behavior and attitudes towards nature.

Investment Priority 4.1 Strengthen the capacity of local and national civil society organizations in financial management, project management and organizational governance

The financial controls, management capacity and governance arrangements of many local and national civil society organizations, especially CBOs, are not to the standards that many international donors are comfortable with. For example, many organizations are too small to be able to recruit qualified accountants. INGOs and the larger national and regional civil society organizations, on the other hand, do have the capacity to handle grants, including large ones, from international donors, as well as to actively fundraise. Given these disparities among different civil society organizations, partnerships can be an effective strategy to make donor funding available to the organizations that are best placed to engage with local communities and deliver lasting results on the ground. Experience shows that partnerships maintaining an explicit focus on capacity building can build the capacity of CBOs and local NGOs to the point at which they can successfully secure funding themselves, such as from the GEF Small Grants Programme.

Under this investment priority, civil society organizations will provide capacity building to local and national organizations within their formal or informal partnerships and networks. Capacity building may take the form of training in financial management and project management but it may also include mentoring to facilitate the development of

appropriate governance arrangements, which are a critical element in organizational capacity and sustainability. Capacity building should be provided within the context of partnerships or networks with explicit codes of conduct or social contracts among their members, to ensure that issues of power, equity and accountability are given due consideration.

Investment Priority 4.2 Provide core support for the development of civil society organizations into national and regional conservation leaders

The conservation-focused civil society sector in all three hotspot countries remains dominated by international organizations. While international organizations provide an important channel for external funding and technical expertise, they do not always have the local relationships and legitimacy, or the stability of mission, necessary to support successful, long-term conservation interventions on the ground. There is a need, therefore, to support the emergence of national and regional conservation leaders that can advocate for conservation objectives at these levels, and strengthen, coordinate and give voice to grassroots organizations and local communities engaged in conservation.

The analysis of the civil society context for conservation (Chapter 7) identifies lack of long-term support for core costs as a key constraint on the development of civil society organizations in the hotspot. Most national and regional civil society organizations working on conservation issues in the hotspot are dependent upon grant funding to sustain their operations. Funding cycles are typically only one to three years in length, making it difficult for these organizations to invest in professional development, retain trained staff or compete with the private sector on salaries and benefits. As a result, national and regional civil society organizations report high levels of staff turnover, with ensuing implications for technical capacity, relationships with local communities, and institutional memory. The instability of funding for civil society organizations also has an impact on individual capacity, as it is very difficult for individuals to pursue a career path within civil society; most professionals working in conservation spend periods working in government or the private sector, not necessarily on related issues, because of limited job security and career development opportunities within the civil society sector. This investment priority will foster the organizational development of national and regional civil society organizations by covering their core operating costs for a fixed period, to enable them to invest in developing and retaining a core of skilled staff, diversify their funding sources to reduce dependence on short-term grants, and take on leadership roles.

Investment Priority 4.3 Strengthen civil society capacity in conservation management, science and leadership, through short-term training courses at domestic academic institutions

The stakeholders consulted during the preparation of the ecosystem profile recommended that the most cost-effective way to invest in the development of individual capacity for biodiversity conservation in the hotspot would be to take advantage of established programs at academic institutions in the region to provide short-term training courses for conservation professionals. Experience with similar initiatives in the past has been positive, although several stakeholders identified financial sustainability as a challenge. Consequently, to be eligible for support under this investment priority, applicants must

demonstrate a clear commitment to ensuring institutional and financial sustainability. In addition, training courses must be short-term (undergraduate and postgraduate programs will not be eligible for support) and focus on conservation management, conservation science and/or conservation leadership.

Strategic Direction 5: Provide strategic leadership and effective coordination of conservation investment through a Regional Implementation Team

In every hotspot approved for investment from July 2007 onwards, CEPF will support a Regional Implementation Team to convert the plans in the ecosystem profile into a cohesive portfolio of grants that exceeds in impact the sum of its parts. Each Regional Implementation Team will consist of one or more civil society organizations active in conservation in the hotspot. For example, a team could be a partnership of civil society organizations or it 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 at www.cepf.net. The team will operate in a transparent and open manner, consistent with CEPF's 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 East Melanesian Islands Hotspot. However, grant applications from formal affiliates of those organizations that have an independent board of directors will be accepted and will be subject to additional external review.

The Regional Implementation Team will provide strategic leadership and local knowledge to build a broad constituency of civil society groups working across institutional and political 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. Each major function is regarded as being distinctly administrative, or distinctly programmatic. As these types of function are very different, they are assigned to separate investment priorities.

Investment Priority 5.1 Operationalize and coordinate CEPF's grant-making processes and procedures to ensure effective implementation of the investment strategy throughout the hotspot

This investment priority covers the three functions in the Regional Implementation Team's terms of reference that are administrative in nature:

i) Establish and coordinate a process for proposal solicitation and review.
ii) Manage a program of small grants (less than US$20,000).
iii) Provide reporting and monitoring.

Administrative costs are those expenses incurred by the Regional Implementation Team to support the various aspects of CEPF grant making. For large grants, the Regional

Implementation Team assists applicants and the CEPF Secretariat by reviewing and processing grant applications, ensuring compliance with CEPF policies, and facilitating on-time and accurate grantee and portfolio reporting and monitoring. In particular, the Regional Implementation Team has a very important role to play in soliciting and reviewing proposals. This role encompasses a wide range of activities, from issuing calls for proposals to establishing review committees to making final recommendations for approval or rejection. While much of this work is labeled as administrative, it does have a sound programmatic foundation, as grants need to be strategic and of high quality. As such, the activities covered under this investment priority include evaluation of applications and making recommendations on which projects to support. These tasks require technical expertise, knowledge of strategy, and the ability to understand that all selected projects will make a unique contribution to the achievement of CEPF's objectives.

The Regional Implementation Team also assumes significant administrative responsibilities as manager of CEPF's small granting mechanism, including budgeting, processing proposals, and drafting and monitoring contracts. Small grants play an extremely important role in the CEPF portfolio. These grants can address themes or geographic areas of importance, serve as planning grants, or provide opportunities to engage local and grassroots groups that may not have the capacity to implement large grants. The strategic role that these grants should play cannot be underestimated. Therefore, although most of the activities pertaining to this function are administrative, two very important ones must be highlighted: (i) conduct strategic oversight of the small grants portfolio to ensure coherence with the overall grant portfolio, CEPF donor partners and others active in the hotspot; and (ii) decide on the award of all grant applications. Without these activities, both of which ensure that small grants are integrated and strategic, the small grants program would not be able to contribute to the achievement of CEPF's objectives.

This investment priority also covers reporting and monitoring. This entails collecting data on portfolio performance, ensuring compliance with reporting requirements, ensuring that grantees understand and comply with social and environmental safeguard policies, and reviewing reports. It also includes site visits to grants, which may identify needs for follow-up capacity building. This will ensure effective project implementation and monitoring, and requires technical expertise to be performed effectively and inform adaptive management.

Investment Priority 5.2 Build a broad constituency of civil society groups working across institutional and political boundaries towards achieving the shared conservation goals described in the ecosystem profile

This investment priority covers the two functions in the Regional Implementation Team's terms of reference that are programmatic in nature:

iv) Coordinate and communicate CEPF investment, build partnerships and promote information exchange in the hotspot.
v) Build the capacity of grantees.

These functions include programmatic duties that directly support strategic development of the grant portfolio and contribute in their own right to the achievement of conservation results that yield portfolio-wide benefits. Such duties include facilitating learning exchanges among grantees and other stakeholders, identifying leveraging opportunities for CEPF, and aligning CEPF investment with investments by other donors. Programmatic functions require the Regional Implementation Team to maintain in-house conservation expertise to ensure that CEPF funds are strategically channeled to optimize the achievement of its conservation objectives.

A critical programmatic function covered by this investment priority, especially in the context of the East Melanesian Islands Hotspot, is to coordinate different CEPF investments and facilitate partnership building among different actors. The Regional Implementation Team will be responsible for identifying local civil society organizations active at the 20 priority sites, facilitating partnerships between them and the national civil society organizations best placed to provide technical and financial support, and building networks of civil society organizations at the national and regional levels to address issues of common concern.

This investment priority also covers capacity building, a function that is regarded as being at the core of the Regional Implementation Team's responsibilities. It places the Regional Implementation Team at the heart of strategy implementation by making it responsible for coordination, communication, collaboration and liaison with donors, partners, governments and other stakeholders. It also puts the Regional Implementation Team in charge of ensuring that the CEPF grant portfolio is geared to meeting the objectives laid out in the ecosystem profile. It includes the promotion of synergies between CEPF's objectives and local, national and regional initiatives.

This function focuses on building the capacity of domestic civil society organizations to access and make effective use of CEPF funding. It is a cornerstone of the Regional Implementation Team's work to ensure that partners have the institutional and individual ability to design and implement projects that contribute to the targets of the investment strategy. This is not capacity building for its own sake; rather, it is specifically targeted at appropriate strategic stakeholders to ensure delivery of CEPF's objectives through improved projects and higher quality implementation. Experience has shown that these capacity building efforts are essential to ensuring good projects that are integrated into a wider hotspot strategy and a common conservation vision. Capacity building for civil society organizations in project design, implementation and reporting will also help them access funding from other available funding sources, such as the Mama Graun Conservation Trust Fund, the Vanuatu Biodiversity Conservation Trust Fund (see Section 10.5.1) and the GEF Small Grants Programme (see Section 10.2.2), and thereby contribute to the sustainability of CEPF investments. Other aspects of capacity building for civil society in the hotspot are addressed by Strategic Direction 4.

13. SUSTAINABILITY

Sustainability is achieved if the impacts of CEPF's investments are maintained beyond the lifetime of the funding, and if the desired outcomes are ultimately achieved. Strategies to achieve this must be built into the very fabric of the investment strategy itself. The approach suggested for the East Melanesian Islands Hotspot has been developed with this very much in mind. Some of the key factors to achieve sustainability are:

- Mainstreaming.
- Sustainable financing.
- Commitment.
- Partnerships.
- Capacity.

Mainstreaming suggests that the key components, outputs and lessons-learned of a project or initiative become part of the long-term program of established conservation agencies within the country or region. The most important of these are governments and local communities. Governments will always be there making policies that affect biodiversity and communities will always be there managing biodiversity on a day-to-day basis. The importance of these agencies has been reflected in the process to develop the investment strategy, in which special emphasis was made to involve government officials and communities. Moreover, the process has paid particular attention to ensuring that the investment strategy fits and aligns with NBSAPs and other national conservation strategies developed by the governments of the hotspot countries. This is in line with commitments to harmonization of international development assistance under the 2005 Paris Declaration on Aid Effectiveness and the 2009 Cairns Compact on Strengthening Development Coordination in the Pacific (commonly known as the Forum Compact), which all Pacific states have endorsed.

NBSAPs are the key ongoing roadmap for effective conservation action in the hotspot. To achieve sustainability, it is important for each country to have its NBSAP translated into a strategic plan and practical annual workplans. This is being achieved in the hotspot with support from the Pacific Roundtable on Nature Conservation coordinated by IUCN. The CEPF investment strategy is designed to be strongly supportive of the implementation of actions under the NBSAPs and other national conservation strategies.

Specifically, the CEPF investment strategy aligns with the main goals of the NBSAP for PNG in the following ways:

- Strategic Directions 1 (community-based conservation) and 2 (biodiversity mainstreaming) align with the goal to conserve, sustainably use and manage the country's biological diversity.
- Strategic Direction 3 (species conservation) aligns with the goal to promote and strengthen research of the country's biological diversity and the sustainable development of the country's biological resources.

- Strategic Direction 4 (capacity building) aligns with the goal to strengthen and promote institutional and human capacity building for biodiversity conservation, management and sustainable use.
- Strategic Direction 5 (Regional Implementation Team) aligns with the goal to strengthen partnership and promote coordination for conserving biodiversity.

Regarding the NBSAP for the Solomon Islands, the CEPF investment strategy aligns with the strategic goals in the following ways:

- Strategic Direction 1 (community-based conservation) aligns with the goal to ensure full commitment to a national protected area system by developing appropriate legislation and protected area design, as well as with the goal to ensure that people, resource owners and the public are better informed of the importance and values of biodiversity through research.
- Strategic Direction 2 (biodiversity mainstreaming) aligns with the goal to ensure that the commitment of government and stakeholders to conserving and managing biodiversity is integrated into national legislation, sectoral plans, policies and programs.
- Strategic Direction 3 (species conservation) aligns with the goal to ensure that unique plant and animal species are given appropriate levels of protection and are managed sustainably with a better informed public on their significance, and the goal to ensure biodiversity of the Solomon Islands is protected from introduced and modified species, through legislation, monitoring, research and awareness.
- Strategic Directions 4 (capacity building) and 5 (Regional Implementation Team) align with the goal to empower stakeholders to effectively participate in the conservation and sustainable use of biological resources.

Finally, the CEPF investment strategy aligns with the key objectives of the NBSAP for Vanuatu as follows:

- Strategic Direction 1 (community-based conservation) aligns with the objective to foster community participation in the management and conservation of biodiversity, as well as the objective to increase local awareness of the importance and value of biodiversity.
- Strategic Direction 2 (biodiversity mainstreaming) aligns with the objective to develop appropriate policy, planning and legal mechanisms for the management of biodiversity.
- Strategic Direction 3 (species conservation) aligns with the objective to ensure sustainable management and conservation of Vanuatu's biodiversity, as well as the objective to improve our knowledge about biodiversity in Vanuatu.
- Strategic Directions 4 (capacity building) and 5 (Regional Implementation Team) align with the objective to improve the capacity of national and provincial governments, NGOs and community organizations to manage biodiversity.

National and local civil society organizations can play a critical role, in supporting governments and communities in their roles as stewards of the natural environment. Such

organizations in the East Melanesian Islands can lack appropriate capacity and staying power, so a key focus of the investment strategy is to help achieve longevity in such groups (Investment Priority 4.2). Larger INGOs and universities, which have extensive capacity, can act as mentors, forming long-term partnerships to build capacity in national and local organizations (Investment Priority 4.1) and also in key individuals in leadership roles (Investment Priority 4.3). Capacity-building was universally identified as an important need during the stakeholder consultations. However, it should be recognized that capacity building is a long process, particularly when working at the community level, and this is one reason why an extended timeframe is proposed for the East Melanesian Islands Hotspot.

It is increasingly recognized that a key success factor is meaningful community engagement in the conservation process. It is critical that all projects funded by CEPF reflect this and, wherever relevant, adopt a bottom-up participatory approach to involving local communities. The extended timeframe will allow national, regional and international organizations, able to provide technical and financial support, to build relationships and trust at the community level, and, over time, support the emergence of strong local institutions that can implement sustainable conservation actions.

In order to be effective, conservation actions do not only need to be long-term but also relevant to local people. For this reason, community wellbeing is identified as a key approach in the investment strategy. This can be achieved by projects that achieve increased income for communities, such as by increasing fishing yields through establishment of LMMAs (Investment Priority 1.3), attracting more fee-paying tourists through ecotourism ventures (Investment Priority 1.4) or increasing yields from sustainable harvest of wild plants and animals (Investment Priority 3.3). It can also be achieved by projects that strengthen local communities' rights over land and resources, such as by conducting participatory ownership and tenure mapping (Investment Priority 2.1) or providing legal training and support to landowners affected by incompatible development projects (Investment Priority 2.2). It should also be recognized that community cohesion and cultural pride (in preserving rare species) are also elements of human wellbeing (Investment Priorities 1.2 and 3.2).

Conservation will always cost money, so sustainable financing is a key component of the CEPF investment strategy. One approach will be to support projects that demonstrate innovative conservation incentive and financing mechanisms, such as payments for ecosystem services (Investment Priority 1.4). Another approach will be to support civil society groups to explore partnerships with the private sector (Investment Priority 2.3). Large companies operating in the hotspot need to realize that it is to their benefit to conserve biodiversity and ways should be sought to engage such companies. Fiji Water in Fiji has recently committed US$5 million to conserve a key biodiversity area and rehabilitate the watershed from which they extract water, and similar models could be developed in the East Melanesian Islands. Even mining and logging companies are becoming increasingly aware of the business case for supporting conservation. A third approach will be to develop linkages between the RIT, conservation trust funds and the GEF Small Grants Programme, to align support to civil society organizations, and assist

CEPF grantees transition to these more permanent sources of funding. Overall, CEPF's focus on building partnerships at all levels that can provide lasting support, financial or otherwise, for conservation goals will be critical to achieving sustainability.

14. CONCLUSION

In terms of species richness and especially endemism, the East Melanesian Islands are one of the most biologically important regions on the planet. In addition, the mainly rural population relies heavily on biodiversity for food security and livelihoods. Local communities benefit from constitutionally guaranteed customary land ownership and resource tenure but boundaries are often in dispute. Rural populations have been long isolated, by barriers of geography and language, which has resulted in a high level of self-reliance but also cultural differences among groups. Threats to biodiversity have increased in recent decades through agricultural expansion, of both smallholdings and oil palm plantations, and the growth of extractive industries, such as logging and mining. The underlying causes of these threats include population growth, urbanization and migration patterns, economic growth and increasing consumption.

Over the last two decades, the countries in the hotspot have developed NBSAPs and other conservation strategies, and INGOs have established programs there. Significant investment in conservation has been made over this period by different donors but it has not always delivered the expected results or left a legacy in terms of local capacity and appreciation of conservation objectives. Nevertheless, domestic civil society organizations with a focus on biodiversity conservation have begun to emerge in all three countries. In addition, local communities, sometimes with outside support and sometimes independently, have responded to the conservation issues facing them with a range of strategies, often founded on traditional customs and governance arrangements. The conservation approach to have shown greatest promise in recent years has been community-managed conservation areas, especially LMMAs; although this requires significant capacity to be built among both community-based organizations and the groups that give them technical support, as well as clear communication and monitoring, to ensure that these areas deliver on the overlapping but different goals of both communities and conservation organizations. Moreover, there is a need to integrate the goals of conservation area into the plans and policies of other sectors, so that they are not undermined by incompatible developments.

In this context, there are significant opportunities for CEPF to support biodiversity conservation in ways that deliver significant, meaningful benefits to local communities. However, this will require an engagement longer than the typical five-year period, a commitment to capacity building at multiple levels, and a readiness to align global biodiversity priorities with local cultural and development priorities.

To develop its strategy to deliver a program of investment along these lines, CEPF commissioned a year-long consultative process that involved an expert roundtable meeting and nine stakeholder consultation workshops, and engaged more than 150 stakeholders from local communities, CSOs, government institutions and donor agencies.

The process resulted in a common conservation vision for the hotspot and an eight-year investment strategy for CEPF. This strategy comprises 15 investment priorities, grouped under five strategic directions. The successful implementation of this strategy will require time, persistence and, above all, a commitment to genuine and lasting partnership. The cooperation and common vision that has been witnessed through the ecosystem profiling process inspires confidence that such success will be achieved.

EAST MELANESIAN ISLANDS LOGICAL FRAMEWORK: 2013-2018

Objective	Targets	Means of Verification	Important Assumptions
Engage civil society in the conservation of globally threatened biodiversity through targeted investments with maximum impact on the highest conservation priorities	20 key biodiversity areas covering 1,549,009 hectares have new or strengthened protection and management. At least 100,000 hectares within production landscapes are managed for biodiversity conservation or sustainable use. At least 5 local land-use or development plans influenced to accommodate biodiversity. 48 globally threatened species have improved conservation status and/or available information on status and distribution. At least 10 partnerships and networks formed among civil society, government and communities to leverage complementary capacities and maximize impact in support of the ecosystem profile. At least 40 civil society organizations, including at least 30 domestic organizations, actively participate in conservation actions guided by the ecosystem profile.	Grantee and Regional Implementation Team performance reports. Annual portfolio overview reports; portfolio midterm and final assessment reports. Protected Areas Tracking Tool (SP1 METT). IUCN Red List of Threatened Species.	The CEPF ecosystem portfolio will effectively guide and coordinate conservation action in the East Melanesian Islands Hotspot. Investments by other donors will support complementary activities that reduce threats to priority sites and species. Political stability will facilitate the implementation of conservation initiatives and improve the operating environment for civil society. Civil society organizations and private companies will be willing to engage in biodiversity conservation, form new partnerships, and adopt innovative approaches.

Intermediate Outcomes	Intermediate Indicators	Means of Verification	Important Assumptions
Outcome 1: Local communities empowered to protect and manage globally significant biodiversity at priority Key Biodiversity Areas under served by current conservation efforts. $3,200,000	Baseline surveys completed for at least 10 priority sites. Awareness of the values of biodiversity and the nature of threats and drivers raised among local communities within at least 10 priority sites. Threat levels to at least 15 priority sites reduced through locally relevant conservation actions implemented by local communities. Conservation incentives (ecotourism, payments for ecosystem services, conservation agreements, etc.) demonstrated for at least 5 priority sites. At least 75 percent of local communities targeted by site-based projects show tangible wellbeing benefits.	Grantee and Regional Implementation Team performance reports. CEPF Secretariat supervision mission reports. Protected Areas Tracking Tool (SP1 METT). Community agreements designating new conservation areas. Baseline survey reports. Human wellbeing monitoring reports.	Local communities will be willing to play an active role in site-based conservation. Increased awareness of biodiversity values will translate into increased local community support for conservation initiatives. Government policies will continue to provide for community management of forests, fisheries and other natural resources. Suitable and sufficient funding sources will be available for conservation incentives models. Appropriate, cost-effective site-based monitoring protocols for human well-being impacts can be developed. Sufficient civil society capacity to implement site-based conservation exists or can be built.

Intermediate Outcomes	Intermediate Indicators	Means of Verification	Important Assumptions
Outcome 2: Biodiversity conservation integrated into local land-use and development planning. $1,000,000	Ownership and tenure rights within customary lands mapped for at least 5 priority sites. At least 10 communities affected by incompatible development projects provided with legal training and support. At least 3 partnerships catalyzed between civil society organizations and natural resource companies to promote sustainable development through better environmental and social practices. Biodiversity and ecosystem service values of at least 5 priority sites integrated into local land-use and/or development plans and policies.	Grantee and Regional Implementation Team performance reports. CEPF Secretariat supervision mission reports. Annual reports of private companies. Local land-use and development plans and policies covering the priority sites.	Governments and donors will remain committed to environmentally sustainable development. Governments will create space for civil society to engage in the review and formulation of local land-use and development plans. Land-use conflicts will not prevent participatory ownership and tenure mapping at the priority sites. Private companies in key natural resource sectors will appreciate the business case for better environmental and social practices. Sufficient civil society capacity to undertake biodiversity mainstreaming exists or can be built.

Intermediate Outcomes	Intermediate Indicators	Means of Verification	Important Assumptions
Outcome 3: Priority globally threatened species safeguarded by addressing major threats and information gaps. $1,200,000	Knowledge of the status and distribution of at least 5 priority species improved through research Species recovery plans developed, implemented and monitored for at least 20 priority species. Science-based harvest management introduced for at least 3 priority species important to local food security.	Grantee and Regional Implementation Team performance reports. CEPF Secretariat supervision mission reports. IUCN Red List species accounts.	National and customary laws provide an appropriate basis for species-focused conservation action, including sustainable harvest of certain species. Sufficient civil society capacity to implement species-focused conservation exists among civil society or can be built. Governments and donors will remain committed to species conservation, and able to support implementation of species recovery plans.
Outcome 4: Local and national capacity to conserve biodiversity increased through civil society partnerships. $2,100,000	At least 5 civil society networks enable collective responses to priority and emerging threats. At least 20 domestic civil society organizations demonstrate improvements in organizational capacity. At least two civil society organizations emerge as national conservation leaders in each hotspot country. At least 30 conservationists demonstrate strengthened capacity in conservation management, science and leadership.	Grantee and Regional Implementation Team performance reports. CEPF Secretariat supervision mission reports. Civil society organizational capacity tracking tool. Training needs assessments and evaluation reports.	The operating environment for civil society will remain constant or improve across the hotspot. The key capacity limitations of civil society organizations can be addressed through a combination of capacity building and grant support. National civil society organizations are willing to take on a leadership role. Domestic academic institutions will continue to provide short-term training courses in relevant fields.

Intermediate Outcomes	Intermediate Indicators	Means of Verification	Important Assumptions
Outcome 5: A Regional Implementation Team provides strategic leadership and effectively coordinates CEPF investment in the East Melanesian Islands Hotspot. $1,500,000	At least 40 civil society organizations, including at least 30 domestic organizations actively participate in conservation actions guided by the ecosystem profile. At least 80 percent of domestic civil society organizations receiving grants demonstrate more effective capacity to design and implement conservation actions. At least 20 civil society organizations supported by CEPF secure follow-up funding from conservation trust funds and/or the GEF Small Grants Programme. At least 2 participatory assessments are undertaken and lessons learned and best practices from the hotspot are documented.	Regional Implementation Team performance reports. CEPF Secretariat supervision mission reports. Civil society organizational capacity tracking tool.	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 goals 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.
Funding Summary	**Amount**		
Total Budget	$9,000,000		

ABBREVIATIONS USED IN THE TEXT

ADB	Asian Development Bank
AMNH	American Museum of Natural History
AusAID	Australian Agency for International Development
AVI	Australian Volunteers International
AZE	Alliance for Zero Extinction
CBC	Center for Biodiversity and Conservation
CBO	community-based organization
CEPF	Critical Ecosystem Partnership Fund
CI	Conservation International
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CR	Critically Endangered
DSE	Development Services Exchange
ECANSI	Environment Concerns Action Network Solomon Islands
EIA	environmental impact assessment
EN	Endangered
ENSO	El Niño/Southern Oscillation
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FFA	Forum Fisheries Agency
FSPI	Foundation of the Peoples of the South Pacific International
GDP	gross domestic product
GEF	Global Environment Facility
GHG	greenhouse gas
GNP	Gross National Product
IBA	Important Bird Area
ICCO	Interchurch Organisation for Development Cooperation
INGO	international nongovernmental organization
IPCC	Intergovernmental Panel on Climate Change
ITCZ	Inter-tropical Convergence Zone
IUCN	International Union for the Conservation of Nature
JOCV	Japan Overseas Cooperation Volunteers
KBA	Key Biodiversity Area
LLG	local-level government
LMMA	locally managed marine area
LULUCF	land use, land-use change and forestry
MGCTF	Mama Graun Conservation Trust Fund
MoU	memorandum of understanding
Mt	million metric tons
NBSAP	National Biodiversity Strategy and Action Plan
NGO	nongovernmental organization
NOAA	National Oceanographic and Atmospheric Administration
NZAID	New Zealand Agency for International Development
PNG	Papua New Guinea

RAMSI	Regional Assistance Mission to Solomon Islands
REDD	Reducing Emissions from Deforestation and Forest Degradation
SICA	Solomon Islands Christian Association
SICCP	Solomon Islands Community Conservation Partnership
SIDT	Solomon Islands Development Trust
SILMMA	Solomon Islands Locally Managed Marine Areas
SPC	Secretariat of the Pacific Community
SPCZ	South Pacific Convergence Zone
SPREP	Secretariat of the Pacific Regional Environment Programme
TNC	The Nature Conservancy
TRC	Truth and Reconciliation Commission
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UPNG	University of Papua New Guinea
USAID	United States Agency for International Development
USP	University of the South Pacific
VANGO	Vanuatu Association of Nongovernmental Organizations
VBCTF	Vanuatu Biodiversity Conservation Trust Fund
VSA	Volunteer Service Abroad
VSO	Volunteer Service Overseas
VU	Vulnerable
WCS	Wildlife Conservation Society
WWF	World Wide Fund for Nature

REFERENCES

Agence France Press (2001) The Mortlock Islands sinking. *Agence France Press* 13 December 2001.

Anon. (2002) *Solomon Islands human development report 2002: building a nation.* Volume 1. Main Report. Honiara: Government of the Solomon Islands.

ADB (2003) *Pacific region environment strategy*. Discussion draft, June 2003. Manila: Asian Development Bank.

Anon. (2009) *2009 national population and housing census.* Port Vila: Vanuatu National Statistics Office.

ADB (2010) *Responding to climate change in the Pacific: moving from strategy to action*. Manila: Asian Development Bank.

Anon. (2012) *Preliminary figures, Papua New Guinea census 2011*. Port Moresby: National Statistical Office of Papua New Guinea.

Anon. (undated) *Republic of Vanuatu national adaptation programme of action.* Port Vila: National Advisory Committee on Climate Change.

Atkinson, C. T., Woods, K. L., Dusek, R. J., Sileo, L. S. and Iko, W. M. (1995) Wildlife disease and conservation in Hawaii: Pathogenicity of avian malaria (*Plasmodium relictum*) in experimentally infected iiwi (*Vestiaria coccinea*). *Parasitology* 111: S59-S69.

Audra, P., Lauritzen, S. E. and Rochette, P. (2011) Speleogensis in the hyperkarst of the Nakanai Mountains (New Britain, Papua New Guinea). Evolution model of a juvenile system (Muruk Cave) inferred from U/Th and palaeomagnetic dating. *Speleogensis* 10: 25-30.

AusAID (1995) *Forest resources and vegetation mapping of PNG.* Canberra: Australian Agency for International Development.

AusAID (2005) *Civil society scoping mission, Papua New Guinea, 15th to 29th August, 2005*. Canberra: Australian Agency for International Development.

AusAID (2006) *Solomon Islands national forest resource assessment update*. Canberra: URS Sustainable Development.

AusAID (2007) *Mapping AusAID's engagement with civil society in the PNG country program.* Downloaded from www.ode.ausaid.gov.au on 20 May 2012.

Australian Bureau of Meteorology (2007) *South Pacific Sea Level and Climate Monitoring Project Report.* Adelaide: Australian National Tidal Facility.

Australian Bureau of Meteorology (2011) *International Climate Change Adaptation Initiative: Pacific Climate Change Science Programme.* Volumes 1 and 2. Canberra: Australian Government.

Avosa, M. (unpublished) Controversy surrounding the state's usufruct rights over indigenous-owned land-based resources and its environment implications in PNG.

Barry, G. (2003) *Overview and commentary on "People against foreign NGO neocolonialism: unheard rainforest conservation voices from Papua New Guinea"*. Downloaded from http://forests.org/archived_site/today/recent/2003/pngnewc2.htm on 13 August 2012.

Beehler, B. M., Angle, J. P., Gibbs, D., Hedemark, M. and Kuro, D. (2001) A field survey of the resident birds of southern New Ireland. Pp 61-66 in Beehler, B. M.

and Alonso, L. E. eds. *Southern New Ireland, Papua New Guinea: a biodiversity assessment.* Washington, DC: Conservation International.

Berdach, J. T. and Llegu, M. (2007) *Solomon Islands: country environmental analysis*. Manila: Asian Development Bank Mainstreaming Environmental Considerations in Economic and Development Planning Processes Project.

Berdach, J. T. and Mandeakali, L. (2004) *Papua New Guinea: country environmental analysis*. Manila: Asian Development Bank Mainstreaming Environmental Considerations in Economic and Development Planning Processes Project.

BetterAid (2012) *CSO analysis of the Busan Partnership.* Downloaded from http://betteraid.org/ en/news/286-latest-news/543-cso-analysis-of-the-busan-partnership.html on 14 August 2012.

Bezuijen, M., Morgan, C. and Mather, R. (2011) *A rapid vulnerability assessment of coastal habitats and selected species to climate risks.* Gland: International Union for the Conservation of Nature.

Bickford, D., Howard, S. D., Ng, D. J. J. and Sheridan, J. A. (2010) Impacts of climate change on the amphibians and reptiles of Southeast Asia. *Biodiversity and Conservation* 19: 1043-1062.

BirdLife International (2009) *Gallinula silvestris*. In: IUCN (2011) *IUCN Red List of Threatened Species*. Version 2011.2 <www.iucnredlist.org> Downloaded on 16 June 2012.

BirdLife International (2010) *Pseudobulweria becki.* In: IUCN (2011) *IUCN Red List of Threatened Species*. Version 2011.2. <www.iucnredlist.org> Downloaded on 16 June 2012.

Bourke, R. M. and Betitis, T. (2003) *Sustainability of agriculture in Bougainville province, Papua New Guinea.* Canberra: Australian National University.

Bourke, R. M., McGregor, A., Allen, M. G., Evans, B. R., Mullen, B. F., Pollard, A. A., Wairiu, M. and Zotalis, S. (2006) *Solomon islands smallholder agriculture study. Volume 1: main findings and recommendations.* Canberra: Australian Agency for International Development.

Brodie, T. and Turak, E. (2001) *Land-use practices in the Stettin Bay catchment area and their relation to the status of the coral reefs in the bay.* Townsville: Australian Centre for Tropical Freshwater Research.

Brunton, B. (1998) *Forest loss in Papua New Guinea.* Downloaded from http://www.wrm.org.uy/deforestation/Oceania/Papua.html on 29 February 2012.

Buchanan, G. M., Butchart, S. H. M., Dutson, G., Pilgrim, J. D., Steininger, M. K., Bishop, K. D. and Mayaux, P. (2008) Using remote sensing to inform conservation status assessment: estimates of recent deforestation rates on New Britain and the impacts upon endemic birds. *Biological Conservation* 141: 55-66.

Burrett, C., Duhig, N., Berry, R. and Varne, R. (1991) Asian and South-western Pacific continental terranes derived from Gondwana and their biogeographic significance. *Aust. Syst. Bot.* 4: 13-24.

Bush, M. B., Silman, M. R. and Urrego, D. H. (2004) 48,000 years of climate and forest change in a biodiversity hotspot. *Science* 303: 827-829.

Carter, T. R., Parry, M. L., Harasawa, H. and Nishioka, S. (1994) *IPCC technical guidelines for assessing climate change impacts and adaptation.* London and

Tsukuba: Department of Geography, University College London, and Center for Global Environmental Research, National Institute for Environmental Studies.
Central Bank of Solomon Islands (2008) *2007 Central Bank of Solomon Islands annual report*. Honiara: Central Bank of Solomon Islands.
Central Bank of Solomon Islands (2011) *2010 Central Bank of Solomon Islands annual report*. Honiara: Central Bank of Solomon Islands.
Cheatle, R. J. (1987) Strategies and tactics for development of steep land resources in Solomon Islands. In: *Proceedings of International Conference on Steep Land Agriculture in the Humid Topics.* Kuala Lumpur: Mardi Press.
Cheung, W. W. L., Lam, V. W. Y., Sarmiento, J. L., Kearney, K., Watson, R. and Pauly, D. (2009) Projecting global marine biodiversity impacts under climate change scenarios. *J. of Fish and Fisheries* 10: 235-251.
Choat, J., Van Herwerden, L., Robbin, W. and Hobbs, P. (2006) *Report of the ecological surveys undertaken at Middleton and Elizabeth Reefs*. Townsville: James Cook University.
Church, J., Woodworth, P., Aarup, T. and Wilson, S. eds. (2010) *Understanding sea level rise and variability.* Oxford: Blackwell Publishing Ltd.
Clarke, P., Millar, I. and Solberger, K. (2008) *South Pacific Regional Environmental Law Capacity Building Project. Scoping report.* Gland: IUCN.
Commonwealth of Nations (2012) *Solomon Islands.* Downloaded from http://www.commonwealthofnations.org/ on 14 August 2012.
Compagno, L. J. V., White, W. and Fowler, S. (2003) *Carcharhinus hemiodon*. In: IUCN (2011) *IUCN Red List of Threatened Species.* Version 2011.2. <www.iucnredlist.org> Downloaded on 16 June 2012.
Conservation Stewards Program (2012) *Conservation Stewards Program.* Downloaded from http://www.conservation.org/global/csp/Pages/partnerlanding.aspx on 6 July 2012.
Cultural Survival (2010) *Asserting traditional rights: community conservation in Solomon Islands.* Downloaded from http://www.culturalsurvival.org/publications/cultural-survival-quarterly/solomon-islands/asserting-traditional-rights-community-cons on 14 August 2012.
Curry, G. N., Koczberski, L., Omuru, E., Duigu, J., Yala, C. and Imbun, B. (2007) *Social assessment report for the smallholder agriculture development project (SADP) Papua New Guinea.* Perth: Curtin University of Technology.
Davies, J., Dunne, R. and Brown, B. (1997) Coral bleaching and elevated sea-water temperature in Milne Bay province, Papua New Guinea, 1996. *Marine and Freshwater Research* 48: 513-516.
Deharveng, L., Bedos, A., Prié, V. and Queinnec, E. (2011) Focus on cave terrestrial habitats. Pp 296-300 in Bouchet, P., Le Guyader, H. and Pascal, E. eds. *The natural history of Santo.* Paris: Muséum National d'Histoire Naturelle, IRD and Pro-Natura.
Deutsch, C. A., Tewksbury, J. J., Huey, R. B., Sheldon, K. S., Ghalambor, C. K., Haak, D. C. and Martin, P. R. (2008) Impacts of climate change on terrestrial ecotherms across latitude. *Proc. Natl. Acad. Sci.* 105(18): 6668-6672.

Diamond, J. M. (1975) Assembly of species communities. Pp 342-444 in: Diamond, J. M. and Cody, M. L. eds. *Ecology and evolution of species communities*. Cambridge, USA: Harvard University Press.

Dow, K. and Downing, T. (2006) *The atlas of climate change: mapping the world's greatest challenge.* London: Earthscan.

Dowl, J. L. (1998) *Carpoxylon macrospermum.* In: IUCN (2011) *IUCN Red List of Threatened Species.* Version 2011.2. <www.iucnredlist.org> Downloaded on 16 June 2012.

DSE (2008) *Development data base.* Second edition. Honiara: Development Services Exchange.

Duguman, J. (2010) *Report on the relocation of the Carteret Islanders, Autonomous Region of Bougainville, PNG.* Apia: United Nations Educational, Scientific and Cultural Organisation.

Eade, D. (1997) *Capacity-building: an approach to people-centred development.* Oxford: Oxfam.

Economist Intelligence Unit (2003) *Country profiles: Pacific islands 2003.* New York: Economist Intelligence Unit.

Eddowes, P. J. (1998) *Helicia polyosmoides*. In: *IUCN Red List of Threatened Species.* Version 2011.2. <www.iucnredlist.org> Downloaded on 16 June 2012.

Ellison, J. and Gilman, E. (2004) *Manual for American Samoa community-based mangrove nonitoring: monitoring changes in mangrove community structure and response to relative sea level rise.* Pago Pago: American Samoa Coastal Management Program, Department of Commerce.

FAO (2011a) *Fisheries of the Pacific islands: regional and national information.* Bangkok: Food and Agriculture Organization of the United Nations Regional Office for Asia and the Pacific.

FAO (2011b) *State of the world's forests.* Rome: Food and Agriculture Organization of the United Nations.

Filardi, C. E., Boseto, D. and Filardi, C. E. (2007) A preliminary desk study identifying important bird areas (IBAs) in the Solomon Islands. Unpublished draft report submitted to BirdLife International.

Flannery, T. F. (1995) *Mammals of the south-west Pacific and Moluccan islands.* Chatswood: Australian Museum and Reed Books.

Frielink, A. B. J. (1983) *Coastal fisheries in Papua New Guinea, the current situation*. Research report. Port Moresby: Department of Primary Industry.

FSC (1996) *FSC international standard: FSC principles and criteria for forest stewardship.* Bonn: Forest Stewardship Council.

Gilman, E., Van Lavieren, H., Ellison, J., Jungblut, V., Wilson, L., Areki, F., Brighouse, G., Bungitak, J., Dus, E., Henry, M., Sauni Jr., I., Kilman, M., Matthews, E. Teariki-Ruatu, N., Tukia, S. and Yuknavage, K. (2006) *Pacific island mangroves in a changing climate and rising sea.* Nairobi: United Nations Environment Programme.

Global Facility for Disaster Reduction and Recovery (2011) *Climate risk and adaptation country profile: vulnerability, risk reduction and adaptation to climate change: Solomon Islands*. Washington, DC: The World Bank.

Global Greengrants Fund (2012) *Global Greengrants Fund: for a just and sustainable world*. Downloaded from www.greengrants.org on 16 July 2012.
Government of PNG (1975) *Constitution of the Independent State of Papua New Guinea*. Port Moresby: Government of Papua New Guinea.
Government of PNG (1991) *National forest policy*. Port Moresby: Papua New Guinea Forest Authority.
Government of PNG (1996) *National forest plan*. Port Moresby: Papua New Guinea Forest Authority.
Government of PNG (2000) *Initial national communication to the United Nations Framework Convention on Climate Change.* Port Moresby: Government of Papua New Guinea.
Government of PNG (2007) *National biodiversity strategy and action plan*. Port Moresby: Department of Environment and Conservation.
Government of PNG (2010) *Papua New Guinea's fourth national report to the Convention on Biological Diversity.* Port Moresby: Government of Papua New Guinea.
Government of the Solomon Islands (2001) *Initial national communications to the United Nations Framework Convention on Climate Change.* Honiara: Ministry of Culture, Tourism and Aviation.
Government of the Solomon Islands (2008) *Solomon Islands state of environment report 2008.* Honiara: Ministry of Environment, Conservation and Meteorology.
Government of the Solomon Islands (2009) *Solomon Islands national biodiversity strategy and action plan*. Honiara: Ministry of Environment, Conservation and Meteorology.
Government of the Solomon Islands (2011) *Fourth national report to the Convention on Biological Diversity*. Honiara: Ministry of Environment, Climate Change, Disaster Management and Meteorology.
Government of Vanuatu (1999a) *Vanuatu National Biodiversity Strategy and Action Plan Project: National Biodiversity Conservation Strategy.* Port Vila: Vanuatu Environment Unit.
Government of Vanuatu (1999b) *Vanuatu national communication to the Conference of the Parties to the United Nations Framework Convention on Climate Change*. Port Vila: Vanuatu Government Press.
Government of Vanuatu (2002) *Environmental management and conservation act no. 12*. Port Vila: Government of Vanuatu.
Green, P. S. (1979) Observations on the phytogeography of the New Hebrides, Lord Howe Island and Norfolk Island. Pp 41-53 in Bramwell, D. ed. *Plants and islands.* London: Academic Press.
Greenslade, P. J. M. (1971) Interspecific competition and frequency changes among ants in Solomon Islands coconut plantations. *Journal of Applied Ecology* 8: 323-352.
Guinot, D. (1987) Nouvelles decouvertes dans des grotter de Nouvelle-Bretagne du crabe aveugle *Troglapax joliveti* Guinot, 1986, et description d'un crabe douce cavernicole, *Sendleria genuitei* sp. nov. *C. R. Acad. Sci.* 305(111): 25-30.
Hackman, B. D. (1973) The Solomon Islands fractured arc. Pp 179-191 in: Coleman, P. J. ed. *The western Pacific: island arcs; marginal seas; geochemistry*. Perth: University of Western Australia Press.

Hall, R. (2002) Cenozoic geological and plate tectonic evolution of SE Asia and the SW Pacific: computer-based reconstructions, model and animations. *Journal of Asian Earth Sciences* 20: 353-431.

Hargy Oil Palms Ltd (2012) *Hargy Oil Palms Limited.* Downloaded from http://www.hargy.com.pg/ on 14 August 2012.

Hay, J. E., Mimura, N., Campbell, J., Fifita, S., Koshy, K., Mclean, R., Nakalevu, T., Nunn, P. and de Wet, N. (2003) *Climate variability and change and sea level rise in the Pacific Island Region: a resource book for policy and decision makers, educators and other stakeholders.* Apia: Secretariat of the Pacific Regional Environment Programme.

Hay, J. E. and Schuster, C. (2009) NZAID support to the Global Environment Facility's Small Grants Programme. Final Report. Unpublished report to the New Zealand Agency for International Development.

Hay, J. E. and Sem, G. (2000) *Vulnerability and adaptation: assessment of vulnerability and adaptation to climate change.* Apia: Secretariat of the Pacific Regional Environment Programme.

Hills, T., Brooks, A., Atherton, J., Rao, N., and James, R. (2011) *Pacific Island biodiversity, ecosystems and climate change adaptation: building on nature's resilience.* Apia: Secretariat of the Pacific Regional Environment Programme.

Hole, D. G., Willis, S. G., Pain, D. J., Fishpool, L. D. C., Butchart, S. H. M., Collingham, Y. C., Rahbek, C. and Huntley, B. (2009) Projected impacts of climate change on a continent-wide protected area network. *Ecology Letters* 12: 420-431.

Holloway, R. (2001) *Using the Civil Society Index: assessing the health of civil society: a handbook for using the CIVICUS index on civil society as a self-assessment tool.* Canada: CIVICUS.

Holthus, P., Crawford, C., Makro, C. and Sullivan, S. (1992) *Case study: Majuro Atoll, Republic of Marshall Islands.* Apia: Secretariat of the Pacific Regional Environment Programme.

Houghton, J. T., Meria Filho, L. G., Callander, N. H., Kattenberg, A. and Maskell, K. eds. (1996) *Climate change 1995: the science of climate change.* Cambridge, UK and New York: Cambridge University Press.

Houghton, J. T., Ding, Y., Griggs, D. J., Noguer, M., van der Linden, P. J., Dai, X., Maskell, K. and Johnson, C. A. eds. (2001) *Climate change 2001: the scientific basis: contribution of Working Group I to the Third Assessment Report of the Intergovernmental Panel on Climate Change.* Cambridge, UK and New York: Cambridge University Press.

Hunt, C. (2001) *The contribution of forestry to development in selected Pacific island countries.* Port Moresby: National Research Institute.

Institute of Pacific Islands Forestry (2011) *Pacific Island Ecosystems at Risk (PIER): plant threats to Pacific ecosystems*. Downloaded from http://www.hear.org/pier/ on 29 February, 2012.

Invasive Species Specialist Group (2003) *Global Invasive Species Database.* Downloaded from http://www.issg.org on 2 February 2012.

Isaac, N. J. B., Turvey, S. T., Collen, B., Waterman, C. and Baillie, J. E. M. (2007) Mammals on the EDGE: conservation priorities based on threat and phylogeny. *PLoS ONE* 2(3): e296. Doi: 10.1371/journal.pone.0000296.

IUCN (2011) *IUCN Red List of Threatened Species.* Downloaded from http://www.iucn redlist.org/ on 2 February 2012.

IUCN and UNEP (2009) *The World Database on Protected Areas (WDPA).* Cambridge, UK: United Nations Environment Programme-World Conservation Monitoring Centre.

James, S. A. (2008) *Climate change impacts on native plan communities in Melanesia.* Honolulu: Bishop Museum.

Kaluwin, C., Aung, T. H. and Lennon, G.W. (1998) *Climate change and sea level, part 2: social science*. Adelaide: National Tidal Facility, The Flinders University of South Australia.

Kaluwin, C. and Hay, J. eds. (1998) *SPREP report of the 3rd Climate Change and Sea Level Rise Conference 1997 in New Caledonia.* Apia: Secretariat of the Pacific Regional Environment Programme.

Kay, R. C., Cole, A., Elisara, F. M. and Yamada, K. (1993) *Assessment of coastal vulnerability and resilience to sea level rise and climate change. Case study: Upolu Island, Western Samoa. Phase I: concepts and approach.* Apia: Secretariat of the Pacific Regional Environment Programme.

King, P. (2007) *Country environmental analysis: Vanuatu*. Manila: Asian Development Bank.

Kool, J., Brewer, T., Mills, M. and Pressey, R. (2010) *Ridges to reefs conservation for Solomon Islands.* Townsville: ARC Centre of Excellence for Coral Reef Studies, James Cook University.

Lakshman, C. (2012) *Review of legislative and regulations framework governing the establishment and legal status of the civil society sector in the Pacific member states of the ACP.* Suva: Institute of Justice and Applied Legal Studies, University of the South Pacific.

Lal, N. P., Kinch, J. and Wickham, F. (2009) *Review of economic and livelihood impact assessments of and adaptation to climate change in Melanesia.* Apia: Secretariat of the Pacific Regional Environment Programme.

Lane, B. M. (2006) *Evaluating the governance of coastal resources and environments in Vanuatu.* Apia: Secretariat of the Pacific Regional Environment Programme.

Langhammer, P. E., Bakarr, J. I., Bennun, L. A., Brooks, T. M.. Clay, R. P., Darwall, W., De Silva, N., Edgar, G. J., Eken, G., Fishpool, L. D. C., de Fonseca, G. A. B., Foster, M. N., Knox, D. H., Matiku, P., Radford, E. A., Rodrigues, A. S. L., Salaman, P., Sechrest, W. and Tordoff, A. W. (2007) *Identification and gap analysis of key biodiversity areas: targets for comprehensive protected area systems.* Gland: IUCN.

Leary, T., Hamilton, S. and James, R. (2008a) *Pteropus tuberculatus.* In: IUCN (2011) *IUCN Red List of Threatened Species.* Version 2011.2. <www.iucnredlist.org> Downloaded on 15 June 2012.

Leary, T., Seri, L., Flannery, T., Wright, D., Hamilton, S., Helgen, K., Singadan, R., Allison, A., James, R. and Bonaccorso, F. (2008b) *Uromys imperator.* In: IUCN (2011) *IUCN Red List of Threatened Species.* Version 2011.2. <www.iucnredlist.org> Downloaded on 15 June 2012.

Leary, T., Wright, D., Hamilton, S., Singadan, R., Menzies, J., Bonaccorso, F., Helgen, K. and Seri, L. (2008c) *Uromys imperator.* In: IUCN (2011) *IUCN Red List of*

Threatened Species. Version 2011.2. <www.iucnredlist.org> Downloaded on 15 June 2012.
Lees, A. (1990) *A protected forests system for the Solomon Islands*. Nelson: Maruia Society and Canberra: Australian National Parks and Wildlife Service.
Lehodey, P., Bertignac, M., Hampton, J., Lewis, A. and Piaut, J. (1997) El Niño and tuna in the western Pacific. *Nature*, 289: 715-717.
Leisz, S. J., Burnett, J. B. and Allison, A. (2009) *Climate change and biodiversity in Melanesia: what do we know?* Consensus report. Honolulu: Bishop Museum.
Lewis, M. P. ed. (2009) *Ethnologue: languages of the world.* Sixteenth Edition. Dallas: SIL International.
Lidimani, D. L. (2004) *Law and civil society organisations in Solomon Islands: a review of the enabling legislative framework.* Country report. Port Moresby: International Centre for Not for Profit Law.
Lidimani, D. L. (2007) *Law and civil society organisations in Papua New Guinea: a review of the enabling legislative framework.* Country report. Port Moresby: International Centre for Not for Profit Law.
Lipsett-Moore, G. Game, E., Peterson, N., Saxon, E., Sheppard, S., Allison, A., Michael, J., Singadan, R., Sabi, J., Kula, G. and Gwaibo, R. (2010) *Interim national terrestrial conservation assessment for Papua New Guinea: protecting biodiversity in a changing climate.* Pacific Island Countries Report No. 1/2010. South Brisbane: The Nature Conservancy.
Low, W. and Davenport, E. (2002) NGO capacity building and sustainability in the Pacific. *Asia Pacific Viewpoint* 43(3): 367-379.
MacArthur, R. H. and Wilson, E. O. (1963) An equilibrium theory of insular zoogeography. *Evolution* 17(4): 373-387.
Mallick, D. I. J. (1973) Some petrological and structural variations in the New Hebrides. Pp 193-211 in: Coleman, P. J. ed. *The western Pacific: island arcs; marginal seas; geochemistry*. Perth: University of Western Australia Press.
Marquet, G., Taiki, N., Chadderton, L. and Gerbeaux, P. (2002) Biodiversity and biogeography of freshwater crustaceans (Decapodia: Natantia) from Vanuatu, a comparison with Fiji and New Caledonia. *Bull. Fr. Péche piscic.* 364: 217-232.
Marsh, H. (2008) *Dugong dugon*. In: IUCN (2012) *IUCN Red List of Threatened Species.* Version 2012.1. <www.iucnredlist.org> Downloaded on 5 July 2012.
Mayr, E. and Diamond, J. M. (2001) *The birds of northern Melanesia: speciation, ecology and evolution.* Oxford: Oxford University Press.
McIlwaine, C. (2007) From local to transitional civil society: re-framing development perspectives on the non-state sector. *Geography Compass* 1(6): 1252-1281.
Menzies, N. (2007) *Legal pluralism and the post-conflict transition in the Solomon Islands: kastom, human rights and international interventions.* Discussion paper. Berlin: Hertie School of Governance.
Metz, B., Davidson, O., Bosch, P., Dave, R. and Meyer, L. eds. (2007) *Climate change 2007: mitigation of climate change.* Cambridge, UK, and New York: Cambridge University Press.
MGCTF (2009) *Mama Graun Conservation Trust Fund*. Brochure. Downloaded from http://toolkit.conservationfinance.org/sites/default/files/documents/communications/brochure-2009-mama-graun-png.pdf on 19 August 2012.

Mueller-Dombois, D. and Fosberg, F. R. (1998) *Vegetation of the tropical Pacific islands*. New York: Springer-Verlag.

National Parliament of Solomon Islands (1996) *The provincial government act of 1996*. Downloaded from http://www.parliament.gov.sb/files/legislation/Acts/1996/The%20Provincial%20Government%20ACT%201996.pdf on 14 August 2012.

New Britain Oil Palm Ltd (2011) *Annual report 2011*. Kimbe: New Britain Oil Palm Ltd.

Nishida, G. M. and Evenhuis, N. L. (2000) Arthropod pests of significance in the Pacific: a preliminary assessment of selected groups. Pp 115-142 in Sherley, G. ed. *Invasive species in the Pacific: a technical review and draft strategy*. Apia: Secretariat of the Pacific Regional Environment Programme.

NOAA (2011) *National Oceanographic Data Center*. Online database accessed at http://www.nodc.noaa.gov/General/temperature.html on 8 November 2011.

Nunn, P. D. (1998) *Pacific island landscapes: landscape and geological development of southwest Pacific islands, especially Fiji, Samoa and Tonga*. Suva: Institute of Pacific Studies, University of the South Pacific.

Nunn, P. D., Aalbersberg, W., Ravuvu, A. D., Mimura, N. and Yamada, K (1994a) *Assessment of coastal vulnerability and resilience to sea-level rise and climate change. Case study: Yasawa Islands, Fiji. Phase II: development of methodology*. Apia: Secretariat of the Pacific Regional Environment Programme.

Nunn, P. D., Balogh, E., Ravuvu, A. D., Mimura, N. and Yamada, K. (1994b) *Assessment of coastal vulnerability and resilience to sea-level rise and climate change. Case study: Savai'i Island, Western Samoa. Phase II: development of methodology*. Apia: Secretariat of the Pacific Regional Environment Programme.

O'Brien, M., Beaumont, D. J., Peacock, M. A., Hills, R. and Edwin, H. (2003) *The Vanuatu megapode* Megapodius layardi *monitoring and conservation*. Sandy: Royal Society for the Protection of Birds.

Olson, D. M., Dinerstein, E., Wikramanayake, E. D., Burgess, N. D., Powell, G. V. V., Underwood, E. C., D'Amico, J. A., Itoua, I., Strand, H. E., Morrison, J. C., Loucks, C. J., Allnutt, T. F., Ricketts, T. H., Kura, Y., Lamoreux, J. F., Wettengel, W. W., Hedao, P. and Kassem, K. R. (2001) Terrestrial ecoregions of the world: a new map of life on Earth. *BioScience* 51(11): 933-938.

Packham, G. H. (1973) A speculative phanerozoic history of the south-west Pacific. Pp 369-388 in: Coleman, P. J. ed. *The western Pacific: island arcs; marginal Seas; geochemistry*. Perth: University of Western Australia Press.

Pacific Islands Legal Information Institute (2012) *PacLII databases*. Downloaded from www.paclii.org/databases.html during May-July 2012.

Parry, M., Canziani, O., Palutiko, F. J. van der Linden, J. and Honson, E. eds. (2007) *Climate change 2007: impacts, adaptation and vulnerability*. Cambridge, UK, and New York: Cambridge University Press.

Pauku, R. L. (2009) *Solomon Islands forestry outlook study*. Honiara: Solomon Islands Government.

Polhemus, D. A., Englund, R. A., Allen, G. R., Boseto, D. and Polhemus, J. T. (2008) *Freshwater biotas of the Solomon Islands: analysis of richness, endemism and threats*. Honolulu: Bishop Museum.

PNG Eco-forestry Forum (2010) *Iko-forestri Nius April-September 2010*. Downloaded from http://www.ecoforestry.org.pg on 1 May 2012.

PNG Forest Authority (1995) *Country report on timber trade statistics.* Port Moresby: Papua New Guinea Forest Authority.

PNG Forest Authority (2007) *Welcome to the Papua New Guinea Forest Authority website.* Downloaded from http://www.forestry.gov.pg/site/index/php on 10 May 2012.

PNG National Weather Service (2010) Meteorological data provided by the National Weather Service of the Government of Papua New Guinea.

Pressey, R. L. (1994) *Ad hoc* reservations: forward or backward steps in developing representative reserve systems. *Conservation Biology* 8: 662-668.

Prime Minister and National Executive Council (2010) *PNG Vision 2050 report*. Port Moresby: Government of Papua New Guinea.

Ramsar (2011) *About the Ramsar Convention*. Downloaded from http://www.ramsar.org/cda/en/ramsar-about-about-ramsar/main/ramsar/1-36%5E7687_4000_0__ on 12 September 2011.

Regenvanu, R. (2007) *Making policy to support living cultures: a case study in 'mainstreaming culture' from Vanuatu.* Paper presented at the conference Islands at a Crossroads: Cultural Diversities in Small Island Developing States, Victoria, Seychelles, 11-13 April 2007.

Reid, C., Marshall, J., Logan, D. and Kleine, D. (2010) *Coral reefs and climate change*. Brisbane: University of Queensland.

Richards, S. and Parker, F. (2004a) *Palmatorappia solomonis*. In: IUCN (2012) *IUCN Red List of Threatened Species*. Version 2012.1. <www.iucnredlist.org>. Downloaded on 14 August 2012.

Richards, S. and Parker, F. (2004b) *Platymantis akarithymus*. In: IUCN (2012) *IUCN Red List of Threatened Species.* Version 2012.1. <www.iucnredlist.org>. Downloaded on 14 August 202.

Rowe, A. (2007) Review of the LMMA network. Final report. Unpublished report to the MacArthur Foundation and the Packard Foundation.

Salinger, M. J. (2001) Climate variation in New Zealand and southwest Pacific. Pp 130-149 in Sturman, A. and Spronken-Smith, R. eds. *The physical environment: a New Zealand perspective.* Melbourne and Auckland: Oxford University Press.

Sanderson, E. W., Redford, K. H., Vedder, A., Coppolillo, P. B. and Ward, S. E. (2001) A conceptual model for conservation planning based on landscape species requirements. *Landscape and Urban Planning* 878: 1-16.

SCBD (2010) *Strategic plan for biodiversity 2011-2020 and the Aichi Targets: living in harmony with nature.* Montreal: Secretariat of the Convention on Biological Diversity.

Schwartz, M. W. (1999) Choosing the appropriate scale of reserves for conservation. *Annual Review of Ecology and Systematics* 30: 83-108.

Sem, G., Hay, J., Campbell, J., Yamada, K., Mimura, N. and Onno, K. (1996) *Tuvalu vulnerability studies 1996.* Apia: Secretariat of the Pacific Regional Environment Programme.

Shearmann, P. L., Bryan, J. E., Ash, J., Hunnam, P., Mackey, B. and Loks, B. (2008) *The state of the forests of Papua New Guinea: mapping the extent and condition of forest cover and measuring drivers of forest change in the period 1972-2002.* Port Moresby: University of Papua New Guinea.

Sheppard, C. (2006) Longer-term impacts of climate change. Pp 392-418 in Cote, I. M. and Reynolds, J. D. eds. *Coral reef conservation*. Cambridge, UK: Cambridge University Press.

Sillitoe, P. (2000) *Social change in Melanesia: development and history.* Cambridge, UK: Cambridge University Press.

Sizer, N. and Plouvier, D. (2000) *Increased investment and trade by transnational logging companies in Africa, the Caribbean and the Pacific: implications for the sustainable management and conservation of tropical forests.* Brussels: WWF, World Resources Institute and the European Commission.

Skilleter, G. and Warren, S. (2000) Report of effects of habitat modification in mangroves on the structure of mollusk and crab assemblages. *Journal of Experimental Marine Biology and Ecology* 244(1): 107-129.

Social Designs (2012) *NGO management and capacity building initiatives for GLI (UK) networks and social entrepreneurs in Tamil Nadu, India*. Downloaded from www.socialdesignsite.com/content/view/317/73 on 19 July 2012.

Solomon, S. D., Qin, M., Manning, Z., Chen, M., Marquis, K., Averyt, B., Tignor, M. and Miller, H. L. eds. (2007) *Climate change 2007: the physical science basis.* Cambridge, UK and New York: Cambridge University Press.

Solomon Islands Curriculum Development Centre (1990) *A social studies atlas of Solomon Islands: an insight into the infra-structure of a developing nation.* Honiara: Curriculum Development Centre Press.

Solomon Islands National Statistics Office (2006) *Household income and expenditure survey 2005/6: national report*. Part one. Honiara: National Statistics Office.

Spalding, M. D., Fox, H. E., Allen, G. R., Davidson, N., Ferdana, Z. A., Finlayson, M., Halpern, B. S., Jorge, M. A., Lombana, A., Louie, S. A., Martin, K. D., Mcmanus, E., Molnar, J., Recchia, C. A. and Robertson, J. (2007) Marine ecoregions of the world: a bioregionalization of coastal and shelf areas. *BioScience* 57(7): 573-583.

SPC (2011) *Vulnerability of tropical Pacific fisheries and aquaculture to climate change.* Noumea: Secretariat of the Pacific Community.

SPREP (1992) *The Pacific way: Pacific island developing countries' report to the United Nations Conference on Environment and Development.* Noumea: Secretariat of the Pacific Regional Environment Programme.

SPREP (2011) *Pacific Islands Framework for Action on Climate Change 2006-2015.* Second edition. Apia: Secretariat of the Pacific Regional Environment Programme.

SPREP and IUCN (2007) *Action Strategy for Nature Conservation and Protected Areas in the Pacific Island Region 2008-2012: empowering local people, communities and Pacific institutions.* Apia: Secretariat of the Pacific Regional Environment Programme, and Suva: IUCN Oceania Office.

Stattersfield, A. J., Crosby, M. J., Long, A. J. and Wege, D. C. (1998) *Endemic bird areas of the world: priorities for biodiversity conservation.* Cambridge: BirdLife International.

Steinberg, C. R., Choukroun, S. M., Slivkoff, M. M., Mahoney, M. V. and Brinkman, R. M. (2006) *Currents in the Bismarck Sea and Kimbe Bay, Papua New Guinea.* Brisbane: Australian Institute of Marine Science and The Nature Conservancy.

Still, C. J., Foster, N. F. and Schneider, S. H. (1999) Simulating the effects of climate change on tropical montane cloud forests. *Nature* 398: 608-610.

SustainAbility (2003) *The 21st century NGO: in the market for change.* London: SustainAbility, the United Nations Global Compact and the United Nations Environment Programme.
Swartzendruber, J. F. (1993) *PNG conservation needs assessment synopsis report.* Port Moresby: The Biodiversity Support Program.
Thaman, R. (2002) *Threats to Pacific island biodiversity and biodiversity conservation in the Pacific islands.* Suva: University of the South Pacific.
The Company Haus (2011) *The Company Haus of Solomon Islands.* Downloaded from http://www.companyhaus.gov.sb/ on 8 May 2012.
The Coral Triangle Initiative (2012) *About the Coral Triangle Initiative.* Downloaded from http://www.coraltriangleinitiative.net/about-us on 14 August 2012.
The Tanorama Network (2012) *The Tanorama Network.* Downloaded from http://www.tanorama.com/pngsrch_ngo_links.html on 10 May 2012.
Thuiller, W. (2007) Biodiversity: climate change and the ecologist. *Nature* 444: 550-552.
TNC (2012) *Papua New Guinea: sweet success.* Downloaded from http://www.nature.org/ourinitiatives/regions/asiaandthepacific/papuanewguinea/explore/sweet-success.xml on 10 May 2012.
Transparency International (2012) *Corruption Perceptions Index 2011.* Downloaded from http://cpi.transparency.org/cpi2011/ on 14 August 2012.
UNDP (2005) *Republic of Vanuatu: Millenium Development Goals report 2005*. New York: United Nations Development Programme.
UNDP (2012) *SGP: the GEF Small Grants Programme.* Downloaded from http://sgp.undp.org/index.php?option=com_countrypages&view=countrypage&country=89&Itemid=204 on 20 August 2012.
Upton, M. (2006) *Strengthening civil society in Solomon Islands: organisational and network development in Development Services Exchange.* Canberra: Australian National University.
van Beukering, P., Scherl, L. M., Sutabuabm E. and Keusgerm C. (2007) *Case study 2: Arnavon Community Marine Conservation Area (Solomon Islands): the role of marine protected areas in contributing to poverty reduction.* Brisbane: The Nature Conservancy.
VANGO (2011) *VANGO newsletter issue no. 3 2011.* Port Vila: Vanuatu Association of Nongovernmental Organisations.
Wantok Environment Center (2012) *Vanuatu conservation areas directory.* Downloaded from http://www.positiveearth.org/bungalows/conservation.htm on 14 August 2012.
Watson, R. T., Zinyowera, M. C. and Moss, R. H. eds. (1996) *Climate change 1995: impacts, adaptation and mitigation of climate change: scientific-technical analyses*. Cambridge, UK: Cambridge University Press.
Watson, R. T., Zinyowera, M. C. and Moss, R. H. eds. (1997) *The regional impacts of climate change: an assessment of vulnerability.* Cambridge, UK: Cambridge University Press.
Weiner, J. F. and Glaskin, K. (2007) *Customary land tenure and registration in Australia and Papua New Guinea: anthropological perspectives.* Canberra: Australian National University.

Whittaker, R. J. (1998) *Island biogeography: ecology, evolution and conservation.* Oxford: Oxford University Press.
Wilson, E. O. (1959) Adaptive shift and dispersal in a tropical ant fauna. *Evolution* 13(1): 122-144.
Wilson, E. O. (1992) *The diversity of life.* Boston: Belknap Harvard.
Winn, P. (2012) *Up for grabs: millions of hectares of customary land in PNG stolen for logging*. Utimo: Greenpeace Australia Pacific.
Woodward, D. E. and Murray, J. D. (1993) On the effect of temperature-dependent sex determination on sex ratio and survivorship in crocodilians. *Proc. R. Soc. Lond. B* 252(1334): 149-155; 1471-2954.
World Meteorological Organization (2011) *World Weather Information Service*. Downloaded from http://worldweather.wmo.int/ on 14 November 2011.
WWF (2009) *An assessment of the effectiveness of Papua New Guinea's protected areas using WWF's RAPPAM methodology*. Port Moresby: WWF, Department of Environment and Conservation, and The Nature Conservancy.
WWF (2011a) *Offshore fisheries: ensuring the sustainability of Pacific Tuna: the US Treaty*. Factsheet. Downloaded from assets.panda.org/downloads/factsheet_9.pdf on 11 August 2012.
WWF (2011b) *WildFinder*. Downloaded from http://www.worldwildlife.org/science/wildfinder/ on 14 September 2011.
WWF (2012) *Conservation trust funds.* Downloaded from http://www.worldwildlife.org/what/howwedoit/conservationfinance/conservationtrustfunds.html on 14 August 2012.
Yan, C. Y. and Kroenke, L. W. (1993) A plate tectonic reconstruction of the SW Pacific 0-100Ma. Pp 697-709 in: Berger, T., Kroenke, L. W. and Mayer, L. eds. *Proceedings of the Ocean Drilling Program: scientific results 130*. College Station: Ocean Drilling Program.

APPENDICES

Appendix 1. Globally Threatened Species in the East Melanesian Islands Hotspot

No.	Scientific Name	Common Name	Global Threat Status			Distribution by Country			CEPF Priority
			Critically Endangered	Endangered	Vulnerable	Papua New Guinea	Solomon Islands	Vanuatu	
	MAMMALS		**6**	**14**	**9**	**10**	**20**	**8**	
1	*Balaenoptera borealis*	Sei Whale		EN		+			
2	*Balaenoptera physalus*	Fin Whale		EN				+	
3	*Dugong dugon*	Dugong			VU	+	+	+	Yes
4	*Emballonura semicaudata*	Polynesian Sheathtail Bat		EN				+	Yes
5	*Hipposideros demissus*	Makira Horseshoe Bat			VU		+		
6	*Melomys matambuai*	Manus Melomys		EN		+			Yes
7	*Notopteris macdonaldi*	Fijian Blossom Bat			VU			+	
8	*Physeter macrocephalus*	Sperm Whale			VU	+	+	+	
9	*Pteralopex anceps*	Bougainville Monkey-faced Bat		EN		+	+		Yes
10	*Pteralopex atrata*	Guadalcanal Monkey-faced Bat		EN			+		Yes
11	*Pteralopex flanneryi*	Greater Monkey-faced Bat	CR			+	+		Yes
12	*Pteralopex pulchra*	Montane Monkey-faced Bat	CR				+		Yes
13	*Pteralopex taki*	New Georgia Monkey-faced Bat		EN			+		Yes
14	*Pteropus anetianus*	Vanuatu Flying-fox			VU			+	Yes
15	*Pteropus cognatus*	Makira Flying-fox		EN			+		Yes
16	*Pteropus fundatus*	Banks Flying-fox		EN				+	Yes
17	*Pteropus mahaganus*	Sanborn's Flying-fox			VU	+	+		
18	*Pteropus nitendiensis*	Temotu Flying-fox		EN			+		Yes
19	*Pteropus rennelli*	Rennell Flying-fox			VU		+		
20	*Pteropus tuberculatus*	Vanikoro Flying-fox	CR				+		Yes
21	*Pteropus woodfordi*	Dwarf Flying-fox			VU		+		
22	*Solomys ponceleti*	Poncelet's Giant Rat	CR			+	+		Yes
23	*Solomys salebrosus*	Bougainville Giant Rat		EN		+	+		Yes
24	*Solomys sapientis*	Isabel Giant Rat		EN			+		Yes
25	*Tadarida bregullae*	Fijian Mastiff Bat		EN				+	Yes
26	*Thylogale browni*	New Guinea Pademelon			VU	+			
27	*Uromys imperator*	Emperor Rat	CR				+		Yes
28	*Uromys porculus*	Guadalcanal Rat	CR				+		Yes
29	*Uromys rex*	King Rat		EN			+		Yes
	BIRDS		**2**	**5**	**34**	**22**	**21**	**10**	
30	*Accipiter brachyurus*	New Britain Sparrowhawk			VU	+			

No.	Scientific Name	Common Name	Global Threat Status			Distribution by Country			CEPF Priority
			Critically Endangered	Endangered	Vulnerable	Papua New Guinea	Solomon Islands	Vanuatu	
31	*Accipiter imitator*	Imitator Sparrowhawk			VU	+	+		
32	*Accipiter luteoschistaceus*	Slaty-backed Goshawk			VU	+			
33	*Accipiter princeps*	New Britain Goshawk			VU	+			
34	*Actenoides bougainvillei*	Moustached Kingfisher			VU	+	+		
35	*Alcedo websteri*	Bismarck Kingfisher			VU	+			
36	*Aplonis brunneicapillus*	White-eyed Starling		EN		+	+		
37	*Aplonis santovestris*	Santo Mountain Starling			VU			+	Yes
38	*Cacatua ophthalmica*	Blue-eyed Cockatoo			VU	+			
39	*Charmosyna palmarum*	Palm Lorikeet			VU		+	+	Yes
40	*Clytorhynchus sanctaecrucis*	Santa Cruz Shrikebill		EN			+		
41	*Columba pallidiceps*	Yellow-legged Pigeon			VU	+	+		
42	*Ducula bakeri*	Vanuatu Imperial Pigeon			VU			+	Yes
43	*Ducula brenchleyi*	Chestnut-bellied Imperial Pigeon			VU		+		
44	*Erythrura regia*	Royal Parrotfinch			VU			+	Yes
45	*Gallicolumba sanctaecrucis*	Santa Cruz Ground-dove		EN			+	+	Yes
46	*Gallinula silvestris*	Makira Moorhen	CR				+		Yes
47	*Haliaeetus sanfordi*	Solomons Sea Eagle			VU	+	+		
48	*Henicopernis infuscatus*	New Britain Honey-buzzard			VU	+			
49	*Henicophaps foersteri*	New Britain Bronzewing			VU	+			
50	*Megalurulus grosvenori*	Bismarck Thicketbird			VU	+			
51	*Megapodius layardi*	Vanuatu Megapode			VU			+	Yes
52	*Nesasio solomonensis*	Fearful Owl			VU	+	+		
53	*Nesofregetta fuliginosa*	Polynesian Storm-Petrel		EN				+	Yes
54	*Ninox odiosa*	New Britain Boobook			VU	+			
55	*Numenius tahitiensis*	Bristle-thighed Curlew			VU		+		
56	*Phylloscopus amoenus*	Sombre Leaf-warbler			VU		+		
57	*Pitta anerythra*	Black-faced Pitta			VU	+	+		
58	*Pitta superba*	Superb Pitta			VU	+			
59	*Pseudobulweria becki*	Beck's Petrel	CR			+	+		Yes
60	*Pterodroma brevipes*	Collared Petrel			VU		+	+	Yes
61	*Pterodroma cervicalis*	White-necked Petrel			VU			+	Yes
62	*Pterodroma leucoptera*	Gould's Petrel			VU			+	
63	*Puffinus heinrothi*	Heinroth's Shearwater			VU	+	+		
64	*Rhipidura malaitae*	Malaita Fantail			VU		+		
65	*Rhipidura semirubra*	Manus Fantail			VU	+			
66	*Tyto aurantia*	Bismarck Masked-owl			VU	+			
67	*Tyto manusi*	Manus Masked-owl			VU	+			
68	*Zoothera talaseae turipavae*	Guadalcanal Thrush			VU		+		

No.	Scientific Name	Common Name	Global Threat Status			Distribution by Country			CEPF Priority
			Critically Endangered	Endangered	Vulnerable	Papua New Guinea	Solomon Islands	Vanuatu	
69	*Zosterops luteirostris*	Splendid White-eye		EN			+		
70	*Zosterops splendidus*	Ranongga White-eye			VU		+		
	REPTILES		**2**	**4**	**4**	**5**	**6**	**5**	
71	*Brachylophus fasciatus*	Fijian Banded Iguana		EN				+	
72	*Caretta caretta*	Loggerhead Turtle		EN				+	Yes
73	*Chelonia mydas*	Green Turtle		EN		+	+	+	Yes
74	*Dermochelys coriacea*	Leatherback Turtle	CR			+	+		Yes
75	*Emoia aneityumensis*	Anatom Skink		EN				+	Yes
76	*Emoia isolata*	Bellona Skink			VU		+		
77	*Eretmochelys imbricata*	Hawksbill Turtle	CR			+	+	+	Yes
78	*Geomyersia coggeri*	Cogger's Island Skink			VU	+			
79	*Laticauda crockeri*	Rennell Freshwater Seasnake			VU		+		
80	*Tribolonotus blanchardi*	Blanchard's Crocodile Skink			VU	+	+		
	AMPHIBIANS		**0**	**0**	**5**	**5**	**2**	**0**	
81	*Austrochaperina novaebritanniae*	New Britain Land Frog			VU	+			
82	*Litoria lutea*	Solomon Islands Treefrog			VU	+	+		Yes
83	*Palmatorappia solomonis*	Solomon Islands Palm Frog			VU	+	+		Yes
84	*Platymantis akarithymus*	Pomugu Wrinkled Ground Frog			VU	+			
85	*Platymantis parkeri*	Parker's Wrinkled Ground Frog			VU	+			
	FISHES		**1**	**3**	**2+**	**21**	**16**	**15**	
86	*Alopias vulpinus*	Thresher Shark			VU			+	
87	*Bolbometopon muricatum*	Green Humphead Parrotfish			VU	+	+	+	
88	*Carcharhinus hemiodon*	Pondicherry Shark	CR			+			
89	*Carcharhinus longimanus*	Oceanic Whitetip Shark			VU	+	+	+	
90	*Carcharhinus plumbeus*	Sandbar Shark			VU	+			
91	*Centrophorus granulosus*	Gulper Shark			VU	+			
92	*Cheilinus undulatus*	Humphead Wrasse		EN		+	+	+	
93	*Cromileptes altivelis*	Humpback Grouper			VU	+	+	+	
94	*Epinephelus lanceolatus*	Giant Grouper			VU	+	+	+	
95	*Hippocampus kuda*	Estuary Seahorse			VU	+	+		
96	*Isurus oxyrinchus*	Shortfin Mako Shark			VU	+	+	+	
97	*Isurus paucus*	Longfin Mako Shark			VU		+		
98	*Makaira nigricans*	Blue Marlin			VU	+	+	+	
99	*Manta alfredi*	Manta Ray			VU	+			
100	*Nebrius ferrugineus*	Tawny Nurse Shark			VU	+			

No.	Scientific Name	Common Name	Global Threat Status			Distribution by Country			CEPF Priority
			Critically Endangered	Endangered	Vulnerable	Papua New Guinea	Solomon Islands	Vanuatu	
101	*Negaprion acutidens*	Sharptooth Lemon Shark			VU	+	+	+	
102	*Plectropomus areolatus*	Squaretail Coralgrouper			VU	+	+	+	
103	*Plectropomus laevis*	Black-saddled Coralgrouper			VU	+	+	+	
104	*Rhina ancylostoma*	Shark Ray			VU	+	+		
105	*Rhincodon typus*	Whale Shark			VU	+	+	+	
106	*Sphyrna lewini*	Scalloped Hammerhead		EN		+			
107	*Sphyrna mokarran*	Great Hammerhead		EN		+			
108	*Taeniurops meyeni*	Blotched Fantail Ray			VU			+	
109	*Thunnus obesus*	Bigeye Tuna			VU	+	+	+	
110	*Urogymnus asperrimus*	Porcupine Ray			VU		+	+	
	INSECTS		**0**	**2**	**5**	**5**	**4**	**0**	
111	*Euploea lacon*	Spartan Crow			VU	+			
112	*Graphium meeki*	Meek's Graphium			VU	+	+		
113	*Papilio moerneri*	Bismarck Swallowtail		EN		+			
114	*Parantica clinias*	New Ireland Yellow Tiger			VU	+			
115	*Parantica garamantis*	Angled Tiger			VU	+	+		
116	*Tiradelphe schneideri*	Schneider's Surprise		EN			+		
117	*Tirumala euploeomorpha*	Crow Tiger			VU		+		
	BIVALVES		**0**	**0**	**2**	**2**	**2**	**2**	
118	*Tridacna derasa*	Southern Giant Clam			VU	+	+	+	
119	*Tridacna gigas*	Giant Clam			VU	+	+	+	
	ANTHOZOANS		**0**	**5**	**145**	**146**	**134**	**79**	
120	*Acanthastrea bowerbanki*	coral species			VU		+	+	
121	*Acanthastrea brevis*	coral species			VU		+		
122	*Acanthastrea faviaformis*	coral species			VU	+	+		
123	*Acanthastrea hemprichii*	coral species			VU	+	+	+	
124	*Acanthastrea ishigakiensis*	coral species			VU	+	+	+	
125	*Acanthastrea regularis*	coral species			VU	+	+		
126	*Acropora abrolhosensis*	coral species			VU	+	+		
127	*Acropora aculeus*	coral species			VU	+	+	+	
128	*Acropora acuminata*	coral species			VU	+	+	+	
129	*Acropora anthocercis*	coral species			VU	+	+	+	
130	*Acropora aspera*	coral species			VU	+	+	+	
131	*Acropora awi*	coral species			VU	+	+		
132	*Acropora batunai*	coral species			VU	+	+		

No.	Scientific Name	Common Name	Global Threat Status			Distribution by Country			CEPF Priority
			Critically Endangered	Endangered	Vulnerable	Papua New Guinea	Solomon Islands	Vanuatu	
133	*Acropora caroliniana*	coral species			VU	+	+	+	
134	*Acropora dendrum*	coral species			VU	+	+	+	
135	*Acropora derawanensis*	coral species			VU	+			
136	*Acropora desalwii*	coral species			VU	+	+		
137	*Acropora donei*	coral species			VU	+	+	+	
138	*Acropora echinata*	coral species			VU	+	+	+	
139	*Acropora elegans*	coral species			VU	+			
140	*Acropora globiceps*	coral species			VU	+	+	+	
141	*Acropora hoeksemai*	coral species			VU	+	+		
142	*Acropora horrida*	coral species			VU	+	+	+	
143	*Acropora indonesia*	coral species			VU	+	+		
144	*Acropora jacquelineae*	coral species			VU	+	+		
145	*Acropora kimbeensis*	coral species			VU	+	+		
146	*Acropora kirstyae*	coral species			VU	+	+	+	
147	*Acropora listeri*	coral species			VU	+	+	+	
148	*Acropora lokani*	coral species			VU	+	+		
149	*Acropora lovelli*	coral species			VU	+	+	+	
150	*Acropora microclados*	coral species			VU	+	+	+	
151	*Acropora multiacuta*	coral species			VU	+	+		
152	*Acropora palmerae*	coral species			VU	+	+	+	
153	*Acropora paniculata*	coral species			VU	+	+	+	
154	*Acropora plumosa*	coral species			VU	+	+		
155	*Acropora polystoma*	coral species			VU	+	+	+	
156	*Acropora retusa*	coral species			VU		+		
157	*Acropora simplex*	coral species			VU	+			
158	*Acropora solitaryensis*	coral species			VU	+	+	+	
159	*Acropora speciosa*	coral species			VU	+	+	+	
160	*Acropora spicifera*	coral species			VU	+	+	+	
161	*Acropora striata*	coral species			VU	+	+		
162	*Acropora tenella*	coral species			VU	+	+	+	
163	*Acropora turaki*	coral species			VU	+	+		
164	*Acropora vaughani*	coral species			VU	+	+	+	
165	*Acropora verweyi*	coral species			VU	+	+	+	
166	*Acropora walindii*	coral species			VU	+			
167	*Acropora willisae*	coral species			VU	+	+		
168	*Alveopora allingi*	coral species			VU	+	+	+	
169	*Alveopora daedalea*	coral species			VU	+			
170	*Alveopora fenestrata*	coral species			VU	+	+	+	

No.	Scientific Name	Common Name	Global Threat Status			Distribution by Country			CEPF Priority
			Critically Endangered	Endangered	Vulnerable	Papua New Guinea	Solomon Islands	Vanuatu	
171	*Alveopora gigas*	coral species			VU	+			
172	*Alveopora marionensis*	coral species			VU	+	+	+	
173	*Alveopora minuta*	coral species		EN		+	+		
174	*Alveopora verrilliana*	coral species			VU	+	+	+	
175	*Anacropora matthai*	coral species			VU	+	+		
176	*Anacropora puertogalerae*	coral species			VU	+	+	+	
177	*Anacropora reticulata*	coral species			VU	+	+	+	
178	*Anacropora spinosa*	coral species		EN		+	+		
179	*Astreopora cucullata*	coral species			VU	+	+	+	
180	*Astreopora incrustans*	coral species			VU	+	+		
181	*Australogyra zelli*	coral species			VU	+	+		
182	*Barabattoia laddi*	coral species			VU	+	+	+	
183	*Cantharellus noumeae*	coral species		EN		+			
184	*Catalaphyllia jardinei*	coral species			VU	+	+	+	
185	*Caulastrea curvata*	coral species			VU	+	+	+	
186	*Caulastrea echinulata*	coral species			VU	+	+		
187	*Cyphastrea agassizi*	coral species			VU	+	+		
188	*Cyphastrea ocellina*	coral species			VU	+	+	+	
189	*Echinophyllia costata*	coral species			VU	+	+		
190	*Euphyllia ancora*	coral species			VU	+	+		
191	*Euphyllia cristata*	coral species			VU	+	+	+	
192	*Euphyllia paraancora*	coral species			VU	+	+	+	
193	*Favia rosaria*	coral species			VU	+	+	+	
194	*Favites spinosa*	coral species			VU	+			
195	*Fungia curvata*	coral species			VU	+			
196	*Galaxea acrhelia*	coral species			VU	+	+	+	
197	*Galaxea astreata*	coral species			VU	+	+	+	
198	*Goniastrea ramosa*	coral species			VU	+	+		
199	*Goniopora burgosi*	coral species			VU	+	+		
200	*Halomitra clavator*	coral species			VU	+	+		
201	*Heliofungia actiniformis*	coral species			VU	+	+	+	
202	*Heliopora coerulea*	coral species			VU	+	+	+	
203	*Isopora brueggemanni*	coral species			VU	+			
204	*Isopora crateriformis*	coral species			VU	+	+		
205	*Isopora cuneata*	coral species			VU	+	+	+	
206	*Leptoria irregularis*	coral species			VU	+			
207	*Leptoseris incrustans*	coral species			VU	+	+	+	
208	*Leptoseris yabei*	coral species			VU	+	+	+	

No.	Scientific Name	Common Name	Global Threat Status			Distribution by Country			CEPF Priority
			Critically Endangered	Endangered	Vulnerable	Papua New Guinea	Solomon Islands	Vanuatu	
209	*Lobophyllia dentatus*	coral species			VU	+	+		
210	*Lobophyllia diminuta*	coral species			VU	+	+	+	
211	*Lobophyllia flabelliformis*	coral species			VU	+	+		
212	*Montastraea multipunctata*	coral species			VU	+	+	+	
213	*Montastraea salebrosa*	coral species			VU	+	+	+	
214	*Montipora altasepta*	coral species			VU	+	+	+	
215	*Montipora angulata*	coral species			VU	+	+		
216	*Montipora australiensis*	coral species			VU	+	+	+	
217	*Montipora cactus*	coral species			VU	+	+		
218	*Montipora calcarea*	coral species			VU	+	+		
219	*Montipora caliculata*	coral species			VU	+	+	+	
220	*Montipora capricornis*	coral species			VU	+	+	+	
221	*Montipora cebuensis*	coral species			VU	+	+	+	
222	*Montipora cocosensis*	coral species			VU	+	+	+	
223	*Montipora corbettensis*	coral species			VU	+	+	+	
224	*Montipora crassituberculata*	coral species			VU	+	+	+	
225	*Montipora delicatula*	coral species			VU	+	+		
226	*Montipora florida*	coral species			VU	+			
227	*Montipora friabilis*	coral species			VU	+	+		
228	*Montipora hodgsoni*	coral species			VU	+	+		
229	*Montipora mactanensis*	coral species			VU	+	+		
230	*Montipora malampaya*	coral species			VU	+	+		
231	*Montipora meandrina*	coral species			VU	+			
232	*Montipora orientalis*	coral species			VU	+	+		
233	*Montipora samarensis*	coral species			VU	+	+	+	
234	*Montipora turtlensis*	coral species			VU	+	+	+	
235	*Montipora verruculosus*	coral species			VU	+	+		
236	*Montipora vietnamensis*	coral species			VU	+	+		
237	*Moseleya latistellata*	coral species			VU	+			
238	*Nemenzophyllia turbida*	coral species			VU	+	+		
239	*Pachyseris rugosa*	coral species			VU	+	+	+	
240	*Pavona bipartita*	coral species			VU	+	+	+	
241	*Pavona cactus*	coral species			VU	+	+	+	
242	*Pavona decussata*	coral species			VU	+	+	+	
243	*Pavona venosa*	coral species			VU	+	+	+	
244	*Pectinia alcicornis*	coral species			VU	+	+	+	
245	*Pectinia lactuca*	coral species			VU	+	+	+	
246	*Pectinia maxima*	coral species		EN		+	+		

No.	Scientific Name	Common Name	Global Threat Status			Distribution by Country			CEPF Priority
			Critically Endangered	Endangered	Vulnerable	Papua New Guinea	Solomon Islands	Vanuatu	
247	*Physogyra lichtensteini*	coral species			VU	+	+	+	
248	*Platygyra yaeyamaensis*	coral species			VU	+	+		
249	*Plerogyra discus*	coral species			VU	+	+		
250	*Pocillopora danae*	coral species			VU	+	+	+	
251	*Pocillopora elegans*	coral species			VU	+	+		
252	*Porites attenuata*	coral species			VU	+	+	+	
253	*Porites cumulatus*	coral species			VU	+	+		
254	*Porites eridani*	coral species		EN		+	+		
255	*Porites horizontalata*	coral species			VU	+	+	+	
256	*Porites nigrescens*	coral species			VU	+	+	+	
257	*Porites rugosa*	coral species			VU	+	+		
258	*Porites sillimaniana*	coral species			VU	+	+		
259	*Porites tuberculosa*	coral species			VU	+	+		
260	*Seriatopora aculeata*	coral species			VU	+	+	+	
261	*Seriatopora dendritica*	coral species			VU	+	+		
262	*Stylocoeniella cocosensis*	coral species			VU	+			
263	*Symphyllia hassi*	coral species			VU	+	+		
264	*Turbinaria bifrons*	coral species			VU			+	
265	*Turbinaria mesenterina*	coral species			VU	+	+	+	
266	*Turbinaria patula*	coral species			VU	+	+	+	
267	*Turbinaria peltata*	coral species			VU	+	+	+	
268	*Turbinaria reniformis*	coral species			VU	+	+	+	
269	*Turbinaria stellulata*	coral species			VU	+	+	+	
	PLANTS		**2**	**7**	**30**	**20**	**20**	**10**	
270	*Agathis silbae*				VU			+	Yes
271	*Aglaia brassii*				VU	+	+		
272	*Aglaia rubrivenia*				VU	+	+		
273	*Aglaia saltatorum*				VU		+	+	
274	*Archidendropsis oblonga*				VU		+		
275	*Avicennia rumphiana*				VU	+			
276	*Calophyllum confusum*				VU		+		
277	*Calophyllum obscurum*				VU		+		
278	*Calophyllum waliense*			EN		+			Yes
279	*Carpoxylon macrospermum*	Carpoxylon Palm	CR					+	Yes
280	*Cycas seemannii*				VU			+	
281	*Cyphosperma voutmelense*	Voutmélé Palm		EN				+	Yes
282	*Diospyros insularis*	New Guinea Ebony		EN		+	+		Yes

No.	Scientific Name	Common Name	Global Threat Status			Distribution by Country			CEPF Priority
			Critically Endangered	Endangered	Vulnerable	Papua New Guinea	Solomon Islands	Vanuatu	
283	*Drymophloeus hentyi*			EN		+			Yes
284	*Geniostoma umbellatum*				VU	+			
285	*Gonystylus macrophyllus*				VU	+	+		
286	*Guioa novobritannica*				VU	+			
287	*Helicia neglecta*				VU	+			
288	*Helicia peekelii*				VU	+			
289	*Helicia polyosmoides*		CR			+			Yes
290	*Intsia bijuga*	Moluccan Ironwood			VU	+	+	+	Yes
291	*Livistona woodfordii*				VU		+		
292	*Mangifera altissima*				VU	+	+		
293	*Mastixiodendron stoddardii*				VU	+	+		
294	*Myristica petiolata*				VU		+		
295	*Myristica psilocarpa*				VU	+			
296	*Osmoxylon arrhenicum*				VU		+		
297	*Osmoxylon chrysanthum*				VU		+		
298	*Osmoxylon corneri*				VU		+		
299	*Osmoxylon lanceolatum*				VU	+			
300	*Osmoxylon reburrum*				VU		+		
301	*Osmoxylon whitmorei*				VU		+		
302	*Palaquium neoebudicum*				VU			+	
303	*Pandanus halleorum*				VU			+	
304	*Pterocarpus indicus*	Burmese Rosewood			VU	+	+	+	
305	*Ptychosperma gracile*			EN		+			Yes
306	*Terminalia archipelagi*			EN		+			
307	*Terminalia rerei*				VU		+		
308	*Veitchia montgomeryana*			EN				+	Yes
	Total		**13**	**40**	**255**	**236**	**225**	**129**	**48**

Notes: + = species recorded in the country (or portion of the country within the hotspot, in the case of PNG); not necessarily of regular occurrence or still occurring there.

Appendix 2. Key Biodiversity Areas in the East Melanesian Islands Hotspot

Map Code	Key Biodiversity Area	Mammals	Birds	Reptiles	Amphibians	Fish	Invertebrates	Plants	Province	Islandscape	Biological Priority Level	CEPF Priority
PNG	**PAPUA NEW GUINEA**											
1	Arawe	+	+			+		+	West New Britain	None	3	
2	Baining Mountains	+	+		+		+		East New Britain	None	3	Yes
3	Buin	+	+	+	+		+		Bougainville	Bukida	2	
4	Buka	+	+	+	+				Bougainville	Bukida	2	
5	Bulu		+	+	+			+	West New Britain	Bismarck Sea	3	
6	Cape Saint George	+	+	+			+	+	New Ireland	None	2	Yes
7	Central Manus	+	+	+		+	+	+	Manus	Bismarck Sea	3	Yes
8	Djaul	+	+			+			New Ireland	Bismarck Sea	5	
9	East Manus	+	+	+			+	+	Manus	None	3	
10	East Mengen	+	+		+		+	+	East New Britain	None	3	
11	Garu*			+					West New Britain	Bismarck Sea	5	
12	Gasmata	+	+	+				+	West New Britain	None	3	
13	Gloucester Volcanics	+	+					+	West New Britain	Bismarck Sea	3	
14	Kerevat Toma	+	+	+	+		+		East New Britain	None	3	
15	Kimbe Bay Marine					+			West New Britain	Bismarck Sea	5	
16	Kunua Plains and Mount Balbi	+	+	+	+		+		Bougainville	Bukida	2	Yes
17	Lavongai	+	+				+	+	New Ireland	Bismarck Sea	3	
18	Lelet Plateau	+	+	+			+	+	New Ireland	Bismarck Sea	3	
19	M'buke and Purdy Islands	+	+						Manus	Bismarck Sea	4	
20	Madina	+	+				+		New Ireland	None	4	
21	Mussau	+	+						New Ireland	None	4	Yes
22	Nakanai Central Pomio	+	+		+		+		East New Britain	None	4	
23	Ndrolowa			+			+		Manus	Bismarck Sea	5	

Map Code	Key Biodiversity Area	Mammals	Birds	Reptiles	Amphibians	Fish	Invertebrates	Plants	Province	Islandscape	Biological Priority Level	CEPF Priority
24	Ninigo	+	+			+			Manus	None	5	
25	Open Bay		+	+				+	East New Britain	None	3	
26	Pokili	+		+					West New Britain	Bismarck Sea	5	
27	Rambutyo	+	+						Manus	Bismarck Sea	4	
28	Tench Island	+	+						New Ireland	None	5	
29	Tigak					+		+	New Ireland	Bismarck Sea	3	
30	Tong	+	+						Manus	Bismarck Sea	4	
31	Tsoi Island*					+		+	New Ireland	None	3	
32	Whiteman Range	+	+		+				West New Britain	Bismarck Sea	4	
SLB	**SOLOMON ISLANDS**											
1	Alu	+		+					Western	Bukida	5	
2	Are-Are South Malaita	+		+					Malaita	None	4	
3	Bellona		+	+					Rennell Bellona	None	3	
4	East Makira	+	+	+			+	+	Makira Ulawa	None	1	Yes
5	East Rennell	+	+	+					Rennell Bellona	None	3	Yes
6	Fauro Island and Islets	+	+	+					Western	Bukida	4	
7	Gela	+		+				+	Central	None	3	
8	Gizo	+	+						Western	New Georgia Archipelago	1	Yes
9	Guadalcanal Watersheds	+	+	+			+	+	Guadalcanal	None	1	Yes
10	Kolombangara Upland Forest	+	+						Western	New Georgia Archipelago	2	Yes
11	Malaita Highlands	+	+					+	Malaita	None	3	
12	Marovo Kavachi	+	+	+	+	+			Western	New Georgia Archipelago	3	Yes
13	Mborokua Island*		+						Western	None	5	
14	Mount Gallego	+	+	+	+			+	Guadalcanal	None	3	
15	Mount Maetambe - Kolombangara River	+	+	+	+		+		Choiseul	Bukida	2	Yes

Map Code	Key Biodiversity Area	Mammals	Birds	Reptiles	Amphibians	Fish	Invertebrates	Plants	Province	Islandscape	Biological Priority Level	CEPF Priority
16	Mount Sasare Catchments	+	+	+	+		+	+	Isabel	Bukida	3	
17	Mufu Point*	+							Isabel	Bukida	5	
18	Nendö	+	+						Temotu	North Vanuatu - Santa Cruz	1	Yes
19	North New Georgia*	+							Western	New Georgia Archipelago	3	
20	North-west Choiseul Karst	+	+	+	+		+		Choiseul	Bukida	2	
21	North-west Isabel	+	+	+	+		+		Isabel	Bukida	2	
22	North-west Vella Lavella	+							Western	New Georgia Archipelago	5	
23	Oroa (Phillip) Island*			+					Makira Ulawa	None	4	
24	Pavuvu	+						+	Central	None	4	
25	Posarae Keleve	+	+	+	+			+	Choiseul	Bukida	2	
26	Ranongga	+	+						Western	New Georgia Archipelago	3	
27	Rendova	+	+						Western	New Georgia Archipelago	3	
28	Roviana - Vonavona	+				+			Western	New Georgia Archipelago	5	
29	San Jorge Island	+	+					+	Isabel	Bukida	5	
30	South-east Ultramafics Choiseul	+	+	+	+		+	+	Choiseul	Bukida	4	
31	Tetepare*	+	+						Western	New Georgia Archipelago	5	
32	Tikopia-Fatutaka						+		Temotu	North Vanuatu - Santa Cruz	4	
33	Tinakula		+						Temotu	North Vanuatu - Santa Cruz	3	
34	Uki - Three Sisters	+	+	+					Makira Ulawa	None	5	
35	Vanikoro	+							Temotu	North Vanuatu - Santa Cruz	1	Yes
36	West Makira Freshwater Swamps*				+				Makira Ulawa	None	5	
VUT	**VANUATU**											
1	Ambae		+						Penama	North Vanuatu - Santa Cruz	4	
2	Ambrym		+						Malampa	North Vanuatu - Santa Cruz	4	
3	Aneityum	+	+	+				+	Tafea	None	1	Yes

Map Code	Key Biodiversity Area	Mammals	Birds	Reptiles	Amphibians	Fish	Invertebrates	Plants	Province	Islandscape	Biological Priority Level	CEPF Priority
4	Epi		+						Shefa	None	5	
5	Erromango		+						Tafea	None	5	
6	Futuna			+				+	Tafea	None	2	Yes
7	Gaua	+	+						Torba	North Vanuatu - Santa Cruz	4	Yes
8	Green Hill	+	+					+	Tafea	None	2	Yes
9	Homo Bay		+					+	Penama	North Vanuatu - Santa Cruz	4	
10	Loru	+	+						Sanma	North Vanuatu - Santa Cruz	3	
11	Maewo South		+					+	Penama	North Vanuatu - Santa Cruz	4	
12	Mota Lava	+	+						Torba	North Vanuatu - Santa Cruz	3	
13	Mount Tukusmera		+						Tafea	None	5	
14	Neck of Malakula - Crab Bay	+	+						Malampa	North Vanuatu - Santa Cruz	5	
15	North Efate	+	+						Shefa	None	5	
16	Pentecost North		+						Penama	North Vanuatu - Santa Cruz	5	
17	Ringi Te Suh		+						Malampa	North Vanuatu - Santa Cruz	5	
18	Rowa Reef*					+	+		Torba	North Vanuatu - Santa Cruz	5	
19	Santo Mountain Chain	+	+					+	Sanma	North Vanuatu - Santa Cruz	1	Yes
20	Small Nambas	+	+						Malampa	North Vanuatu - Santa Cruz	5	
21	Tongoa - Laika	+	+						Shefa	None	4	Yes
22	Torres Islands		+						Torba	North Vanuatu - Santa Cruz	4	
23	Ureparapara		+					+	Torba	North Vanuatu - Santa Cruz	4	
24	Vanua Lava	+	+					+	Torba	North Vanuatu - Santa Cruz	3	
25	Vatthe	+	+						Sanma	North Vanuatu - Santa Cruz	4	
26	West Malo	+	+						Sanma	North Vanuatu - Santa Cruz	3	
27	Wiawi	+	+						Malampa	North Vanuatu - Santa Cruz	5	

Notes: * = KBA identified on the basis of provisional species locality records; surveys to confirm that the site qualifies as a KBA are needed before investing in site conservation action; none of these sites were selected as priorities for CEPF investment.

Appendix 3. Islandscapes in the East Melanesian Islands Hotspot

No.	Islandscape	Key Biodiversity Areas	Countries	Land Area (km^2)	Selection Criteria for Islandscape							
					P1 - Populations of Wide-ranging and Migratory Species	P2 - Entire Freshwater Catchments	P3 - Geographic Diversification	P4 - Carbon Sequestration	P5 - Coastal Corridors	P6 - Coral Reef Gene Flow	P7 - Cultural Values	P8 - Invasive Species and Biosecurity
1	Bismarck Sea	Bulu; Central Manus; Djaul Island; Garu; Gloucester Volcanics; Kimbe Bay Marine; Lavongai; Lelet Plateau; M'buke and Purdy Islands; Ndrolowa; Pokili; Rambutyo; Tigak Islands and Reef; Tong; Whiteman Range	PNG	23,440	*Accipiter brachyurus; Carcharhinus longimanus; Centrophorus granulosus; Makaira nigricans; Pteropus admiralitatum; Pteropus capistratus; Rhincodon typus; Sphyrna lewini; Sphyrna mokarran*	Significant river catchments; freshwater troglodytic communities in New Britain karst	Island endemism; limestone karst communities; primary succession on young volcanoes	Significant forest in New Britain mountains but lowland forest highly degraded already	Not significant	Significant coral reef in Kimbe Bay and Kavieng areas; significant marine connectivity	Strong cultural identity in Manus; Lapita sites in New Ireland	Water hyacinth in Lake Dakataua; invasive mammals on small islands in Manus province
2	Bukida	Alu; Buin; Fauro Island and Islets; Kunua Plains and Mount Balbi; Mount Maetambe - Kolombangara River; Mount Sasare Catchments; Mufu Point; North-west Isabel; North-west Choiseul; Posarae Catchments; San Jorge Island; South-east Choiseul; Southern Buka Hills	PNG and Solomon Islands	17,233	*Accipiter imitator; Dobsonia inermis; Eretmochelys imbricate; Haliaeetus sanfordi; Pteropus admiralitatum; Pteropus mahaganus; Pteropus woodfordi; Puffinus heinrothi*	Significant freshwater catchments on Bougainville, Choiseul and Isabel	Pleistocene land-bridge islands; significant vegetation gradients on Choiseul and Bougainville	Significant forest on Choiseul and Bougainville	Nationally significant mangroves on Isabel and Choiseul	Coral reefs throughout; presumed genetic connectivity	Shared cultural identity among the two Solomon Islands provinces and Bougainville	Invasive species problems but no eradication/control opportunities identified

No.	Islandscape	Key Biodiversity Areas	Countries	Land Area (km^2)	Selection Criteria for Islandscape							
					P1 - Populations of Wide-ranging and Migratory Species	**P2 - Entire Freshwater Catchments**	**P3 - Geographic Diversification**	**P4 - Carbon Sequestration**	**P5 - Coastal Corridors**	**P6 - Coral Reef Gene Flow**	**P7 - Cultural Values**	**P8 - Invasive Species and Biosecurity**
3	New Georgia Archipelago	Gizo; Kolombangara Upland Forest; Marovo; North New Georgia; North-west Vella Lavella; Ranongga; Rendova; Roviana-Vonavona; Tetepare	Solomon Islands	5,085	*Haliaeetus sanfordi; Pseudobulweria becki; Puffinus heinrothi*	Not significant	High altitude communities on Kolombangara and New Georgia with gradients to sea level	Highly degraded forests with opportunities for regeneration	Mangroves along coastal areas throughout the landscape	Coral reefs throughout, especially in Vonavona, Roviana and Marovo; presumed genetic connectivity	Not significant	Invasive species problems; uninhabited islands may provide eradication opportunities
4	North Vanuatu - Santa Cruz	Ambae; Ambrym; Gaua; Homo Bay; Loru; Mota Lava; Neck of Malakula - Crab Bay; Nendö; North Pentecost; Ringi Te Suh; Rowa Reef Islands; Santo Mountain Chain; Small Nambas; South Maewo; Tikopia - Fatutaka; Tinakula; Torres Islands; Ureparapara; Vanikoro; Vanua Lava - Mount Sereama; Vatthe; West Malo; Wiawi	Solomon Islands and Vanuatu	9,904	*Pterodroma brevipes; Pterodroma occulta; Pteropus anetianus*	Significant freshwater catchments on Santo and Malakula; unique freshwater communities on Ambae	Dry forest on western Santo and Malakula,;altitudinal gradients of natural habitat on Santo	Significant forest on Santo and Malakula	Malakula supports largest area of mangrove in Vanuatu	Important latitudinal gradient for coral migration in response to sea temperature changes	Pottery areas on western Santo and Ureparapara; lapita site on Malakula	Invasive species control required for petrel colonies on Vanua Lava

Appendix 4. Provisional Priority Species for CEPF Investment in the East Melanesian Islands Hotspot

Provisional Priority Species	English Name	Global Threat Status	Species-Focused Conservation Action Needed
REPTILES			
Emoia erronan	Common Emo Skink	NE	Establishing status and distribution
Emoia nigromarginata	Black-bordered Emo Skink	NE	Establishing status and distribution
Emoia spp.	emo skink species	NE	Strengthening of biosecurity
Lepidodactylus buleli	Santo Scaly-toed Gecko	NE	Establishing status and distribution
Perochirus guentheri	Gunther's Tropical Gecko	NE	Identification of viable population
Sphenomorphus spp.	common skink species	NE	Strengthening of biosecurity
Ubangalis spp.	skink species	NE	Strengthening of biosecurity
AMPHIBIANS			
Discodeles spp.	frog species	NE	Resolution of taxonomic issues
INVERTEBRATES			
Birgus latro	Coconut Crab	DD	Control of overexploitation
Holothuria spp.	sea-cucumber species	NE	Control of overexploitation
Papustyla pulcherrima	Manus Green Tree Snail	DD	Control of overexploitation
Partula auraniana	tree snail species	NE	Establishing status and distribution
Partula kurneri	tree snail species	NE	Establishing status and distribution
Partula milleri	tree snail species	NE	Identification of viable population
Partula vanicorensis	tree snail species	NE	Establishing status and distribution
Partula spp. (Solomons)	tree snail species	NE	Resolution of taxonomic issues
PLANTS			
Canarium indica	Canarium Nut	NE	Control of overexploitation
Gmelina moluccana	New Guinea White Beech	NE	Control of overexploitation
Xanthostemon melanoxylon	Solomons Blackwood	NE	Population management

Notes: DD = Data Deficient; NE = Not Evaluated by IUCN (2011).

Appendix 5: CBOs Active in the PNG Part of the East Melanesian Islands Hotspot

Organization	Location	Focal Areas	Notes
Kuka Community Group	Bougainville	Watershed restoration activities.	Accompanies a water supply project
Leitana Neihan Women's Development Agency	Bougainville	Women's concerns and peace building through training, counseling, information and working with other organisations.	Active players in bringing about community reconciliation and in contributing towards Bouganville peace settlement. Important in matrilineal inheritance system.
Marine Environment Resources Team	Manus	Survey south coastal area and develop plan for potential income generation including ecotourism.	
New Ireland Monitoring and Awareness Committee	New Ireland	Publicise conservation issues, provide technical aid to sustainability initiatives. Support and collaborate with other NGOs to monitor development programmes.	
Pacific Heritage Foundation	East New Britain	Run environment awareness campaigns, training in timber production skills and marketing villagers' timber. Promotes holistic development that includes economic, social and environmental concerns.	At least four communities with community - owned sawmill resist commercial loggers and harvest their own timber sustainably.
Tulele Peisa Incorporated	Bougainville	Sustainable development projects	
Whiteman Range Resource Development Limited	West New Britain	Raise awareness in the importance of conservation in the Whiteman Range area. Conduct a survey to establish the region as a conservation area.	Engage in ecotourism, pharmaceutical research and participate in carbon trading.
Wide Bay Conservation Association Inc.	East New Britain, New Ireland, Manus	Environmental awareness on deep-sea mining.	Promotes participatory development projects.

Note: Organizations initiated locally to serve local communities are classified as CBOs while those initiated for national coverage are identified as NGOs .

Appendix 6: Domestic NGOs Active in the PNG Part of the East Melanesian Islands Hotspot

Organization	Location	Focal Areas	Achievements	Networking Links
Ailan Awareness	New Ireland	Active since 1993 for marine conservation especially leatherback turtles. Use drama, songs, films, posters, pamphlets, discussions.	133 road shows to 108 villages & 25 schools & 7 community marine resource management plans. Public audiences up to 500 people	Developing curriculum with Research and Conservation Foundation
Barefoot Community Services	East New Britain	Assists other community organizations in training in environment and conservation awareness.	Not available	Local communities
Bismarck Ramu Group	Madang (north PNG coast)	Community awareness, information dissemination, organising, development training, advocacy to develop conservation deeds. Focus on self reliance.	Established an Intergrated Conservation and Development model. Protected 100,000 hectares of rainforest	Local communities
Bougainville Community Based Integrated Humanitarian Programme	Bougainville	Focus on integrated development for self reliance. Activities include re forestation, and responsible agricultural practice to protect the environment.	Not available	Local communities
Centre for Environmental Law and Community Rights	New Ireland, West New Britain, East New Britain, Manus	Legal advice, awareness raising, education, training on environment issues and land rights.	Formed in 2000 to service CBOs, NGOs and landowners. Very successful: 100 percent success in terms of informed consent	Formal relationships with CBOs. Partner of Friends of the Earth
Christians for Environmental Stewardship	Madang (north PNG coast)	Resource materials on environmental awareness for Christians. Training theologians in environmental issues.,	Not available	Anglican Churches: evangelical alliance; environmental ethical consumerism
Divine Word University	Madang (north PNG coast)	Training in anthropology and social sciences	Not available	Not available
Forest Research Institute	Lae (north PNG coast)	Training in ecoforestry techniques	Not available	Not available
Foundation for People and Community Development	Madang (north PNG coast)	Promotes certified community forestry and marketing of Forest stewardship Council (FSC) certified timber.	Active in certified community forestry in Madang area since 1997	Institute of Global Environment research (IGES), TNC, Centre for Environmental Law and Community Resources, PNG Eco Forestry Forum

Organization	Location	Focal Areas	Achievements	Networking Links
Grassroots Opportunities for Work	Madang (north PNG coast)	Training programmes and projects in sustainable agriculture, land use planning and rural business.	Not available	Not available
Mahonia Na Dari (Guardian of the Sea)	West New Britain, Manus	Marine environment education for school children and teachers. Community-based conservation of marine areas. Support research and support ecotourism initiatives.	Since its inception in 1998, it has reached out to more than 150,000 students and teachers. It has facilitated setting aside marine protected areas by coastal communities around Kimbe Bay and is moving to Manus Is.	TNC, EU Islands Regional Environment Programme, Walindi Plantation Resort, Local schools and communities.
Papua New Guinea Center for Locally Managed Marine Areas	West New Britain, New Ireland, Manus	Mobilise communities to protect coastal marine ecosystems.	Communities beginning to take over ownership and provincial fisheries ready to take over monitoring with communities.	Fisheries Department, local fishing communities
Research and Conservation Foundation	Works with several NGOs active in the hotspot	Manages the Crater Wildlife Conservation Area and runs a Conservation Education Program (CEP) for teachers. Raise awareness and sustainable use of natural resources for biodiversity conservation	Established 1986 One of oldest conservation NGOs in PNG.CEP has been ongoing since 1999	Partners with relevant conservation NGOs for education – providing assistance in education resource development.
University of Natural Resources and Environment	East New Britain	Courses in Diploma and Bachelor in tropical agriculture and in fisheries & marine resources	Established in 1965 as Vudal Agriculture University	Not available
University of Papua New Guinea (UPNG)	Port Moresby; works nationwide	The Strengthening Conservation Capacity Program: a diploma course resulting from combined effort from universities and NGOs to strengthen conservation capacity	Course trialled with some NGOs to about 300 participants. Grants expired but course design and content ready for delivery	Not available.
Village Development Trust	Lae, Morobe (north PNG coast)	Kamiali training centre: education and training in forestry, business development, ecotourism, gender and social issues. Kamiali integrated conservation and development project	Over 7 years -ran over 60 courses for at least 1,600 participants, 95 percent of whom were villagers. Established a training Centre, an ecotourism guest house and re-established the provincial based national botanical gardens	TITC, Unitech Dept of Forestry, Bulolo UniversityCollege, Habitat for Humanity, ADRA and other PNG NGOs.

Appendix 7: INGOs Active in the PNG Part of the East Melanesian Islands Hotspot

Organization	Location	Focal Areas	Achievements	Networking Links
Conservation International (CI)	New Britain	Works in partnership with local NGOs for marine resource management, curriculum development and general public awareness of conservation issues. In 2009, conducted a biodiversity survey of the Nakanai Mountains in East New Britain.	Successful survey of Nakanai Mountains	Not available
Live and Learn	West New Britain	Through school and community education & learning - encourage self reliance, environment conservation practices and innovation for sustainable development	Contributed to capacity building for biodiversity conservation through production of a popular resource manual for trainee teachers at the University of Goroka, and at Balob teachers College.	Research and Conservation Foundation, University of Goroka
New Guinea Binatang Research Centre	Madang (PNG north coast)	Capacity building of local field researchers, from paraecologists to postgraduate scientists. General public awareness and education in nature conservation and ecology	Significant achievement in trained Para ecologists some advancing to PhD. Some 30 graduates in tropical ecology each year. General public awareness active. International research publications.	Novotny Lab, University of South Bohemia, Czech Republic.
Organisation for Industrial, Spiritual and Cultural Advancement	East New Britain	Agricultural training and children's forest program	Established the Rabaul Training Centre in 1988. 65 schools and 500 students involved in tree planting in 2010	Not available
Seacology	East New Britain, West New Britain, Manus	Negotiates with communities to set aside conservation areas in exchange for meeting a specific need they identify	Conservation areas and projects claimed throughout PNG. In the hotspot provinces these have included; Wanang Forest area of 2,200ha for 25 years, Tavolo, Pomio District of 988acres, West Manus 49,421 acres of coastal forest, Marine conservation areas in Kimbe, West New Britain, and installation of mooring buoys in fragile reef areas in New Ireland.	Mahonia Na Dari, PNG Divers' Association
The Nature Conservancy	West New Britain, New Ireland, Manus	Facilitates conservation outcomes through working with resource owners, farmers, local governments and local NGOs	Set up MGCTF for up to US$30 million. Land Use planning and Mapping for communities agreed to by local governments, first fair trade certified cocoa in PNG, help Madang province adopt legislation inviting land owners to enter into conservation agreements protecting their rights and their forests. Now followed in West New Britain and Manus and extend to marine conservation.	Mahonia Na Dari, People and Community Development Fiji, PNG Centre for Locally Managed Marine Areas

Appendix 8: CBOs in the Solomon Islands with a Focus on Conservation or Related Fields

Organization	Focal Areas	Province	Mission Statement	Networking Links
Auki Assemblies of God Youth	Forestry	Malaita	To promote church planting, spiritual development and Christian growth	Pentecostal Churches
Dunde Council of Elders	Forestry; marine	Western	To identify different sub-tribes to represent in decision-making and planning in the Council of Elders	United Church
Hanuato'o Conservation	Forestry; biodiversity	Makira Ulawa	To conserve the natural resources of the catchment of the Wai Tawatana and Haurahu River through a community consensus approach	DSE; Makira Community Conservation Foundation
Honiara Beautification Council	Biodiversity	Guadalcanal	Not available	Not available
Kolombagara Island Biodiversity Association	Biodiversity	Western	Not available	Not available
Kindu Resource Management	Resource management	Western	Not available	Not available
Lauru Indigenous Natural Resources	Resource management	Choiseul	Not available	Not available
Lauru Land Conference of Tribal Chiefs	Resource management	Choiseul	Not available	Not available
Makira Community Conservation Foundation	Forestry; biodiversity	Makira Ulawa	To protect biodiversity of Makira Ulawa province, and develop resource management plans through a community consensus approach	Biodiversity conservation CSO network; Center for Biodiversity and Conservation
Marovo Island Nature, Biodiversity and Livelihood Trust	Biodiversity	Western	Not available	Not available
Roviana Conservation Foundation	Coastal fisheries; marine	Western	To create a model of conservation in Western province that can be used elsewhere in the Solomon Islands, Melanesia and Pacific	Roviana-Vonavona Resource Management Committee network
Tetepare Descendants Association	Forestry; marine; biodiversity	Western	To ensure cooperation among Tetepare landowners for the conservation and sustainable management of Tetepare Island's resources	Member of Solomon Islands LMMA network
Western Solomons Conservation	Coastal fisheries; marine	Western	To create a model of conservation in Western province that can be used elsewhere in the Solomon Islands, Melanesia and Pacific	Roviana-Vonavona, Rendova, North New Georgia and Marova Resource Management Committee networks

Source: DSE (2008).

Appendix 9: Domestic NGOs in the Solomon Islands with a Focus on Conservation or Related Fields

Organization	Focal Areas	Mission Statement	Networking Links
Community Sector Programme	Agriculture; forestry; local governance; community development	To build capacity for self reliance within communities, civil society organisations and service providers.	Women Development Division (WDD)
Environment Concerns Action Network Solomon Islands (ECANSI)	Forestry; biodiversity and marine conservation	To form an independent proactive forum for the promotion and protection of the environment of the Solomon Islands and the region	DSE, National Rights Resources Coalition, SILMMA network
Kustom Garden Association	Agriculture; horticulture	To work with farmers at village level to promote self reliance through strengthening food security and sustainable livelihood development and help improve the lives of rural people	DSE, National Agriculture Council, Melanesia Farmer First Network, livelihood advisory groups, farmer schools, rural training centres
Solomon Islands Association of Vocational and Rural Training Centres (SIAVRTC)	Forest management training; agriculture training	To build an effective and efficient VET sub-sector and to strengthen the institutional and human capacity of its member skill training providers	DSE, Ministry of Education and Human Resources Development, PITVET
Solomon Islands Christian Association (SICA)	Community development; literacy training	Solomon Islands Christian Association commission is a society that embodies justice and compassion and unity respect and truth through the out-working of the gospel of Jesus Christ in the lives of people	AJR, Coalition for Education Solomon Islands, DSE, National AIDS Council, National Education Board, SIDT, town planning boards
Solomon Islands Community Conservation Partnership (SICCP)	Community-based biodiversity conservation	To deliver community-based conservation solutions throughout the Solomon Islands	AMNH, CI, Save Your World Foundation, local network with six conservation communities
Solomon Islands Development Trust (SIDT)	Marine conservation; community development; local governance	To improve the quality of life in the villages of Solomon islands through strengthening local governance structures and supporting more inclusive processes in the target communities in Guadalcanal, Malaita and Isabel provinces	Media Association of Solomon Islands, FSPI, DSE, SICA, Greenpeace, Village Eco Timber Enterprise, VSA, government
Solomon Islands Honey Producers Coop /Association	Agriculture	To provide technical expertise, to provide market or to market honey for farmers, and to promote development in environmentally friendly way	Agriculture Development Committee, WWF
Solomon Islands Locally Managed Marine Areas	Marine	To work with communities and conserve and sustainable manage their natural resources for better living	LMMA based in Suva, Fiji and DSE, USP, Fisheries Department
Village Eco Timber Enterprises	Forestry	Export facilitator for timber from village managed sustainable forestry	Greenpeace, ICCO, ITTG, SIDT. Australian Timber Buyers, Natural Resources Development Fund

Source: DSE (2008).

Appendix 10: INGOs Active in the Solomon Islands with a Focus on Conservation or Related Fields

Organization	Focal Areas	Mission Statement	Networking Links
Asia-Pacific Sustainable Development	Agriculture, Forestry	Not available	Not available
Australian People Health Education Development Agency (APHEDA)	Forestry	Union Aid Abroad –APHEDA was established to contribute directly to countries and regions of the world where men and women workers are disadvantaged through poverty, a lack of workplace, denial of labour and human rights, civil conflict and war	DSE, Kastom Garden Association, SIAVRTC
Australian Volunteers International	Forestry, Marine	To share skills and build relationships with people of developing communities, We assist our partner organizations to reduce poverty, promote human rights and gender equity, protect the environment, provide health and education services and fight against HIV/AIDS	Australian Business Volunteers, Australian Youth Ambassadors for Development, JOCV, UNDP, VIDA, VSA, VSO
Australian Youth Ambassadors for Development	Forestry	To strengthen mutual understanding between Australia and the countries of the Asia Pacific and make a positive contribution to development	Australian Business Volunteers, JOCV, VIDA, VSA
Canadian University Students Organisation	Marine conservation	Canadian University Students Organisation supports alliance for global social justice, by sharing information, human and material resources, and by promoting policies for developing global sustainability	Community Sector Programme, DSE, EU Micro-projects, UNESCO.
*Centre for Biodiversity and Conservation at the American Museum of Natural History	Community based conservation	The center's mission is to mitigate critical threats to global biological and cultural diversity	Makira Community Conservation Foundation; also working in Mount Popomanaseu, South Lauru Mangrove Reserve, and Kolombagara Reef to Ridges Reserve
Greenpeace Australia Pacific	Mining, Oil Palm, Forestry, Marine.	Greenpeace is an independent campaigning organization which uses non-violent creative confrontation to explore global environmental problems and to force solutions which are essential to green and peaceful future	Forest network, Natural Resources Development Fund, SIDT, producer associations
Live and Learn	Forestry , Marine	Build more peaceful, self reliant and sustainable communities by developing potential for women, men and young people in formal and informal areas of peace, environment, well being, livelihood and vocational training	DSE, National Rights Resources Coalition

Organization	Focal Areas	Mission Statement	Networking Links
Oxfam International	Agriculture, Forestry, Mining	To contribute to peace and security in the Solomon Islands	DSE, National Rights Resources Coalition, National AIDS Council, Global Fund, Oxfam International Youth Partnership, SIG, NDMO
The Nature Conservancy (TNC)	Marine Protected Area - Arnavon	To strengthen our spiritual and cultural links to the environment through the preservation and protection of the critical habitats and species in the first and longest operation marine protected area within the Solomon islands	CCOSI, DSE, SILMMA network
Worldfish Center	Marine, Coastal fisheries	The WorldFish Center is a non-profit organization that focuses on alleviating poverty and hunger by improving fisheries and aquaculture	FAO, CGIAR, SPC, FFA, USP, PNG Fisheries Dept.CI, WWF, FSPI, SILMMA member
Volunteer Service Abroad (VSA)	Marine	Our intentions are that New Zealand volunteers, partner organizations and communities abroad share skills and knowledge to help improve quality of life, and build self-determining communities and stable nations	DSE, provincial governments, SIDT, Solomon Islands Association of Rural Training Centres, WWFC
World Wildlife Fund (WWF)	Marine, Coastal fisheries	WWF's mission is to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature	SILMMA

Source: DSE (2008); except for organization marked *.

Appendix 11: Civil Society Organizations in Vanutu Active in Nationwide Conservation Efforts

Organization	Mission Statement	Governance Structure	Networking Links
Foundation for the Peoples of the South Pacific Vanuatu	To support and promote the sustainable social, economic and environmental development of all people of Vanuatu.	Elected Board directs work of management and staff team. Membership organisation	Network with government and NGOs as well as CBOs. Set up Village Based Resource Management Association with wide membership of government and civil society bodies.
Wan Smolbag Theatre	Monitor conservation and manage the use of marine turtles in Vanuatu Promote use of integrated resource management practices Advocate and promote environmentally friendly development activities Act as community mouthpiece for conservation and environment issues.	Vanua-Tai Resource monitors of 400 members coordinated by Wan Smolbag Theatre	Network with Vanuatu Fisheries Department, and communities.
Live and Learn	Develop and implement projects and programmes for teachers, schools, communities and other target groups in environment and development education. Promote integration of environment, human, cultural and peace concepts in all education projects and programmes.	INGO – the only one active in promoting conservation of seven INGOs in Vanuatu.	Network with government departments and communities.
Reef Check Vanuatu	Provide tools for communities and custom land owners to monitor and assess community based management in coral reef areas. Raise public awareness on coral reef ecology and threats	Member organization - hosted by the Fisheries department	Network with other NGOs, government agencies

Appendix 12: Civil Society Organizations in Vanuatu Active in Conservation at the Local Level

Organization	Location	Type
Aniwa Community Reforest Cooperative Association	Tafea	CBO
Church of Melanesia	Santo	Faith-based
Environment Trial Committee	Malakula	CBO
Grassroots Small Business Association	Port Vila	National NGO
Hog Harbour Community Services and Economic Development Assoc.	Santo	CBO
Integral Human Development Resource Centre	Santo	CBO
Lapo Ecotourism Committee	Malampa	CBO
Local Conservation Initiatives Projects	Tafea	CBO
Lolihor Development Council	Ambrym	CBO
Malampa Fishermen's Assocaition	Malakula	CBO
Malampa Forestry	Malampa	CBO
Matantas Conservation Area	Santo	CBO
Mere Sawia Conservation	Not available	CBO
Namalulen Kape Ramar Mene: Leadership for Community	Tafea, Tanna	CBO
Nasonal Komuniti Development Trust	Port Vila	National NGO
Nikimlua Community Fishing project	Tanna	CBO
North Efate Indigenous Farmers Association	Emua	CBO
Sanma Tourism	Santo	Private sector
Sanma Small Saw Mill Association	Santo	CBO
Tafea Cooperative Fishermen's Association	Tanna	CBO
Vanua indigenous Development Association	Port Vila	CBO
Vanuatu Rural Development Training Centres Association	Port Vila	National NGO
Wantok Environment Centre	Santo	National NGO
West Ambae Community Development Planners association	Amata	CBO

Source: VANGO (2011).