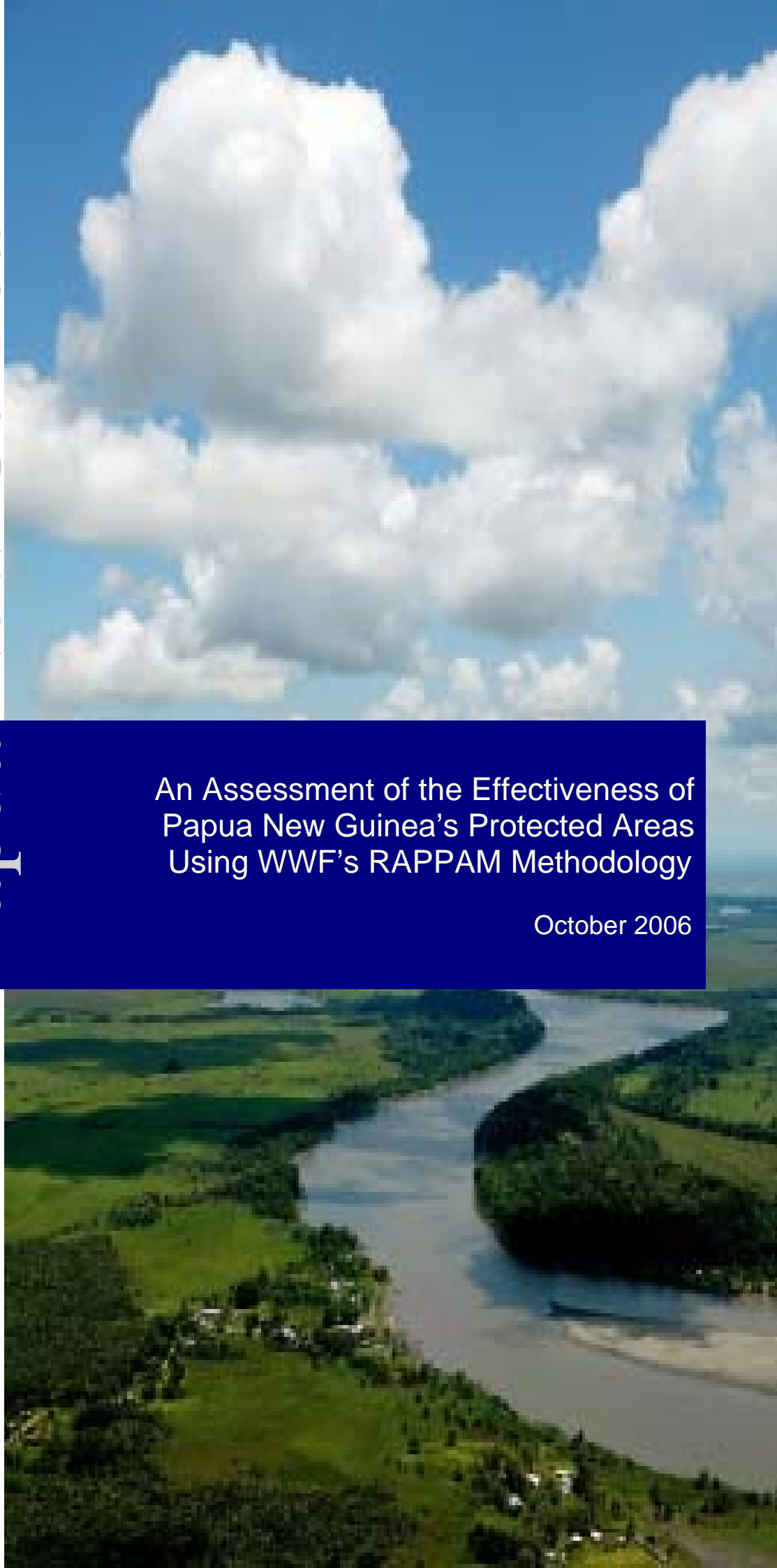




# Papua New Guinea

An Assessment of the Effectiveness of  
Papua New Guinea's Protected Areas  
Using WWF's RAPPAM Methodology

October 2006



# ACKNOWLEDGEMENTS

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Much of the Rapid Assessment and Prioritisation of Protected Area Management (RAPPAM) in PNG would not have been possible with cooperation, dedication and enthusiasm from numerous individuals. It is impossible to name all involved and hopefully this acknowledgement provides all of them with the vigour to participate in further RAPPAM and associated activities. Firstly, thanks go to the Protected Area communities that gave their time most willingly and participated in discussions, while appreciating and adhering to the importance of conservation.

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Third and finally, to the RAPPAM Working and Steering Groups: under the guidance of Ms Lisa Higgins-Zogib and Dr. Marc Hockings respectively. Without the leaders continuous guidance and commitment to this massive task, there would be no report, no recommendations and no follow up activities to continue this imperative endeavor.

A list of participants and contributors is given at the end of this report.



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# ACRONYMS

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CBD	<i>Convention on Biological Diversity</i>
CI	<i>Conservation International</i>
CPR	<i>Conservation Planning Region</i>
DEC	<i>Department of Environment and Conservation</i>
DEH	<i>Department of Environment and Heritage (Australia)</i>
DM	<i>Department of Mining</i>
DOLPP	<i>Department of Lands and Physical Planning</i>
DPE	<i>Department of Petroleum and Energy</i>
DPLLG	<i>Department of Provincial and Local Level Government</i>
EA	<i>Environment Australia</i>
GEF	<i>Global Environment Facility</i>
ICAD	<i>Integrated Conservation and Development</i>
ICDP	<i>Integrated Conservation and Development Project</i>
IUCN	<i>International Conservation Union</i>
NFA	<i>National Fisheries Authority</i>
NGO	<i>Non-Governmental Organization</i>
LLG	<i>Local Level Government</i>
MPA	<i>Marine Protected Area</i>
NFS	<i>National Forest Services</i>
PA	<i>Protected Area</i>
PNG	<i>Papua New Guinea</i>
PNGFA	<i>Papua New Guinea Forest Authority</i>
PRA	<i>Participatory Rural Appraisal</i>
RAP	<i>Rapid Assessment Program</i>
RAPPAM	<i>Rapid Assessment and Prioritization of Protected Area Management</i>
RCF	<i>Research and Conservation Foundation</i>
SCLC	<i>Sepik Community Land Care</i>
SCC	<i>Strengthening Conservation Capacity</i>
TNC	<i>The Nature Conservancy</i>
TPA	<i>Tourism Promotion Authority</i>
UPNG	<i>University of Papua New Guinea</i>
VDT	<i>Village Development Trust</i>
WCS	<i>Wildlife Conservation Society</i>
WMA	<i>Wildlife Management Area</i>
WWF	<i>Worldwide Fund for Nature</i>

# EXECUTIVE SUMMARY

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Papua New Guinea (PNG), comprising the eastern half of the Island of New Guinea, is one of the most important areas for biodiversity on the planet. It contains part of the largest tropical rainforests in the Asia Pacific region and some of the richest coral reefs and saltwater fish diversity on earth.

Only 3% of the land and less than 1% of the marine habitat of PNG is protected. Given the variety of types and levels of tenure and management, it is difficult to talk about any single kind of 'protected area system' in PNG. Yet increasingly there is a need for a more organised and systematic approach to protection, particularly when the emergent threats in the area are considered. As such, it was felt that a review of all the protected areas in the country was necessary.

In addition, as Party to the Convention on Biological Diversity (CBD), PNG has committed to complete a "comprehensive, effectively managed and ecologically-representative national system of protected areas" by 2012. One of the targets within the CBD's Programme of Work on Protected Areas is to assess protected area systems and implement key recommendations by 2010. The present assessment constitutes a critical first step to meeting this target.

WWF's RAPPAM (Rapid Assessment and Prioritisation of Protected Area Management, Ervin, 2003) methodology was chosen as an appropriate tool to assess the management effectiveness of PNG's protected areas at a system level. Being based on the WCPA framework on management effectiveness (Hockings et al. 2000, Hockings et al. 2003, Leverington & Hockings 2003), and having now been implemented in close to thirty countries all over the world, it is an internationally recognised method. It offers a relatively quick and efficient way to assess the strengths and weaknesses of individual protected areas and the overall protected area system as well as recommending steps for improving effectiveness.

The RAPPAM assessment in PNG was jointly coordinated by WWF and the Papua New Guinea Department of Environment and Conservation (DEC) and involved a range of other agencies including the PNG Forest Authority, The Nature Conservancy, Research and Conservation Foundation, Village Development Trust and Conservation International.

The RAPPAM assessment was adapted to the local context to recognise PNG's unique culture and land tenure system. It reviewed existing and proposed protected areas and examined how best to marshal the resources of community, government and non-government stakeholders in protecting PNG's globally important biodiversity.

Findings from the assessment indicated a weak PNG Protected Area system that requires some careful rethinking. Thematic areas of Representation, Legislation and Policy, Collaboration and Partnership, Capacity Building and Training, Communication, Education and Awareness and Pressure and Threats are highlighted in the recommendations.

To help ensure that this exercise is not just a paper one, these recommendations must now be turned into an Action Plan and implemented as fully as possible to ensure that the country's outstanding culture and biodiversity are protected for generations to come.

# 1.0 INTRODUCTION AND BACKGROUND

## 1.1 BIODIVERSITY AND ECOSYSTEMS

**P**NG is one half of the world's largest tropical island and also comprises satellite islands of New Britain, New Ireland, Bougainville and Manus and thousands of smaller islands. It lies between the equator and 12° latitude south and 141° and 160° E longitude. PNG has a land area of 462,243 km<sup>2</sup> and a total coastline of approximately 17,110 km.

This island country of New Guinea accounts for over five percent of the world's biodiversity in less than one per cent of its land area. The island as a whole now supports the largest contiguous area of tropical rainforests in the Asia Pacific region. These forests are home to an estimated 20-25,000 species of higher plants, 740 bird species and 220 species of mammals, the majority of which are endemic to the island. Almost all of the remarkable birds of paradise and tree kangaroos are found in New Guinea and its islands and it boasts more orchids than any other part of the planet.

PNG waters are equally valuable. Its coral reefs are among the most diverse in the world and support some of the richest concentrations of saltwater fish. Almost all reef types found in PNG waters are within fringing and/or barrier reefs, with an estimated area of 40,000 km<sup>2</sup>. PNG also has some of the largest unpolluted tropical freshwater systems in the Asia Pacific region.

**Figure 1: Location of Papua New Guinea**



### Box 1: PNG society at a glance

**Population:** 5.5 million (40% under 15 years)

**Population growth:** 2.3 % per annum

**Languages:** Approx 820

**Literacy:** 56% of population over 10 years

**Infant mortality:** 73 per 1000 live births

**Life expectancy:** 54 years

**Rural residence:** 85%

**Primarily engaged in subsistence agriculture:** 74% of adult population

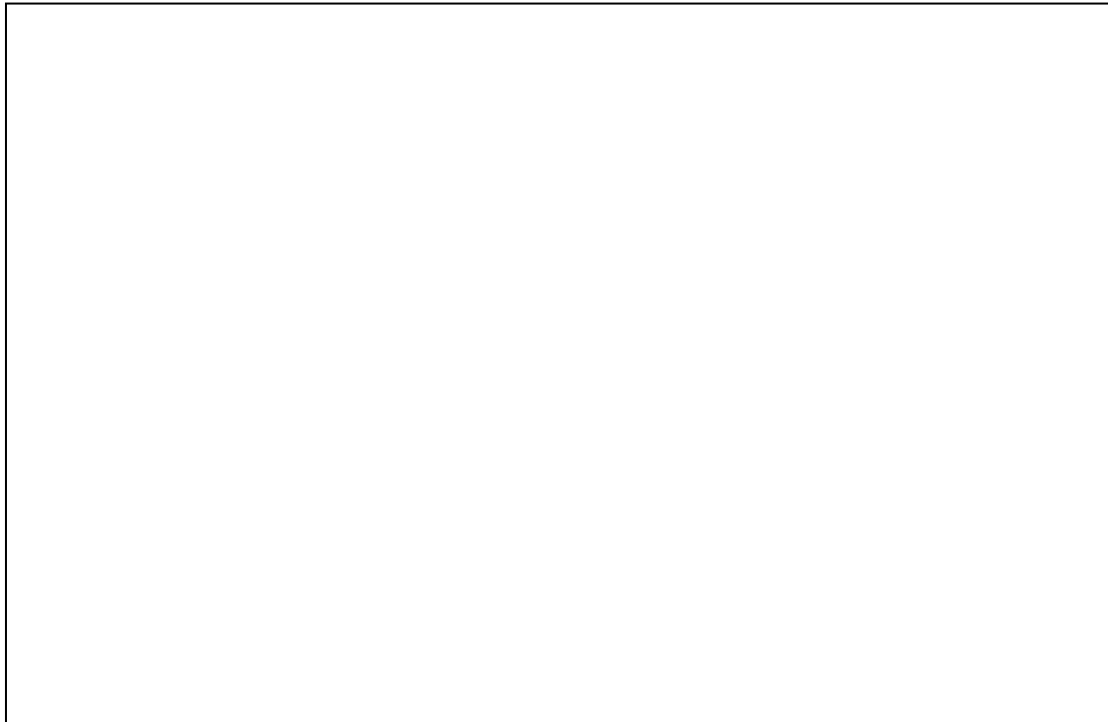
**Engaged in any form of income generation:** 66% of all households

**Annual income per capita:** PGK 994 (USD 301)

**Annual rural income per capita:** PGK 75.00 (USD 25.00)



Figure 2: Ramba WMA, Long Island, Madang Province (Photo: WWF/N Mitchell)



## 1.2 CLANS PROTECTING THEIR RESOURCES

PNG's population of 5.5 million people live largely in rural areas and most follow a subsistence lifestyle based on farming, hunting and collection of forest and sea produce.

More than 50,000 years of human habitation in New Guinea has produced a rich understanding of the natural environment. Each of the country's 820 language groups has developed its own mechanisms for protecting and wisely using its resources and these in turn have fostered the creation of untold thousands of traditional protected areas and protective practices, which include:

- Restrictions on, or the prevention of gardening, hunting, gathering or access in the domains of the forest spirits or *masalai*.
- Areas where seasonal restrictions on the hunting of species have been

- Installed or where certain animals (such as clan totems) may not be hunted.
- Areas that have been restricted to respect the site of past sickness, historic events or to mark the death of an elder.
- Controlled reefs that are recognised as the domain of water spirits.

**The constitution of the modern state of PNG recognises customary ownership of ninety-seven per cent of the land area of the country. Community control of inshore fisheries is also tacitly acknowledged, although legal recognition is much less clear.**

It is beyond the scope of this report to review the range of customary protected areas and protective measures. However, these remain powerful in many parts of the country and offer examples of conservation through an informal system. A list of these is in Annex 3 and reference is made to them within this document.

By necessity, most protected areas are community-based resembling IUCN Category VI. They are encouraged to remain so as this provides a sense of ownership by communities. This in turn creates the need to protect the resources found in these protected areas for the existing community and their future generations.

### 1.3 WHY RAPPAM?

The PNG Department of Environment and Conservation (DEC) is the lead agency administering environment and conservation activities in PNG. While formal protected areas through National Parks and Wildlife Sanctuaries were established in the 1960s, there had not been an accurate listing of the formal protected areas (PA) in PNG prior to the RAPPAM process. A review in 1999 (IUCN/WWF, 1999) noted the existence of 51 formal protected areas<sup>1</sup> covering less than 2.7 % of the country's land mass. The majority of these were small and 89 % had no or minimal management structure. There was subsequently an urgent need to:

- ❁ Improve the management of existing conservation areas.
- Further support community capacity for management.
- Establish new protected areas in the face of rapidly expanding timber and oil palm development, and increasing pressure on marine resources.
- Explore economic alternatives to offset the opportunity costs of setting up protected areas at both the National and community level.

<sup>1</sup> The term "protected area" is used here to recognise a delineated area of land or water held in customary or state ownership with a purpose of maintaining the environmental and cultural values of that area. "Protected area" is interchangeable with "conservation area". The former was preferred by PNG practitioners in order to avoid confusion with the specific form of protected area in PNG known as "Conservation Areas" declared under the Conservation Areas Act 1978 (Jano et al 2003).

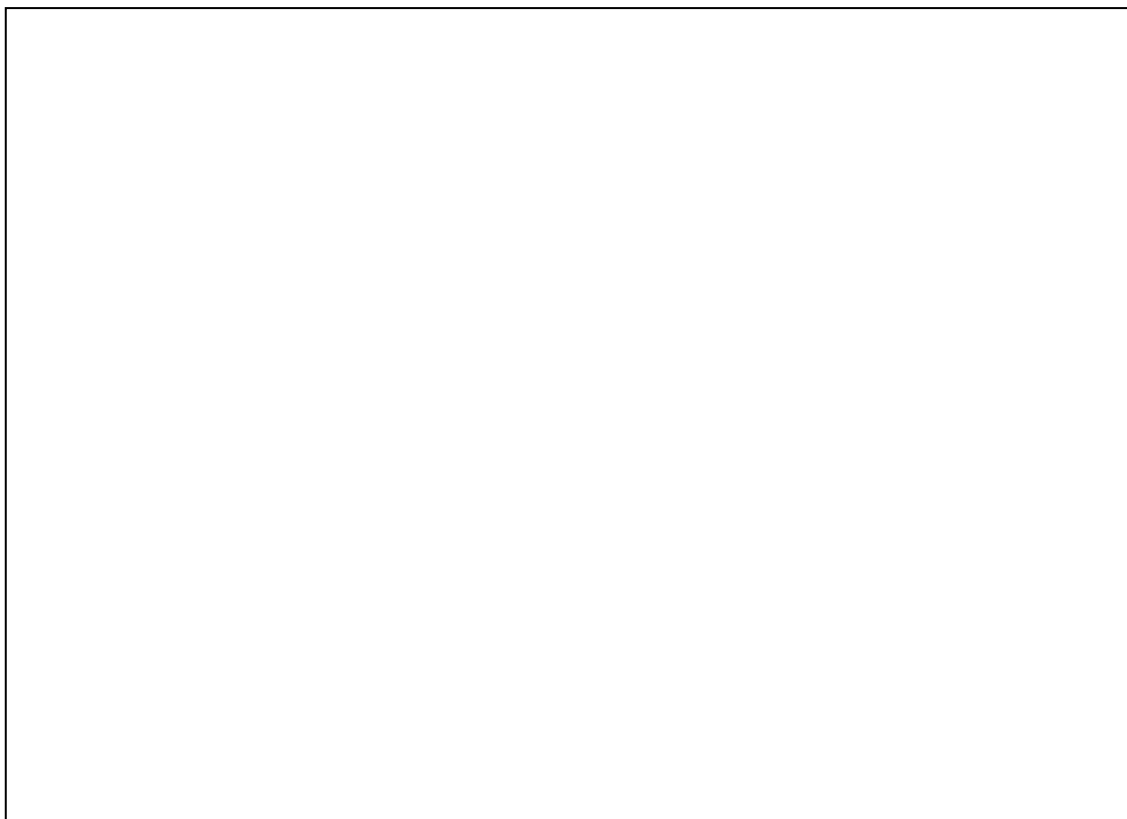
- With the vast majority of land in PNG held in customary ownership, it was imperative to undertake activities in association with landholding clans or resource user groups.

In addition to this review, it was generally acknowledged that:

- Existing types of PAs were not working.
- Logging and mining concessions were being declared over the top of protected areas.
- There was no clear agreement on how to establish or manage PAs.
- Gazetted of new PAs was taking far too long.
- There was little public awareness of the value of PAs.
- No resources were being allocated to PAs.

In other words, something had to be done to create a much stronger and much better managed system of PAs. And in response, WWF-PNG and DEC in conjunction with WWF's international Forests for Life Programme and a number of national conservation organisations and state agencies introduced the RAPPAM assessment into Papua New Guinea. Figure 3 depicts a community RAPPAM workshop.

**Figure 3: Field RAPPAM workshop at the Tab WMA Madang Province (Photo: WWF/N. Mitchell)**



# 2.0 IMPLEMENTING THE METHODOLOGY

## 2.1 GOALS AND OBJECTIVES

The overall goal of the PNG RAPPAM was to “*to improve the management effectiveness of PNG protected areas and the protected area system*”. In the early 1990s, WWF and DEC conducted a review of the protected area system of PNG. This review resulted in a preliminary register of PNG’s protected areas (WWF and DEC, 1992), and an unimplemented design for a protected area strengthening program (WWF and DEC, 1993).

The Department of Environment and Conservation, through its review in 1992, put forward its Strategic Plan. In protected areas, four objectives were propounded:

- The rehabilitation of existing areas.
- The development of an expanded system of conservation areas.
- The strengthening of planning, management and evaluation capabilities of groups involved in conservation and management.
- Communication / advocacy which fosters support for the conservation area system.

While a Conservation Areas Strengthening Project started in November 1993, the majority of the objectives were not achieved. The political climate added to the challenge. A number of conservation initiatives have since evolved such as the Total Environmental

Catchment Management and now Conservation Planning Regions. The latter initiative is based on WWF’s Ecoregion Framework. The RAPPAM assessment then is complimentary to the four objectives set out in the DEC Strategic Plan.

In July 2002, the RAPPAM study got a major boost when the DEC, WWF and Environment Australia (EA) agreed to undertake a number of activities to reinvigorate protected areas and conservation planning in PNG. Activities now underway include the production of:

- Electronic databases and GIS maps of existing and proposed terrestrial and marine protected areas.
- Review of past and predicted forest loss in PNG.
- A generic set of process and facilitation materials for assisting communities to establish new protected areas.
- Information posters on the existing protected areas.
- Establishment of new protected areas in a number of areas of PNG (including TransFly, Managalas Plateau, Sepik, Bosavi, Huon Coast and Wide Bay).

This partnership was further broadened during a meeting in August 2003 at Kamiali Wildlife Management Area with six other national and international NGOs<sup>2</sup>

<sup>2</sup> Conservation International, Foundation for People and Community Development, Partners with Melanesians, The Nature Conservancy, Research and Conservation Foundation and Village Development Trust. Almost all new protected area declarations in the past decade have been supported by non-government organisations.

joining. The “Kamiali Group” developed a longer term vision and action plan for protected area strengthening (the “Kamiali Declaration”) which aimed *inter alia* to ensure the protection of at least 20% of every ecosystem in PNG.

Input from these partnerships helped to develop the operational framework for the RAPPAM. Key activities included:

- An assessment of whether PAs are successfully achieving their conservation goals and are supported by landholding communities.
- Identification of threats and pressures to individual PAs and across the system as a whole.
- Consideration of how effectively PAs contribute to the livelihoods and aspirations of communities.
- Updating the PA Register of the status and management of selected PAs,
- Review of the strengths and weaknesses of government and NGO support to PAs, and how best to apply the resources and skills of government and NGOs to strengthen the PA system.
- Assessment of approaches and tools that are effective in helping communities to manage their natural resources.
- Exploration of mechanisms to reduce conflict between PAs and other land uses.
- Recommendations and next steps to improve PA policy and practice and for improving on-the-ground management in individual PAs.

The final results of the RAPPAM assessment will:

- Promote better PA management at system, process and PA level.
- Improve the value of protected areas to landholding communities.
- Highlight strengths and weaknesses of the current management of PAs.
- Provide the baseline data for comparison with future assessments of PAs.
- Provide clear and repeatable criteria and indicators of good protected area management.
- Feed into government budget and planning processes and the planned National Capacity Self-Assessment.
- Increase cooperation and partnerships between government, non-government and community stakeholders.
- Guide collaborative planning, resource allocation and priority setting.
- Increase public awareness, involvement and support.
- Provide an opportunity for increasing funds and resources available for the PA system.

The information generated by the RAPPAM assessments will be accessible to:

- Community members.
- Government, conservation NGOs and research institutions.
- Donors supporting protected area work.

## 2.2 SELECTION OF PROTECTED AREAS

Protected areas identified during the RAPPAM study include national parks, wildlife management areas, national walking trails, provincial parks, sanctuaries and marine protected areas.

Proposed protected areas, such as Managalas, Tonda extension, and Mt Bosavi; and informal protected areas managed by communities, which do not receive formal recognition from the government, such as Kau Wildlife Area, were also assessed. Altogether, 51 protected areas were assessed (Annex 1).

## 2.2 ADAPTING THE RAPPAM METHODOLOGY TO PNG

The diverse cultural and land tenure system in PNG prompted the adaptation of the RAPPAM methodology. A RAPPAM working group supported by a Steering Group was established in January 2004 and with guidance from the Steering Group, a RAPPAM questionnaire was field tested and amended before the assessments began<sup>3</sup>.

Amendments to the RAPPAM questionnaire were necessary because of the almost total absence of management plans in PNG. To counter this deficiency, questions were added to investigate *traditional* resource use plans (*questions 4k and 13f*), and to draw out issues of landownership and boundaries (*questions 7f and 8f*). Also as most PAs in PNG have no access to funds, some questions on finances seemed irrelevant. Five new questions were also added in a new section on *Sustainable Livelihoods* to explore the integration of economic development into sustainable conservation

<sup>3</sup> Guidelines for conducting the assessments at community level, and a translation into *Pidgin* of the main concepts held within the questionnaire, were documented and distributed to aid consistency. *Pidgin* is the lingua franca understood by the majority of Papua New Guineans although there are approximately 820 different languages and dialects. English is the nominated official language.

planning. Three further questions on *Community Engagement and Mobilisation* were added in an attempt to reveal underlying issues within the community including the essential factor of clear leadership. Box 2 highlights the adaptation of the RAPPAM for PNG.

The RAPPAM methodology combined an external professional review with a self-review of PA management by community members. With the collaboration from other NGOs at the August 2003 meeting, WWF and DEC organised a series of workshops. Three main workshops were held during 2004/5, consisting of an Introductory, Mid Term and Final RAPPAM workshop. The latter workshop resulted in the production of this report where results from the field based assessment from the individual PAs were collated and synthesised. In total, the RAPPAM study took 10 months. The process in Annex 2.

The RAPPAM study followed the following sequence:

- Step 1: Identifying the protected areas to be included in the assessment.
- Step 2: Gathering and assessing existing information for each protected area.
- Step 3: Administering the Rapid Assessment Questionnaire.
- Step 4: Analyzing the findings.
- Step 5: Identifying next steps and priorities.

Care was taken to reduce this expectations factor amongst visited communities. Where possible, communities were encouraged to use the RAPPAM questionnaire as a means to evaluate their own management strengths and weaknesses. This resulted in several community level actions.

Besides the administering of the RAPPAM questionnaires in the PAs, information was obtained to update the PA register in DEC

### **Box 2: Adapting the RAPPAM methodology for Papua New Guinea**

The unusually large-part played by landowners and community in the success and failure of protected areas in Papua New Guinea dictated the need to tailor both the method of obtaining the RAPPAM base data, and the questionnaire itself. The assessments were taken into the protected areas to gauge the extent of activity, interest and commitment within PA committees and the local communities. Such community visits were necessary as the government had not visited many PAs for over a decade and it was not known if they were still functioning.

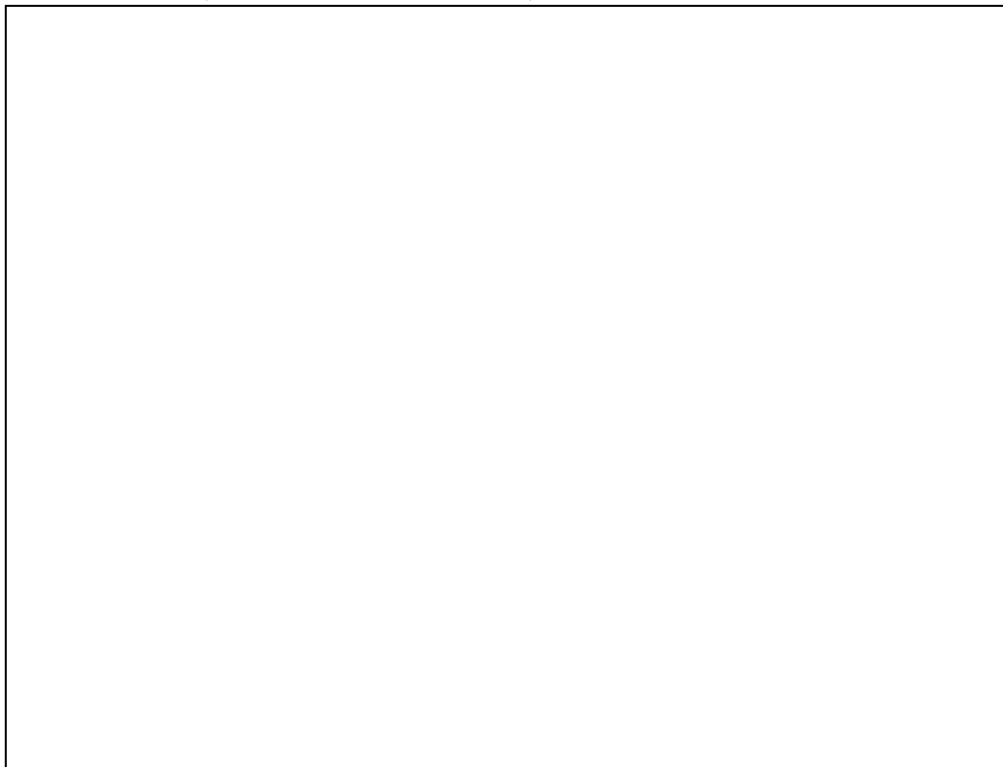
The questionnaire was tested at Sinub Island WMA and Hunstein Range WMA. The tests revealed that due to differing conditions, including local education levels, no two PAs would yield the answers in the same manner and some flexibility would be required in obtaining the data. Depending on the availability of data the answers for the questionnaire were generated via a varying combination of consulting local communities, research institutions, government and NGOs, and published sources.

Against this flexibility was the need to maintain uniformity across all the assessments. The Working Group was initially brought together in a workshop to agree and rehearse a common method of conducting assessments. Guidelines for conducting the assessments at community level, and a translation into *Tok Pisin* of the main concepts held within the questionnaire, were documented and distributed to aid consistency. The questionnaire was then amended accordingly.

Visits to long-neglected PAs were bound to raise the expectations of communities and every care was taken to reduce this factor. Where possible, for example at Tab Island WMA, the committee was encouraged to use the RAPPAM questionnaire as a means to evaluate its own management strengths and weaknesses. This resulted in their recording several community level actions as solutions to problems that the questionnaire highlighted.

The method adopted for conducting the RAPPAM assessment in PNG has itself highlighted the remoteness and difficulty of access to many of the PAs as a main issue in PA management. The programme of field visits to almost fifty protected areas has proved both costly and time-consuming and the task of providing sustained support to such a system is immense.

**Figure 4: RAPPAM Working Group, Introductory RAPPAM Workshop, Motupore Island (Photo: WWF / P Chatterton)**





## 2.4 INFORMATION MANAGEMENT

A key task of the review was to gather and update information on the status and management of PAs and to insert this information into a PA database that was developed by DEC with assistance from Environment Australia. The result will be a revised digital register of PAs in PNG that can be used as a baseline for future assessments.

Where possible, information on the biological and cultural significance of PAs was collected and GIS information produced. However, it should be recognised that available data is very limited and the RAPPAM exercise primarily worked from available information.

Data sharing agreements were signed with all partners in the RAPPAM process ensuring information was gathered and managed to the highest possible standards. DEC made available all necessary documents to the RAPPAM Working Group.

## 2.5 MANAGEMENT

With a severe lack of capacity in the current protected area system in PNG, no one player has sufficient resources or reach to be able to single-handedly develop an assessment of protected area effectiveness in PNG. Neither has any one group the ability to implement any plan for strengthening PA management. Therefore, the RAPPAM assessment was conducted as a partnership between WWF, DEC and Environment Australia with assistance and guidance from other members of the Kamiali Group and a small number of PA specialists in PNG and internationally. A RAPPAM Working Group<sup>4</sup> (Annex 2) was formed

<sup>4</sup> The general requirements for Working Group are a thorough knowledge of RAPPAM, practical experience of PA establishment and management, knowledge of the internationally recognised best practices in these fields and

with the tasks of revising the methodology, developing a work plan, implementing the evaluation and analysing and publishing the results.

A Steering Group that had a supporting and advisory role supported the Working Group. Its main function was to:

- Review and accept the draft terms of reference of RAPPAM.
- Review the changes to the questionnaire.
- Review the work plan.
- Participate in the formulation of the RAPPAM recommendations.
- Review the final RAPPAM report.

WWF and other members of the Kamiali Group provided assistance in GIS and community awareness.

## 2.6 REPORTING

At the start of the PA assessment, a press release was issued in the local newspapers that contained the aims and objectives of the RAPPAM assessment. During the course of carrying out RAPPAM in the provinces, further mediums of communication such as local radio stations were used to organise the community for a community workshop.

The three main RAPPAM workshops were also announced in the press. The present report will be made available on the WWF website and journal articles will also be developed. The results of the RAPPAM assessment will be made available to the public at large and all other interested parties.

good knowledge of the local environmental, socio-economic and socio-cultural issues, and institutional conditions.





## 3.0 FINDINGS AND ANALYSIS

The findings of the RAPPAM assessment are presented here in two sections. Firstly, a classification of the PNG Protected Area System is outlined. This provides an overview of the types of protected areas that are available, protected area legislation and shifts in protected areas. The trend of relinquishing of PA responsibility from the government to conservation organisations, and new protected area initiatives are discussed. Secondly, an exhaustive RAPPAM assessment follows with management effectiveness and vulnerability, planning, pressures and threats and system level analysis.

### 3.1 THE PNG PROTECTED AREA SYSTEM

The RAPPAM study and associated information gathering provided a much clearer view of what constitutes the PA system of PNG. There are both formal and informal types of Protected Areas in PNG

(Box 3). National legislation and International Conventions govern the formal PAs. Box 4 outlines the legislation under the jurisdiction of the Department of Environment and Conservation.

The informal protected areas are set in place through the PNG contract, customary laws and laws that are components of Integrated Conservation and Development projects (ICDP<sup>5</sup>). The latter arrangements have led to a number of areas being declared as WMAs under the Fauna (Control and Protection) Act and Conservation Areas under the Inorganic Law on Provincial and Local Level Government. Additional information on community-based protected areas is shown in Box 5.

<sup>5</sup> Two acronyms of Integrated Conservation and Development projects are used in PNG and this report uses ICDP.

### Box 3: Types of Protected Areas

#### Formal

- Wildlife Management Areas
- Sanctuary
- National Park
- Historic Reserve
- Memorial Park
- Provincial Park
- Protected Areas
- District Park
- Conservation Area
- LLG Conservation Areas
- Fishing exclusion or control zones
- Ramsar Sites
- World Heritage Sites

#### Informal

- Conservation Deed Areas
- Customary Conservation Areas
- Integrated Conservation and Development Projects (ICDP or ICAD)

### Box 4: PA Legislation under the Department of Environment and Conservation

The Department of Environment and Conservation is responsible for administering three different acts, which provide for the establishment and management of protected areas.

The *National Parks Act* provides for the protection of areas for various purposes, including recreation, biological conservation and cultural conservation. Protected areas established under this act may only be established on land that is owned by the national government, and their ongoing management is the responsibility of the national government.

The *Fauna (Protection and Control) Act* provides for the protection of fauna in areas under customary tenure, through the establishment of Wildlife Management Areas (WMAs). These WMAs constitute the overwhelming majority of the protected area network, both by number and by area. Local communities use WMAs to assist them in managing their hunting and subsistence resource use.

The *Conservation Areas Act* has actually never been used, but its intent is to provide for the protection of areas under customary tenure, specifically for the purpose of biodiversity conservation, by the establishment of Conservation Areas.

Other government agencies such as the National Fisheries Service and the Papua New Guinea Forestry Authority also administer acts with provisions or requirements for establishment of conservation reserves of various kinds. These are not considered in this report but are listed in Annex 3.

### Box 5: Community-based management of Protected Areas

Ninety-seven per cent of the land in Papua New Guinea is owned by the local inhabitants and, by necessity therefore, most PAs are community-based. The system's greatest strength is that ultimate power over the land lies with the landowners and no development can take place without their consent. Such ownership should also engender in the management at least the benefits of commitment and continuity. This simple formula has, however, proved insufficient.

Wildlife Management Areas were devised in the 1970s so that PAs could be generated through community initiative and could retain and even strengthen existing local traditions. The community selects the WMA committee and devises the boundary and the rules. This allows for local practices, such as restricted access as traditionally enforced by *masalai* spirits, to be incorporated. Although respect for traditional lines of authority has diminished, traditional forms of resource management have in some cases been the only safety-net following a collapse of formal management.

A major drawback of having derived the WMA concept from traditional rights - rights revolving around hunting - is that only the fauna and not the flora is legally protected. Thus, large developers such as logging, mining and oil companies can legally buy their way past landowners.

At the local scale WMA committees are commonly under pressure from rapidly increasing human populations placing ever-higher demands on the natural resources. With no formalised system of patrols, the PAs are open to abuse without fear of recrimination. Maintaining local respect for the ideals of the WMA appears to be essential and can only be achieved with strong local leadership and effective enforcement of rules.

Reacting to community initiative inevitably hampers the formulation of a PA system representative of vegetation types and geographical regions. It also has the effect of creating many small-scale PAs to which the WMA is well suited, while large-scale PAs are often required to sustain fauna and flora populations. Two very large WMAs, Tonda and Crater Mountain, both experience difficulties in managing a complicated committee structure, which attempts to represent the needs of several different communities.

These two examples can, however, be considered relatively successful community-managed PAs, partly on the basis that they are still functioning. It is perhaps no small coincidence that they are both working in partnership with NGOs while many others, (eg Crown, Ranba, Bagiai), cite neglect as the cause of their failure. Community entry methodologies, such as *social mapping* and *visual management planning*, have now been developed to assist incoming organisations to explore the expectations and needs of the community and should encourage more realistic understanding between parties.

Community management in its simplest form equates to management without funds or recognisable management skills and often results in little more than the management of everyday community life. Even where WMA committees have maintained regular meetings there is often limited capacity to carry out planning, or funds to carry out basic tasks such as patrolling.

**A system-wide role for external organisations, (government, NGOs and research organisations), in supporting community-based PAs while the communities retain the everyday, and the ultimate, responsibility for the natural resources might ensure their future existence.**

### 3.2 SHIFT THE IN FOCUS OF PROTECTED AREAS

Since Independence in 1975, there has been a shift from the PAs that exclude communities (National Parks, Sanctuaries etc) to PAs that support local communities (WMAs). More recently, new reserve types are being developed that promote conservation and community livelihoods such as the Kokoda Track Memorial Reserve (Figure 5). This is associated with the liberation of the country from the Japanese forces in the Second World War in the South Pacific.

An authority has been set up and numerous tourists mainly from Australia have visited the track to see where their relatives were during the war. Initiatives from the Lion and Rotary clubs for the building of health services along the track have been ongoing.

While these initiatives are underway there is an important information gap in terms of the status of the listed protected areas that were gazetted in the 1960s.

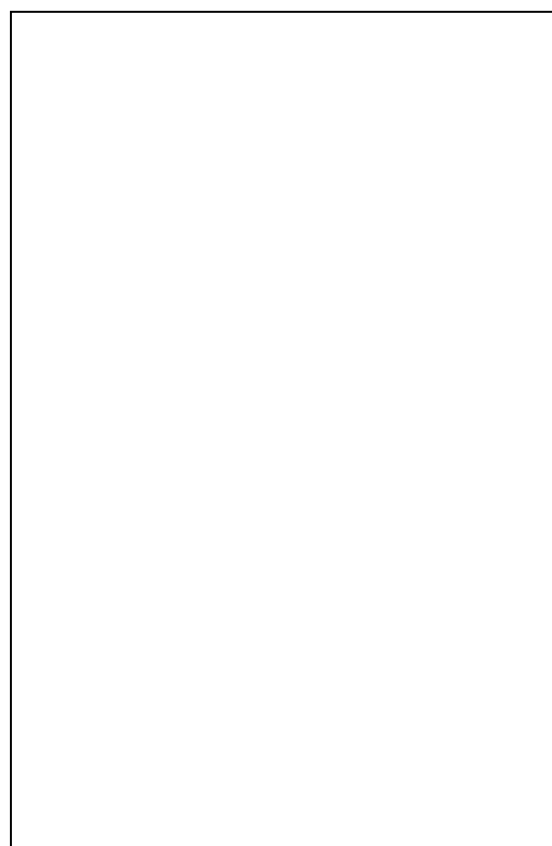
**The formal protected area cover is extremely low. 51 PAs protect only 2.7% of PNG's land area and until these other initiatives are added up there is still a real need to expand the PA system if the CBD targets in this regard are to be met.**

Of these 2.7%, less than 0.07% covers territorial waters, which are often isolated (Figure 6) and remain out of reach from the Department of Environment and Conservation and conservation organizations. The Marine Protected Areas (MPAs) make up less than one fifth of all PAs (280,000 ha). With the country's extensive coastline, it would be beneficial to increase the coverage to meet the marine CBD targets.

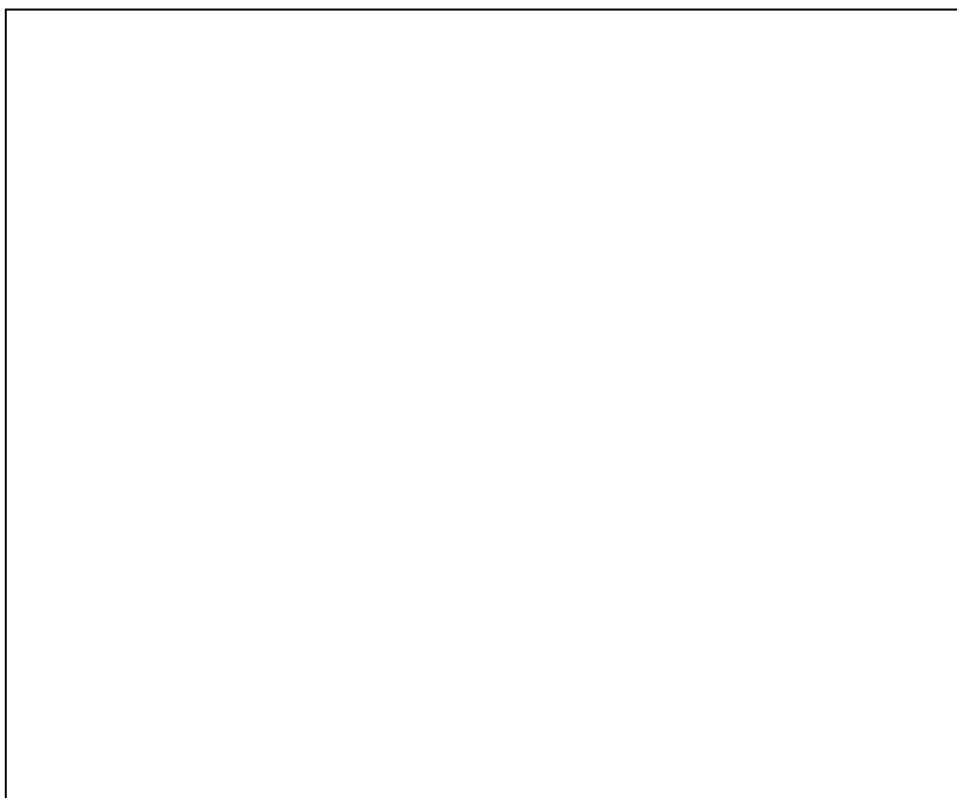
Of the PAs in PNG, Wildlife Management Areas account for 94% by area (Table 1).

While the bulk of the formal PAs are smaller with sizes less than 10,000ha, there are thirteen that are large (Table 2) and Figure 7. There is still information missing for PAs such as the composition of clan groups, road condition and distance to PAs. Mode of transportation and nearest town with communications and infrastructure are other useful details.

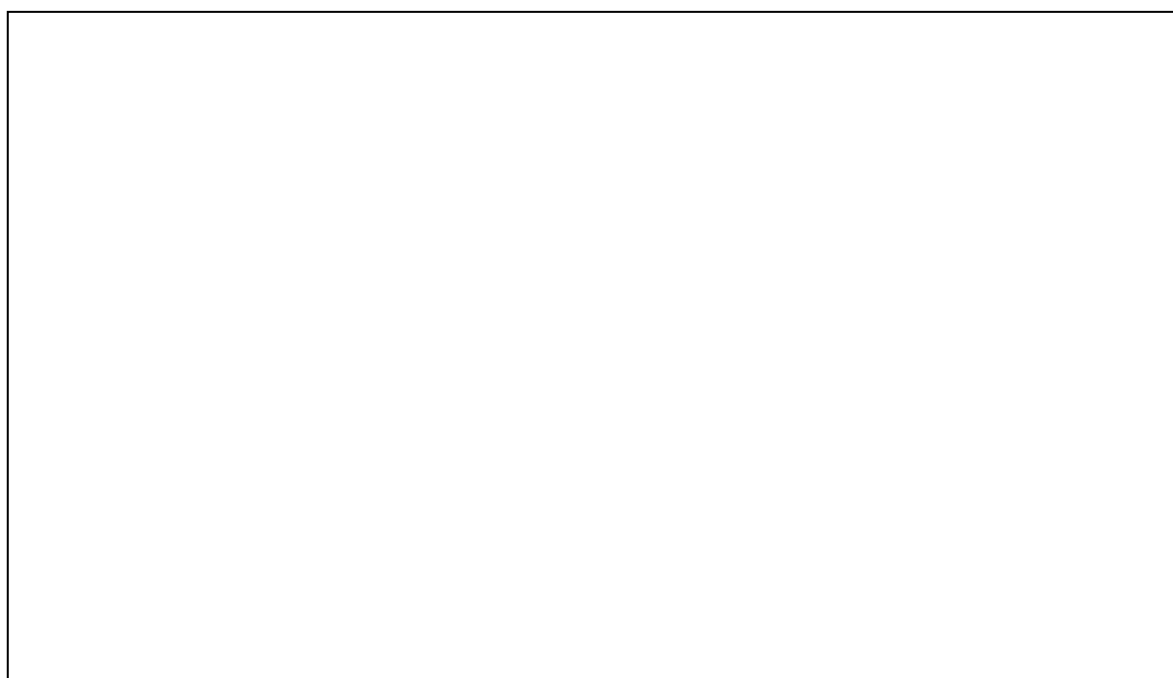
**Figure 5: Kokoda Track Memorial Reserve, Central Province  
(Photo: WWF/P Chatterton)**



**Figure 6: Ranba Wildlife Sanctuary and WMA and Crown Island Wildlife Sanctuary**



**Figure 7: Protected Areas in PNG larger than 10,000 ha**



**Table 1: Distribution of formal PAs by type and area**

Type	No	Area (Ha) <sup>6</sup>	%
WMA	26	1,539,119	94
Sanctuary	5	75,271	5
Protected Area	2	20,245	1
National Park	7	7,959	0.5
Provincial Park	2	177	0.01
Reserve	3	49	0.003
Memorial Park	3	5	0.0003
<b>Total</b>	<b>48</b>	<b>1,642,826</b>	<b>100</b>

**Figure 8: Terrestrial and marine WMAs in PNG**



<sup>6</sup> Extent according to original gazettal notice.

**Table 2: PAs greater than 10,000 ha**

<b>Name</b>	<b>Area (Ha)</b>
Tonda WMA	590,000
Crater Mountain WMA	270,000
Hunstein Range WMA	220,000
Maza WMA	184,230
Kamiali WMA	65,541
Crown Island Wildlife Sanctuary	58,969
Pirung WMA	43,200
Ranba WMA + Sanctuary	57,646
Lake Kutubu WMA	24,100
Oi Mada Wara WMA	22,840
Lihir Island	20,208
Bagiai WMA	13,760
Siwi-Utame WMA	12,540
<b>Total</b>	<b>1,583,034</b>

Besides the larger protected areas, there are also the 20 smallest protected areas, which make up only 0.2% of the area of the PA system (Table 3).

This resembles the greater difference and again the need to extend the total figure to meet the CBD target in 2010 and 2012.

Prior to the 1980s, communities were mostly supported by the government through firstly an Office of Environment and then the Department of Environment and Conservation to declare PAs. By the 1990s conservation NGOs had largely taken over this role (Table 4).

**Table 3: Twenty of the smallest PAs**

Protected Area	Area(Ha)
Mt Wilhelm National Reserve	817
Sawataetae WMA	700
Balek Wildlife Sanctuary	470
Hombareta WMA	130
Loroko National Park	100
Mt Gahavisuka Pro. Park	77
Baiyer River Sanctuary	64
Mt Susu National Park	49
Moitaka Wildlife Sanctuary	44
Baniara Island WMA	37
Namanatabu Reserve	27
Nuraseng WMA	22
Paga Hill Nat. Park Scenic R	17
Nanuk Island Reserve	12
Talele Is. Nat. Park Reserve	12
Kokoda Historical Reserve	10
Cape Wom Memorial Park	2
Wewak Peace Memorial Park	2
Kokoda Memorial Park	1
<b>Total</b>	<b>2,595</b>



**Table 4: Relinquishing responsibility of PAs**

Decade	Area (has)	% Govt
1960s	2,950	100
1970s	1,007,616	100
1980s	83,891	100
1990s	521,348	6
2000s	5,200	0

Many PAs had not been visited by government or NGOs for over a decade. Some communities visited during the RAPPAM were not aware that their land was a protected area, for example:

- Bagiai WMA
- Crown Island WMA and Sanctuary
- Lihir Island PA
- Ranba WMA
- Talele Island National Park Reserve

### 3.3 NEW INITIATIVES

A significant effort is underway to **declare new PAs** and these are following the effort of the Kamiali group meeting and supported by conservation NGOs including WWF (Figure 9). If effective, these will more than double the area of PAs and lead to fulfilling the CBD target by 2010 and 2012 respectively.

Other initiatives include the **Eaglewood Management Areas**, which only began in 2004 (Figure 10). An example of a non-timber forest product (NTFP), the high demand for eaglewood resin provides an opportunity for a sustainable enterprise,

provided management and harvesting measures are in place. WWF together with the National Forest Authority and the Forestry Research Institute have carried out research into areas that are known to have eaglewood.

Despite efforts in the early 1990s to define areas of biological importance (Beehler, 1993), less than one third of PAs, protect habitat in identified biodiversity priority areas. A number of efforts are now underway to establish systematic conservation planning at an Ecoregion level (WWF in the TransFly, TNC in the Adelbert Ranges) and to compile information necessary for a full representation analysis at an island scale (CI – species; TNC – environmental domains; DEC – vegetation change).

**The Conservation Planning Region (CPR)** was enacted by DEC in 2002 where the country was divided into regions based on WWF's Ecoregion Framework. With Environment Australia, DEC embarked on analysing vegetation change with information such as threats to forests (Box 6). Forestry Information Management Systems (FIMS) was obtained from the PNG Forestry Authority. An example of this type of assessment in the New Britain/New Ireland CPR indicates lowland forest types were in danger of extinction (Annex 4).

PA coverage is extremely poor in all Conservation Planning Regions (CPRs) except the Trans Fly (Figure 11). One CPR has effectively no PA coverage (Huon Peninsula) and PAs take up between 0.2 and 5% of all other CPRs. Island ecoregions are slightly better protected than mainland Papua New Guinea.

**Figure 9: New proposed Protected Areas by conservation NGOs**



No clear national strategy exists for the protection of endangered or important species. Some localised efforts have been undertaken (Queen Alexander Birdwing; Tenkile and Matchie tree kangaroo; *Manus Pitta*) though at least one of these is short lived and of limited effect and information is poor on most species.

Only five PAs exceed 50,000 ha. Most PAs are too small to maintain area sensitive species or natural processes. No PAs cover full catchments although the earlier Total Environmental Catchment Management

concept by DEC was proposed along that perspective. This concept has since been abandoned.

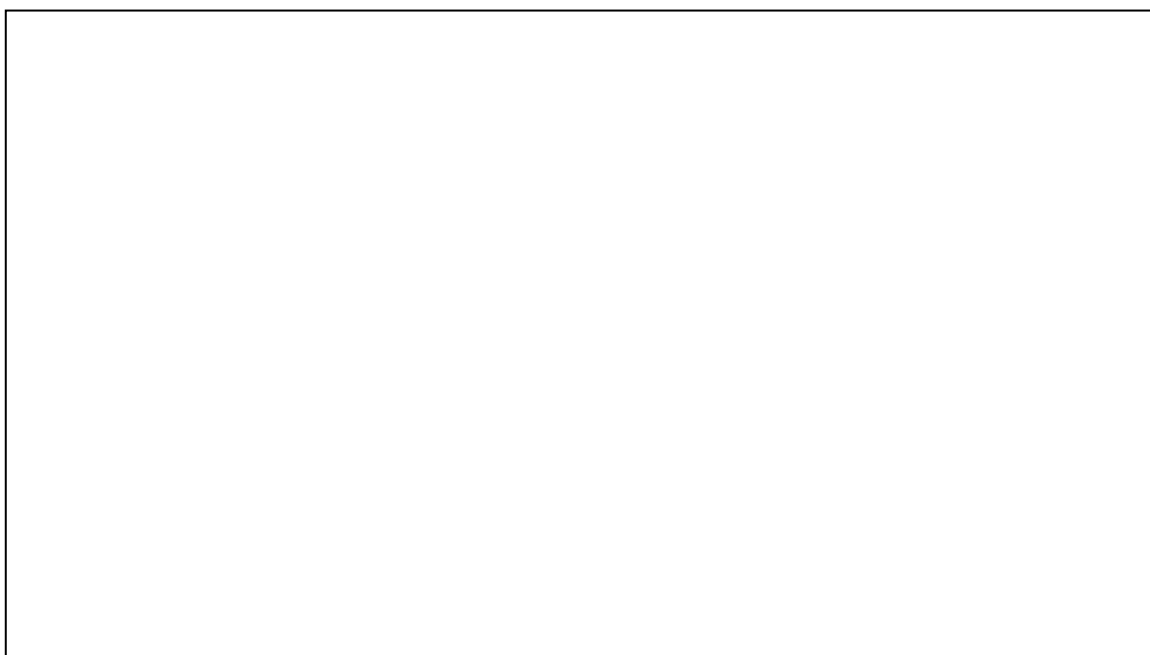
Some ecosystem gradients of successional diversity exist by default (savanna to monsoon forest, Tonda; lowland to montane, Crater; forest to reef, Kamiali). However, there has been no systematic effort to put these in place.

While most PAs do protect important and good quality habitat, a significant number have been declared for reasons other than biodiversity (historic relics, recreation, solving land problems) and do not contain important biodiversity.

**Figure 10: Approved project location of eaglewood areas in PNG**



**Figure 11: Extent of conservation planning regions in Protected Areas**



**Box 6: Analysing vegetation change**

A draft DEC vegetation change analysis is showing dramatic loss of all lowland forest types in New Britain/New Ireland CPR (total extinction is predicted in some types if current logging plans proceed).

PNG's Vegetation Type Assessment is an initial attempt to identify the conservation status of forest types in PNG and to determine forest types and areas for priority conservation. The assessment allows DEC to look at forest change to date due to logging and agriculture, and likely change in the future, in order to determine forest types and areas for priority conservation. The assessment can be used at a strategic level for priority setting to allow PNG to implement its national obligations and international obligations (eg under the CBD).

The FIMS Vegetation map was then intersected with the CPRs to develop the vegetation classification used for this assessment. Dividing the FIMS forest types by CPR results in the assessment being carried out on each CPR - forest type combination and an example is in Annex 4.

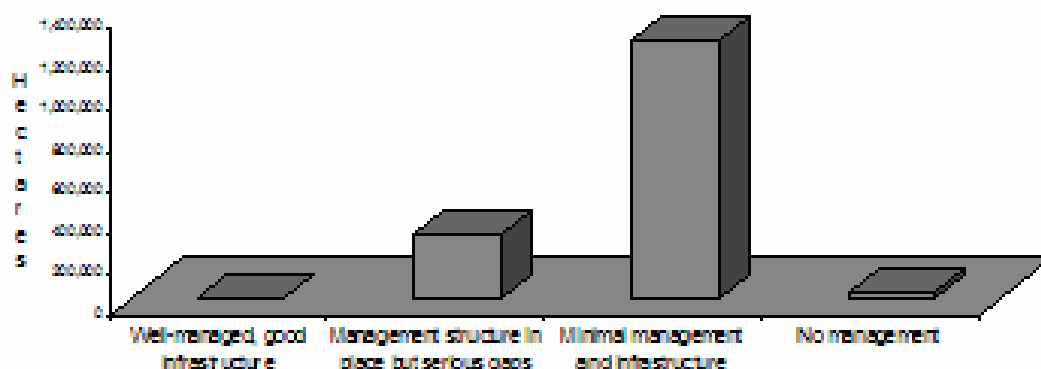
### 3.4 MANAGEMENT EFFECTIVENESS AND VULNERABILITY

An IUCN review in 1999 for the World Bank/WWF Alliance for Forest Conservation and Sustainable Use (IUCN, 1999) showed that 73% of PNG's protected areas have minimal or no management

structure. Sixteen percent had no management at all, 8% had a management structure but there were serious gaps and only 3 % were well managed with a good infrastructure (IUCN, 1999:26).

This review highlighted the need to address this imbalance. A lot of protected areas were in effect only *paper parks*.

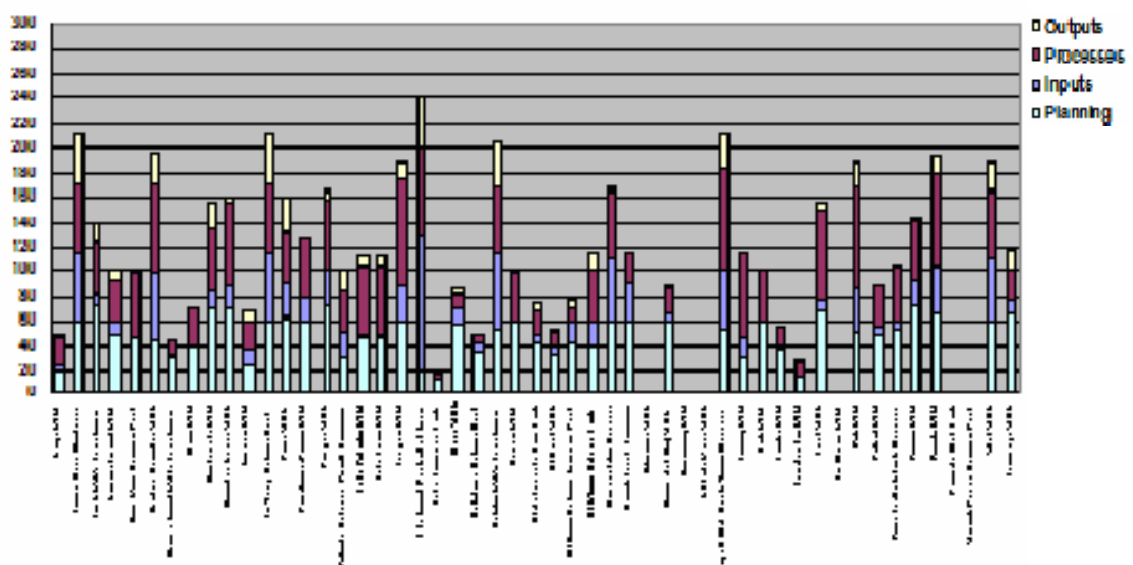
**Figure 12: Summary of the management status of Protected Areas**



Overall management effectiveness is gauged in terms of planning, inputs, processes, and

outputs. Figure 13 shows all of the PAs assessed and it is notable that the National Parks under DEC score low throughout.

**Figure 13: Overall management effectiveness across protected areas**



Five PAs (Baiyer River Sanctuary, Paga Hill, Lihir Island, Crater Mountain and Moitaka)

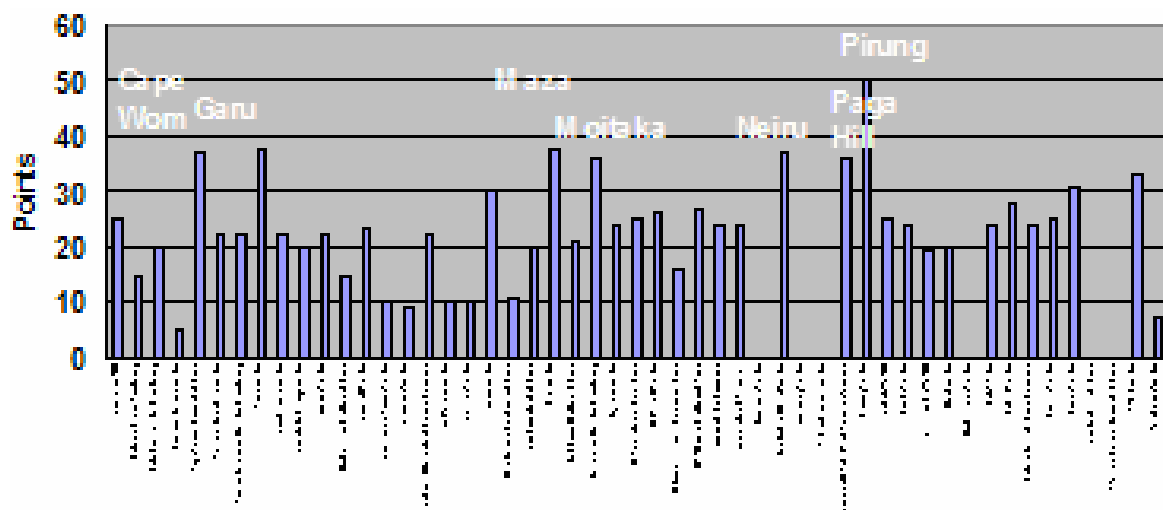
did relatively well while the majority of

parks score low throughout. The bulk of the WMAs scored in the median region.

Figure 14 shows the levels of vulnerability across the system. The higher scoring PAs are those that are more vulnerable than

others. Vulnerability here means that the PA is in danger of losing the values for which it was declared. Areas like Pirung, Paga Hill, Neiru, Maza, Moitaka, and others come out as being most vulnerable.

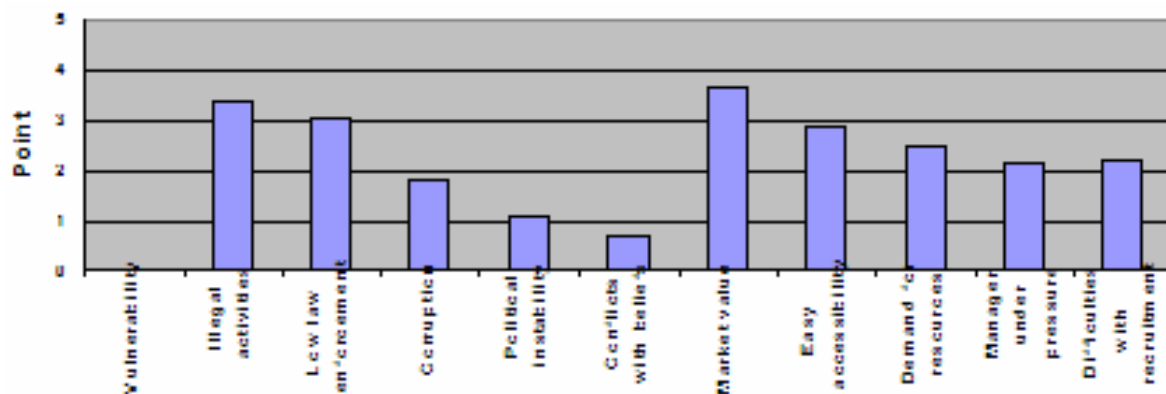
Figure 14: Vulnerability across all protected areas



On average, there is a high level of vulnerability throughout the PNG PA system (Figure 15). Market value of PA resources is high and there is relatively high demand for them. In addition, illegal activities within the areas are often difficult to monitor and prevent. Many parks are also easily accessible for illegal activities being close to towns, transport routes or workers camps (e.g. Paga Hill, Garu, and Mount Kaindi). The absence of rangers exacerbates this vulnerability.

As a result, the PAs are in danger of losing the values for which they were declared. For example, the Moitaka Wildlife Sanctuary, initially set up for tourism and captive wildlife breeding and research, is now defunct with only six remaining crocodiles and empty cages. Cases such as this illustrate the extent to which some areas are vulnerable to illegal activities due to easy accessibility, low law enforcement, inadequate funding and other resources. Some thought at a system level is required in these areas to ascertain whether or not they should remain part of the formal PA system.

**Figure 15: Average vulnerability across Protected Areas**

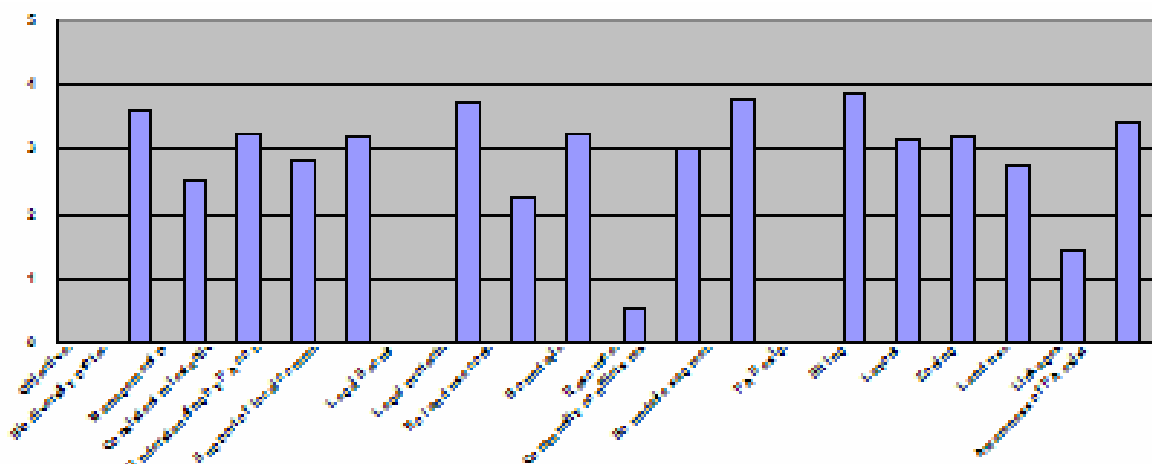


An interesting point is that many of the most vulnerable areas are those that are State managed (Wildlife Sanctuaries and Scenic Reserves). As a result of poor State

management and lack of resources being allocated to these areas, their values are largely degraded.

### 3.5 PLANNING

**Figure 16: Overall planning system for all protected areas**



Planning is surprisingly high across the system (Figure 16). Issues that stand out are land use conflicts and PA layout and configuration. General scores here seem rather optimistic.

Planning scores well, although this may reflect low expectations (e.g. a vision = a work plan). Objectives score well, however very few PAs have clear, specific and measurable objectives. Within legal security, there is a greater appreciation of

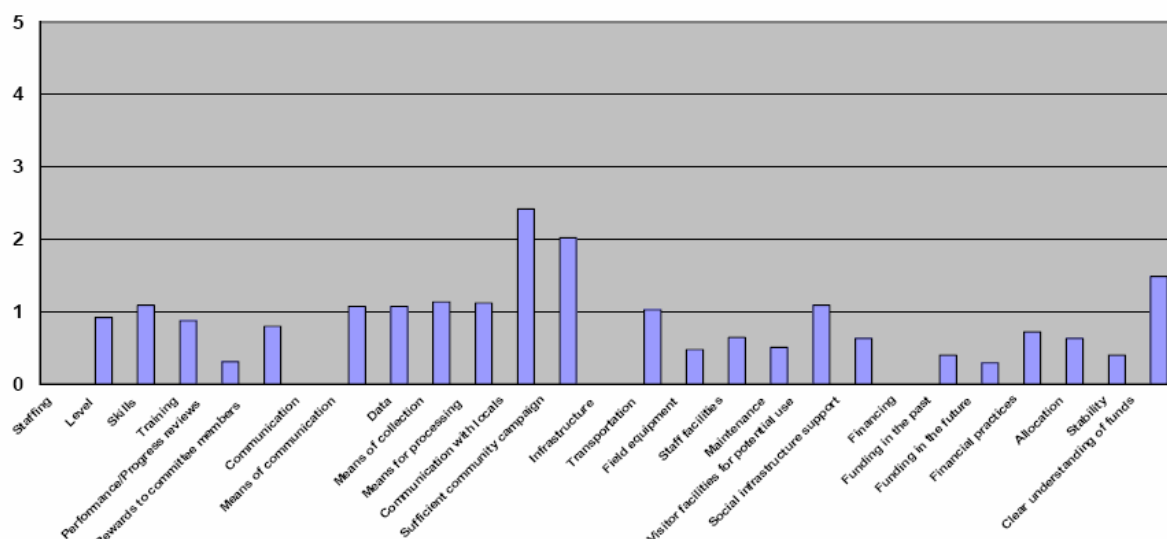
what PAs represent such as boundary agreements; however staff and financial resources are inadequate to carry out critical management activities and this stands out. In the PA design, while parameters such as siting, layout, land use and awareness of PA existence score highly, there could be a reflection of what the communities and government officials perceive. Most PAs do not link with other PAs. Conflict with other land uses is high (logging, oil palm, and mining).

### 3.6 INPUTS

Inputs are what are needed to make a PA work. These are issues to do with staffing, communication and information, infrastructure and finances. Without them PA objectives cannot be met.

All inputs across the system fall way below average (Figure 17). An exception is communication with and from landholders and community understanding of what to do with funds should they be available.

**Figure 17: Overall input system across all Protected Areas**



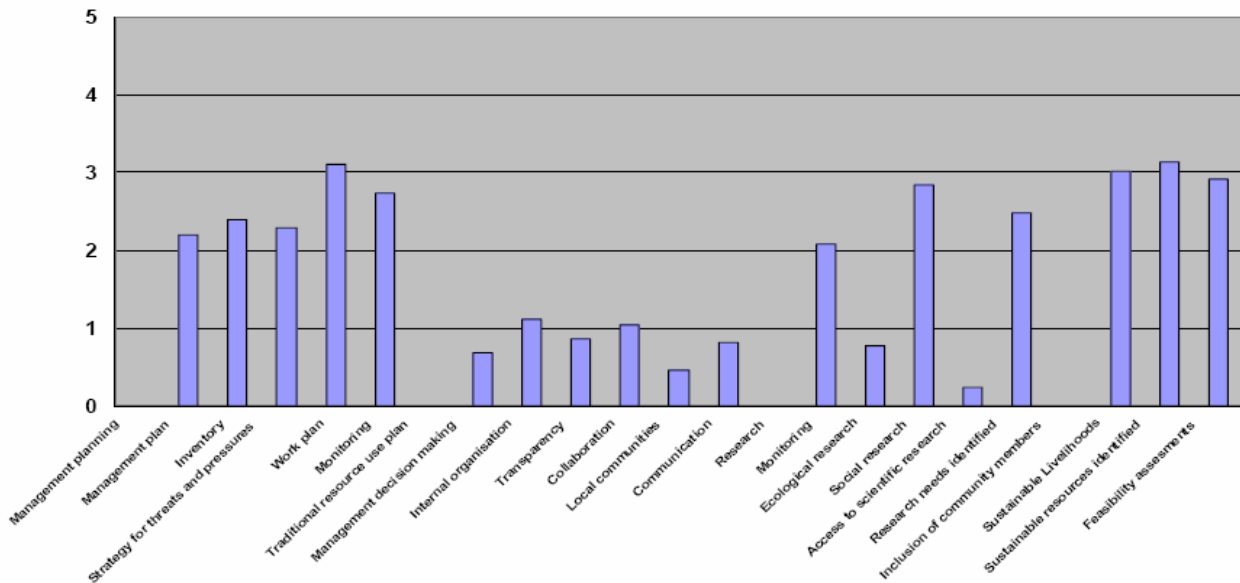
### 3.7 PROCESSES

Process across the whole PA system covers management planning, management decision making and research (Figure 18). Work plans score well: however it is unclear as to the number of PAs that have a clear and documented work plan. While there is an appreciation of an inventory of the resources within the PAs from rapid assessment programs and other biological and botanical studies with some monitoring, management planning, without a clear work plan, the management will be less effective. A lot of WMAs have traditional resource use plans relating to restrictions on allowable areas for hunting or foraging, which have been passed down through the generations in their oral traditions.

Within research, some monitoring, social and economic research has been undertaken with the latter more focussed on ICDP areas where sustainable livelihood and resources have been identified. Access to scientific and ecological research seems to be very poor. This may be attributed to individual PAs having their focus on the social well being of the community.

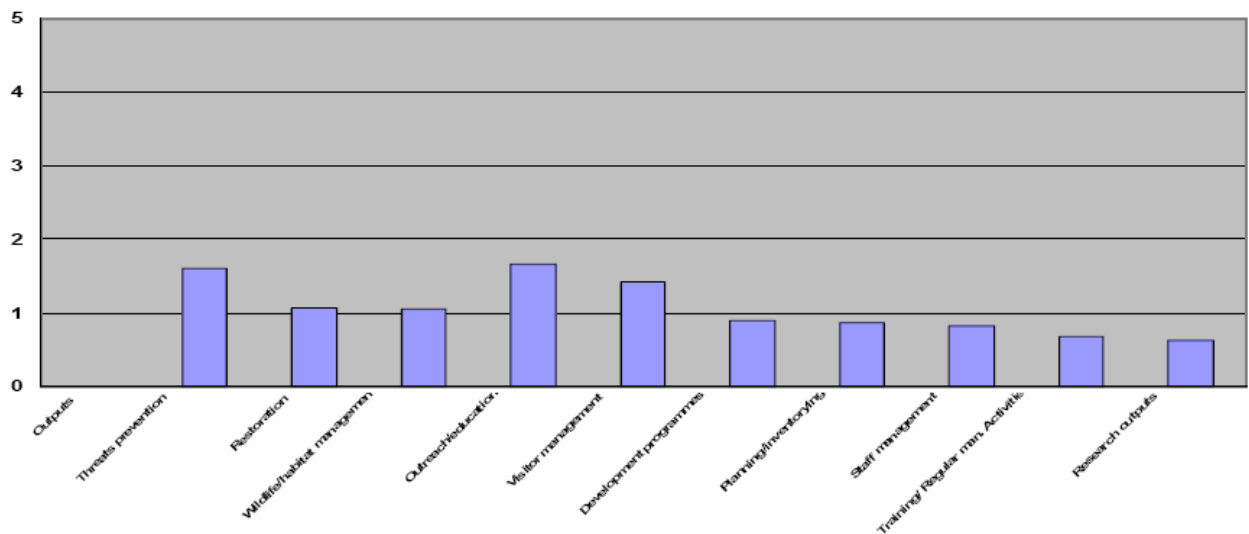
Management decision making with local communities needs a lot of attention where organisation skills are imperative. Skills in organising, transparency with and among the clans and land groups are envisaged. Only with that clarity would communities be able to appreciate the purpose of having a protected area.

**Figure 18: Overall process system across all Protected Areas**



### 3.8 OUTPUTS

**Figure 19: Output system across all Protected Areas**



The PA system is not producing significant results in any area (Figure 19). Threats prevention, education outreach and visitor management are slightly better than other

categories – but in general the scores are very low. Without outputs, the reasons for which the protected area was declared are unlikely to be met.



3.9 PRESSURES AND THREATS

In RAPPAM assessments in other countries, where all of the PAs are state owned and managed, a list of pressures and threats is agreed upon by all of the park managers and all of the PAs then judge to what extent each of the pressures or threats are applicable. In PNG however, given the circumstances, it was decided to let the communities themselves decide what the problems in their areas were, without being led by the RAPPAM assessment groups that visited.

While this approach has its advantages in that we were able to gauge how the communities viewed the problems, it also

has disadvantages. The main drawback is that pressures and threats may well exist in areas but the communities are either not aware of the problems or did not think to cite them (invasive species and climate change are examples). As such the picture portrayed here may not be completely accurate, but it certainly provides us with some useful trends.

A total of 29 cumulative pressures and threats occurred within or adjacent to protected areas (Figure 20). The degree of pressure and threat vary across protected areas depending on whether it is terrestrial or marine, and the top five pressures (current) and threats (future) are listed in Table 5.

Figure 20: Cumulative pressures and threats across all Protected Areas

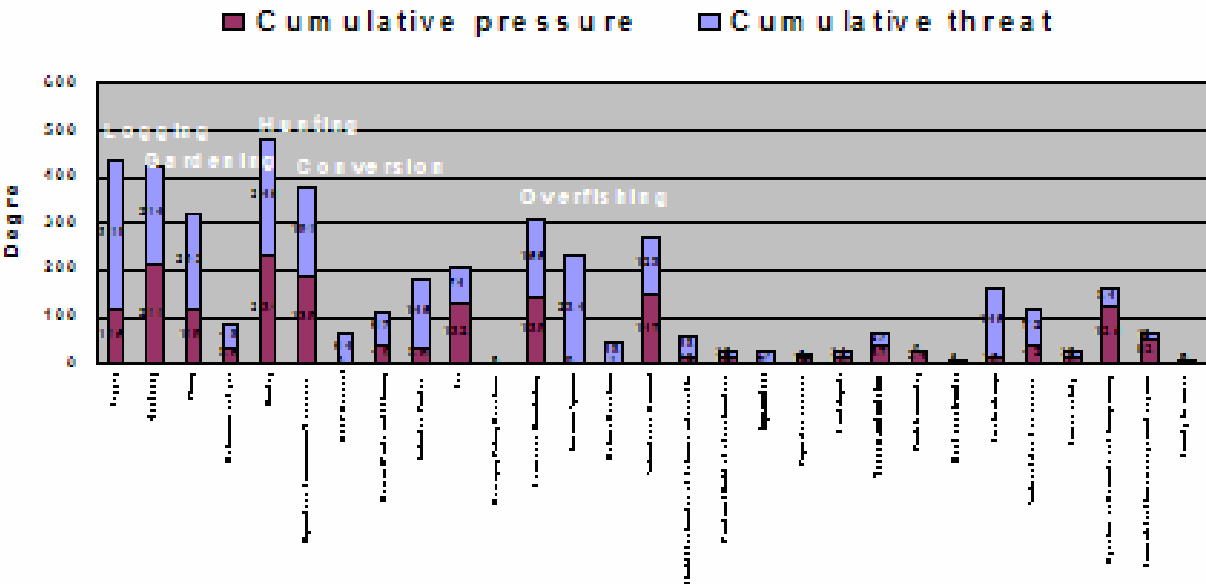
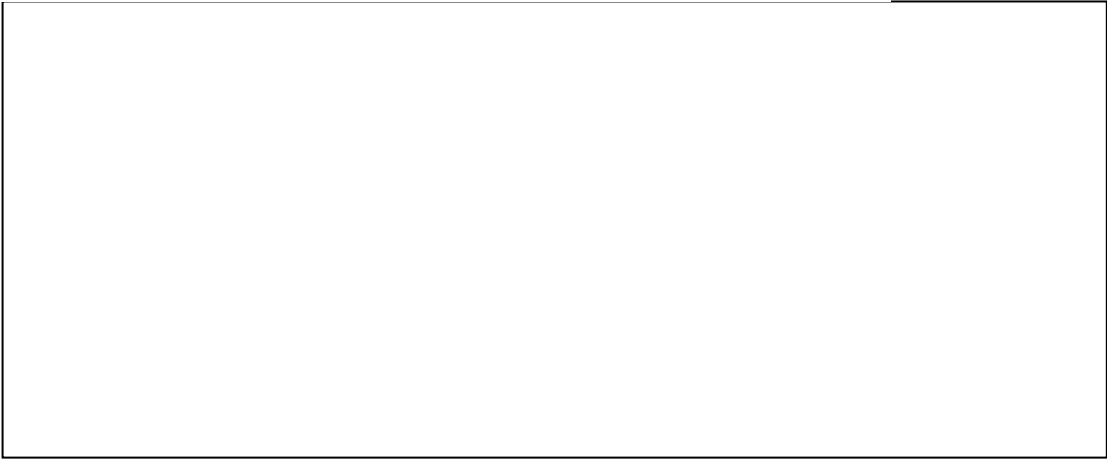


Figure 21: Protected Areas under threat from forestry projects



**Table 5: Major pressures and threats across all Protected Areas**

Rank	Pressure (Current)	Threat (Future)
1	Gardening	Logging
2	Hunting	Invasive species
3	Conversion for agriculture	Hunting
4	Subsistence harvesting	Mining
5	Commercial over fishing	Conversion for agriculture

Half of the problems identified are foreseen to increase substantially in the coming years. In the future, the two main threats of logging and invasive species will far outweigh the common pressures currently (gardening and hunting). In addition to these are industrial pollution, migrants, squatters and trespassers and climate change.

Areas with a very high degree of pressures & threats include: Lihir Island protected area, Maza WMA, Moitaka Wildlife Sanctuary, McAdams National Park, Laugum WMA.

- **Gardening**

The pressure from gardening is low but pervasive. It becomes concerning where PAs are also threatened by in-migration and population pressure (Lihir, Loroko, Bagiai) or where tenure is unclear (McAdam). Gardening is an inevitable activity practiced by 85% of the PNG population and land for gardening will increase. Measures such as organic mulching and soil improvements would assist in reducing this pressure.

- **Hunting**

Hunting (including fishing) is both a pressure and threat around PAs in PNG. This activity is pervasive and will continue. The use of modern equipment such as guns and better nets for fishing increase this pressure.

- **Agricultural Conversion**

Agricultural conversion is ranked both as a pressure and threat. Oil palm is

threatening a number of PAs (Garu, Pokili). There is a need for this threat to be better mapped. A number of areas across PNG have been rumoured to have oil palm development planned and once mapped, a strategy against this will be put into place.

- **Subsistence Harvesting**

Subsistence harvesting of resources is brought about as the community looks to obtain cash for their families such as school fees and basic necessities such as kerosene and batteries. The community relies on their resources and with an increasing population, this pressure will be increased and they may trespass into PAs.

- **Commercial Over fishing**

Commercial fishing is one of the resource developments that has been promoted by the PNG Government. Two fish canneries are in operation with a few others in the pipeline. This will become a notable pressure when 'purse seine' can accumulate a lot of catch along the marine protected areas which are not currently recognised by the National Fishery Authority and fishing companies. Twelve areas are currently affected by over fishing and will reduce to nine in the future.

- **Logging**

Nearly a quarter of all PAs are threatened by proposed forestry developments (12 out of 51) (Figure 21). Logging (degree 318) is a much bigger

threat to the system than even the second biggest threat, which is hunting (degree 245). Logging has been a resource development having its roots prior to independence to provide capital and foreign exchange for a new developing PNG. It has had its controversies during the early 1980s and these continue today, promoted by the current PNG government.

- **Invasive species**

An emerging threat across the system is invasive species, currently only affecting Tonda WMA to any degree. Invasive species include the climbing perch and exotic fish species that were introduced into the Sepik River in the 1970 as a source of protein. These species have destroyed habitats for endemic fish and crocodiles around the Hunstein Range WMA. The climbing perch has also been identified in the Ok Tedi River.

- **Mining**

Mining accounts for a large percentage of the PNG economy and with current high gold prices, further developments will continue. While it may be an enclave development, the extent of riverine and terrestrial impact has been noted. A good example is the Ok Tedi mine which currently has to deal with the issue of acid rock drainage. PAs within and on the fringe of mines are likely to be impacted and there is a need

for collaboration between developers, Department of Mining, DEC and PAs (community and managers) to reduce this pressure.

- **Industrial pollution**

The marine PAs in Madang Lagoon are threatened by industrial pollution Lagoon (Figure 22). This is an important resource for the local dive tourism industry and is clearly an area for urgent action.

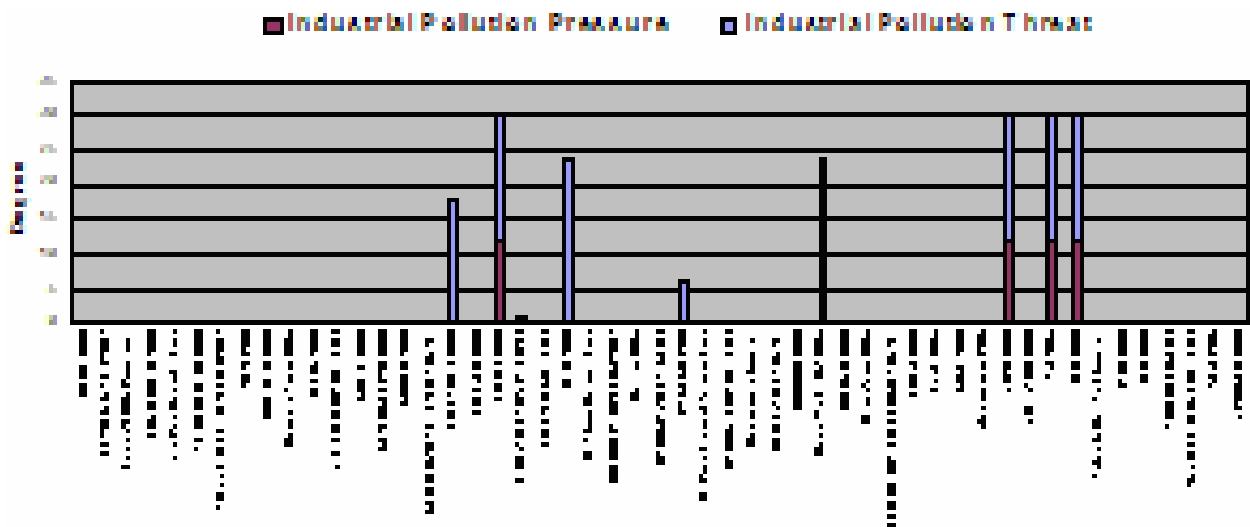
- **Migrants, squatters and trespassers**

Threats occur largely in PAs near urban areas or close to mine sites. PNG is a country with a large percentage of rural to urban drift where the population are in search of better livelihoods in the urban areas or mine sites. Resulting from this, is the building of shanty type accommodation on the edges of protected areas and the foraging of food and other resources within these areas.

- **Climate change**

This is a pervasive threat across much of the PA system. The threat is more prevalent on the low-lying atoll areas of PNG where a change in a few degrees Celsius could make these atolls uninhabitable.

**Figure 22: Industrial pollution pressure and threat in protected areas**

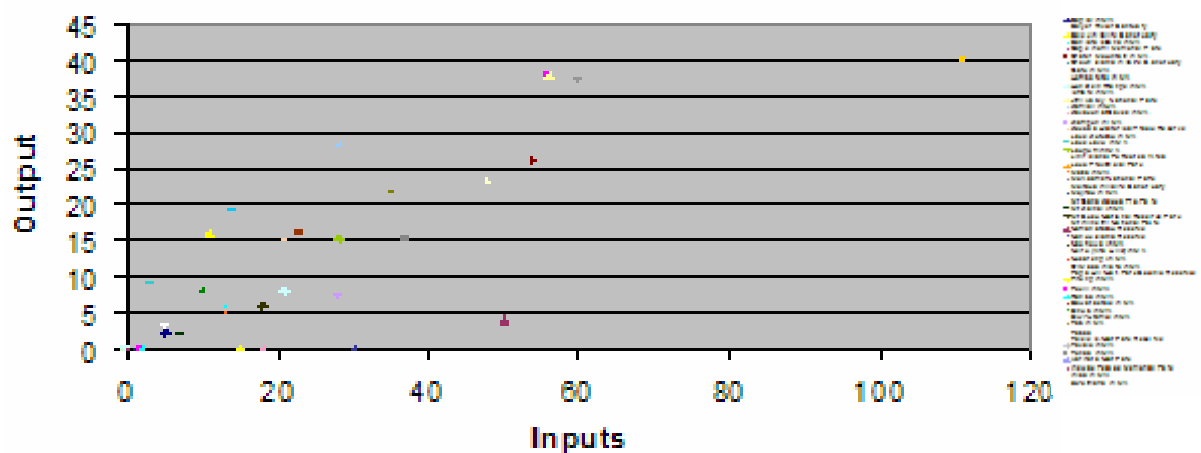


### 3.10 INPUT VERSUS OUTPUT

Figure 23 provides a multivariate analysis where inputs are compared with outputs. It is obvious that the higher the inputs into PA

management, the higher the outputs and the more likely PA objectives are to be achieved. Here, inputs are low and so outputs are mostly low. However the correlation is still clear from the data collected in PNG.

**Figure 23: Input versus output for all Protected Areas**



### 3.11 BIOLOGICAL AND SOCIO-ECONOMIC IMPORTANCE

Community management in its simplest form equates to management without funds and often results in little more than the management of everyday community life. Even where WMA committees have maintained regular meetings there is often limited capacity to carry out planning, or funds to carry out basic tasks such as patrolling. A system-wide role for external organisations, (government, NGOs and research organisations) supporting community-based PAs exists, and whereby communities retain the everyday, and the ultimate, responsibility for the natural resources.

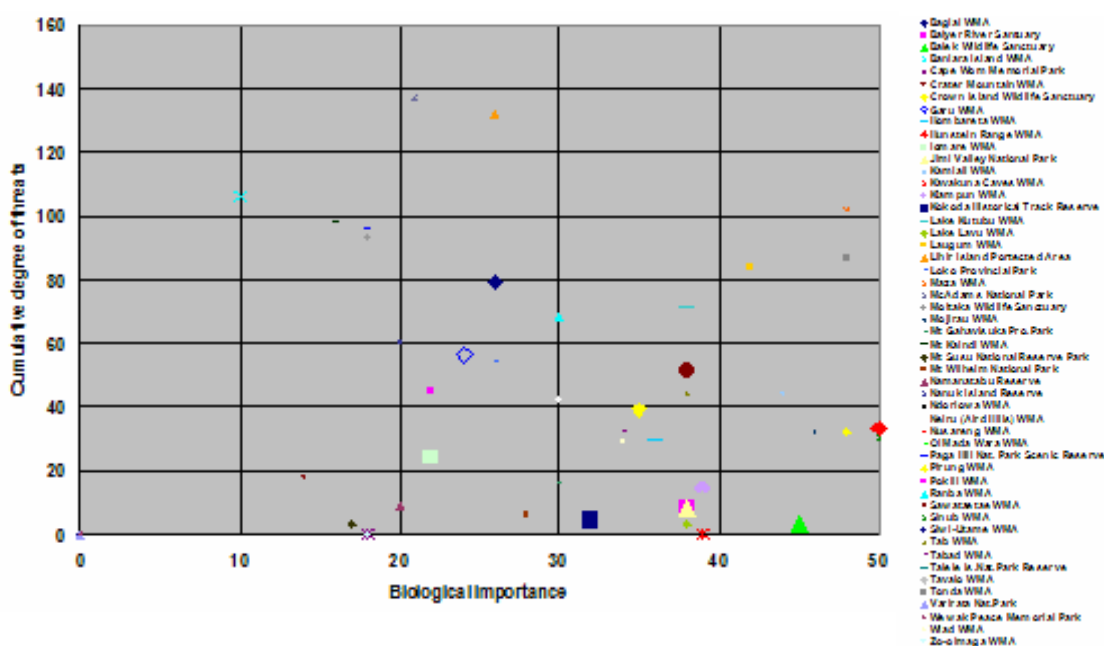
This system's greatest strength is that ultimate power over the land lies with the

landowners and no development can take place without their consent. This simple formula has, however, proved insufficient to date, as has the formulation of a PA system representative of vegetation types, marine habitats and geographical regions.

### 3.12 CONSERVATION PRIORITY

Figure 24 illustrates that most of the areas of high biological importance have relatively low degrees of cumulative threat. Three notable WMA exceptions are Maza, Tonda, and Laugum – each of these have a high degree of biological importance but also seem to be facing a high degree of threat. This could indicate some priority areas for conservation intervention.

**Figure 24: Cumulative degree of threat in relation to biological importance for all Protected Areas**



Scatter plot showing the cumulative degree of threat (Y-axis, 0 to 160) versus socio-economic importance (X-axis, 0 to 60) for 40 different species. The plot shows a general positive correlation, with many species having low threat levels and low importance, and a few species having high threat levels and high importance. The legend lists 40 species names, each associated with a unique color and shape.

Species listed in the legend (from top to bottom):

- *Agave* (Red)
- *Agave* (Blue)
- *Agave* (Green)
- *Agave* (Yellow)
- *Agave* (Orange)
- *Agave* (Purple)
- *Agave* (Pink)
- *Agave* (Brown)
- *Agave* (Grey)
- *Agave* (Black)
- *Agave* (White)
- *Agave* (Light Blue)
- *Agave* (Light Green)
- *Agave* (Light Yellow)
- *Agave* (Light Orange)
- *Agave* (Light Purple)
- *Agave* (Light Pink)
- *Agave* (Light Brown)
- *Agave* (Light Grey)
- *Agave* (Light Black)
- *Agave* (Light White)
- *Agave* (Light Light Blue)
- *Agave* (Light Light Green)
- *Agave* (Light Light Yellow)
- *Agave* (Light Light Orange)
- *Agave* (Light Light Purple)
- *Agave* (Light Light Pink)
- *Agave* (Light Light Brown)
- *Agave* (Light Light Grey)
- *Agave* (Light Light Black)
- *Agave* (Light Light White)
- *Agave* (Light Light Light Blue)
- *Agave* (Light Light Light Green)
- *Agave* (Light Light Light Yellow)
- *Agave* (Light Light Light Orange)
- *Agave* (Light Light Light Purple)
- *Agave* (Light Light Light Pink)
- *Agave* (Light Light Light Brown)
- *Agave* (Light Light Light Grey)
- *Agave* (Light Light Light Black)
- *Agave* (Light Light Light White)

It is adjacent to the PNG-Indonesia border where there is often a continuous exchange of barter, where fresh meat is exchanged for rice and other store goods from the Indonesian side. Again, discussions with the community for avenues to improve their livelihoods would assist in maintaining the PA and the biodiversity it contains.

Bagiai and Karkar Islands have not been sufficiently reviewed for this assessment but it appears that there has not been much recent research there. Previous work has included studies of birds and orchids and Wetlands International has done some research on marine fish stocks in the area of the WMA recently. The island is not particularly noted for its endemism or its diversity but as a large WMA with considerable marine representation (up to 2kms from the shore) it is a significant part of the PA system. Two tiny islands (Tuale and Mangamarek) are noted as significant for breeding fish, birds, turtles and dugongs. The environment, both marine and terrestrial, is still in fairly good condition but with expanding population the detrimental changes are already in evidence.

Tonda contains an immense range of fauna including deer, wild boars and barramundi.

### 3.13 SYSTEM LEVEL ANALYSIS

Analysis of the protected areas system was conducted under three themes; i) system design, ii) policy iii) policy environment. Each theme revealed areas for improvement.

- **System Design**

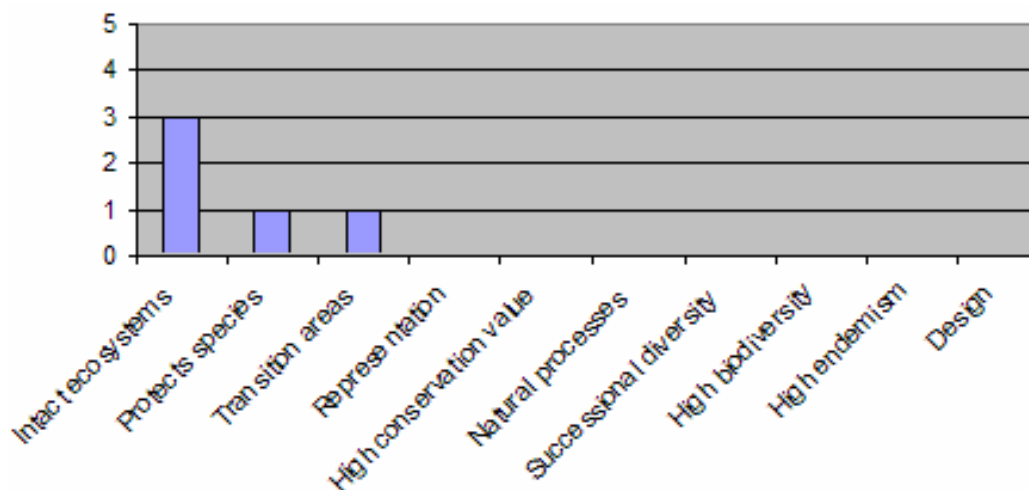
The PA “system” in Papua New Guinea has emerged largely in an *ad hoc* fashion, with no serious design

consideration. As a result, the system scores poorly by most of the design indicators used in this analysis, as illustrated in Figure 26.

The relatively high scores for ecosystem integrity and coverage of transitional areas are probably merely a reflection of

the fact that a relatively large fraction of Papua New Guinean remains in the form of relatively pristine ecosystems.

**Figure 26: System design for all Protected Areas**



- **Policy**

PA policies remain weak in Papua New Guinea, although a project is underway to prepare an overarching national PA policy. The system scores poorly by most of the policy indicators used in this analysis, as illustrated in Figure 27. Some aspects of this poor performance are excused somewhat by a chronic lack of resources faced by the Department of Environment and Conservation, but some are not.

The most glaring policy weakness is the complete lack of any PA objectives or aims at a national level. This situation has inevitably resulted in a “system” that is incoherent and ineffective.

The area of land protected is not nearly enough to maintain natural processes at a landscape level. This situation has arisen mainly because of inherent difficulties in establishing PAs in Papua New Guinea, particularly on land that is held under customary tenure (the vast majority), but has been exacerbated by a lack of resources, and the various system level inadequacies that are discussed elsewhere in this report.

There is apparently a strong commitment by a core group of organisations, to establish and maintain a representative PA system, although lack of coherent information has been a barrier to *bona fide* planning efforts. Targets exist but these are mostly internationally driven, and receive little practical recognition.

Research and monitoring related issues (biological inventory, historical baselines, gap analysis and evaluation) are generally addressed to some degree, although information is often incomplete or poorly coordinated. Scores for these indicators reflect this. The lack of training opportunities is currently being addressed through a non-government funded project, Strengthening Conservation Capacity in Papua New Guinea.

The protected area policy environment in Papua New Guinea is characterised by a lead national government (Department of Environment and Conservation) that has been significantly weakened by repeated diminishing of resources and political influence. Most centralised protected area activities, notably policy development, have not been undertaken recently to anywhere near their historical levels, if at all. In this environment, most protected area policy work is being inappropriately undertaken by various non-government organisations and donor agencies in a relatively uncoordinated fashion. This situation is somewhat masked in Figure 28.

Traditionally, government activities such as enforcement, land conservation policy and recurrent funding generally score poorly. The legislation score reflects the existence of three dedicated pieces of legislation, but also that these have served their historical

purpose and have long been in need of overhaul. Communication between government agencies scores poorly, but is a current focus for improvement.

The relatively strong policy development score reflects recent legislation that requires rigorous environmental approvals for all significant development projects, however, there is much room for improvement in incorporating conservation planning into policy development at a whole-of-government level.

Some areas in which other non-government organisations have been able to “take up the slack” of an ailing government, such as public education and dialogue between government and non-government sectors, scores significantly higher, although their activities are *not* backed by effective policy. The lack of training opportunities as mentioned previously is currently being addressed through a non-government funded project.

The sustainable land use score reflects the existence of legislative planning mechanisms, including new environmental impact assessment legislation; although some workshop participants argued that these do not constitute active sustainable land use planning.



Figure 27: Policy for all Protected Area

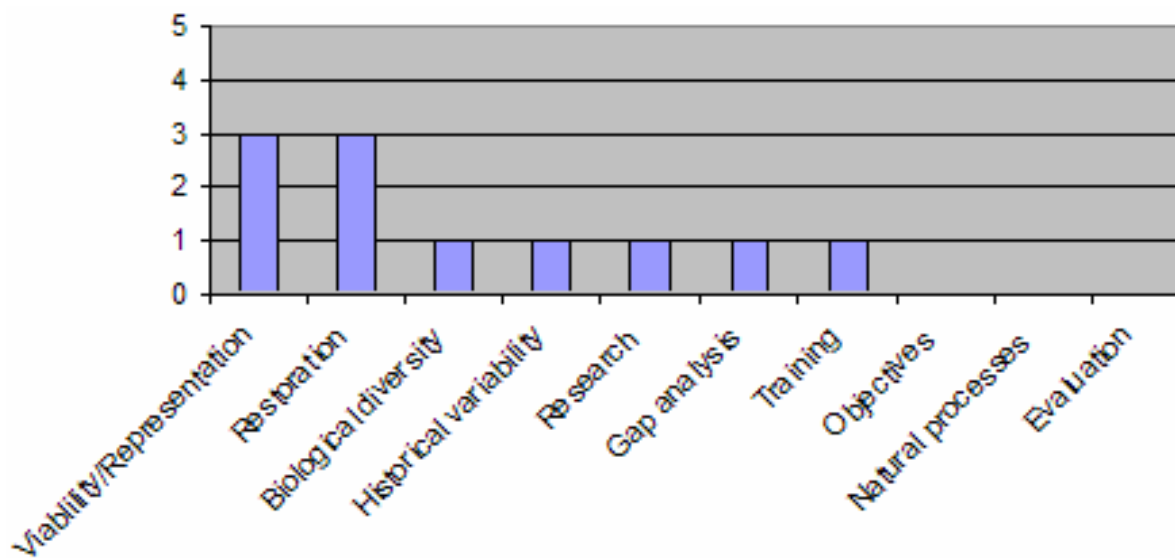
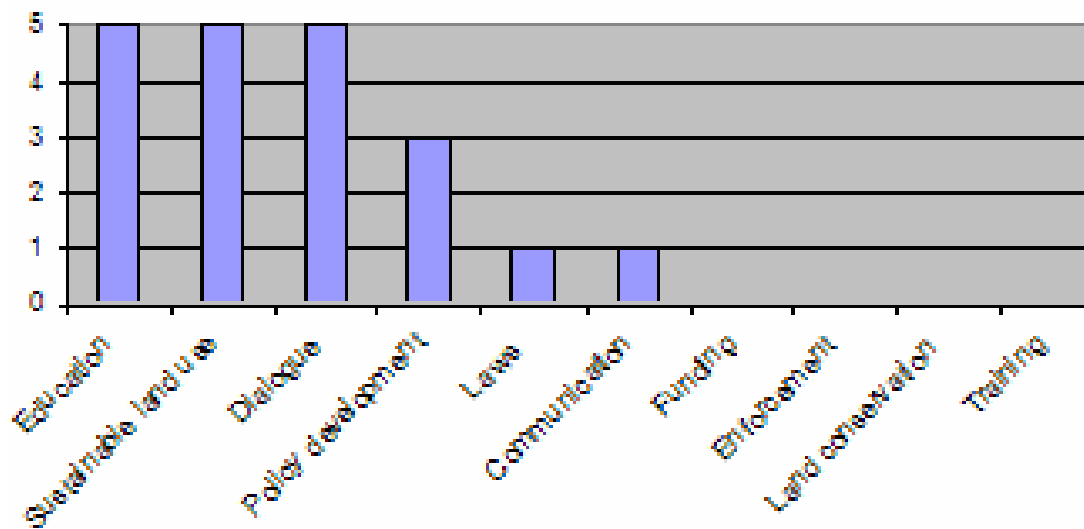


Figure 28: Policy environment for Protected Areas



# 4.0 RECOMMENDATIONS

The analyses in the previous sections show that the PA system in PNG is very weak and there is a drastic need to improve management planning in PNG. The management problems: lack of funding, low staff capability, insufficient resources (manpower and financial) and infrastructure is a common situation across developing countries.

While there is the major problem of continued diminishing funding from the National Government to the lead agency for Protected Areas (DEC), it is essential for action and activity from other concerned organisations. These could be from a global, national or provincial perspective. Conservation and protected areas need to be enlarged with a view to meeting CBD goals.

The importance of maintaining a pristine protected area has enormous benefits for the community, provincial, national and global community. At the outset are six main recommendations and these are to be considered in a holistic approach to resurrect the protected areas in Papua New Guinea. Following these are specific recommendations outlined in six thematic areas (Representation, Legislation and Policy, Collaboration and Partnership, Capacity Building and Training, Communication, Education and Awareness and Pressures and Threats). Some of specific recommendations are currently being undertaken and lead agencies have been identified to implement and follow up on these.

## 4.1 MAIN RECOMMENDATIONS

- Consider the creation of a national para-state institution that will be charged with overseeing the formal PA system in conjunction with DEC (based on examples from other countries).

- Ensure there is representation between all stakeholders (government agencies, conservation organisations, industry and landowners) in relation to the establishment of PAs.
- Amend and streamline protected area legislation and policies that are applicable to all stakeholders.
- Create an avenue for the capacity building and training of communities in sustainable eco-business within PAs.
- Ensure there is adequate communication, education and awareness within all communities.
- Ensure that all threats and pressures within and around PAs are addressed amicably among all stakeholders.

## 4.2 REPRESENTATION

- Develop clear policy on protection of biological diversity (habitats, species, and genetic populations) in order to implement PNG's obligations under article 7 of the CBD.
- Develop criteria for prioritising efforts on existing and proposed PAs (focus on larger areas of higher diversity and biological importance and likelihood of success). This should;
  - Ensure adequate protection of habitat for threatened species;
  - Examine moving the responsibility for some PAs that are not established for biodiversity purposes to other

- more appropriate authorities e.g. War memorials (Kokoda MP, Cape Wom) to National Museum or Defence; recreational parks (Gahavasuka, Varirata) to provincial and town authorities;
- Consider whether PAs protect transitions between habitats;
  - Be confirmed in appropriate legislation and policy under PAs in the National, Provincial and Local Level governments.
- Seek to assist landowners to expand PAs up to a minimum target of 50,000 ha to ensure the viability of populations and habitats. Expansion should seek to protect natural processes at a landscape level (through protection of catchments, fire regimes, flooding and dry season refuges).
- Reach agreement between government and conservation agencies on a system for identifying areas of high biological importance. Information sources include: Vegetation change assessment (DEC), ecoregion action programmes (WWF), species risk assessment (DEC), zero extinction initiative (CI), key biodiversity areas (CI), island ecosystems analysis (TNC) Lessons from these must be incorporated into representation analysis for conservation planning.
- Disseminate information on threatened species to government, NGOs and communities.
- Create a strategy for protection of endemic or threatened species or sites in PAs.
- Establish integrated land use planning that respects biological values and community needs.

••• Any forest type reduced to below 25% of original extent should be excluded from industrial development.

- Establish an institution to promote the systematic establishment and management of PAs in PNG in line with CBD commitments. This should represent government, NGO and community interests.

### 4.3 LEGISLATION AND POLICY

- Prepare national protected areas policy including the preparation of protected area working manuals. This process is already underway within DEC.
- Amend and streamline protected area legislation, in particular to empower communities to protect entire ecosystems (i.e. not just fauna) and to increase penalties.
  - Develop protected area classification systems.
  - Develop protected area establishment criteria, to include such factors as size and design guidelines, representativeness, and protection for endangered and endemic elements.
  - Amend gazettal details to incorporate correct information and reflect current names and spelling.
- Ensure that the national PA network is incorporated into all relevant whole-of-government development plans, policies and strategies.

## 4.4 COLLABORATION AND PARTNERSHIP

- Improve collaboration and coordination between national government implementing agencies (eg DEC, PNGFA, NFS, DM, DPE).
- Establish an endangered species research network to confirm the status of endangered species and share research findings. Possibly circulate “wish lists” for further research (e.g. into particular species or biodiversity surveys of particular protected areas), to research institutions including Papua New Guinea universities.
- Centralise all available species data in national database. Note, the existing Species Information Management System, maintained by the Department of Environment and Conservation, can be used for this purpose.
- Secure an agreement to support RAPPAM recommendations through Mama Graun Trust Fund.
- Develop mechanisms or principles for long-term sustainable financing. Note, this will form part of the national protected areas policy.

## 4.8 CAPACITY BUILDING AND TRAINING

- Assist and train protected area communities in business planning and management to conduct sustainable eco-business within protected areas; and proposal and report writing.
- Ensure that the Strengthening Conservation Capacity (SCC) project is adequately resourced as per in-principle support.

## 4.6 COMMUNICATION, EDUCATION AND AWARENESS

- In all communities, contact exercises should:
  - Emphasise socio-economic benefits of conserving biodiversity, especially through use of protected areas.
  - Avoid jargon and technical language
  - Encourage awareness of environment and conservation values (eg fire control, pollution prevention, erosion mitigation, sustainable harvesting principles etc).

## 4.7 THREATS / PRESSURES

- **Population pressures (including gardening, hunting, subsistence harvesting, settlement)**  
Develop and implement zoning methodology (with emphasis on landowner education) to inform and support land use planning within protected areas.
- **Commercial overfishing (small scale local trade)**  
Provide community education on sustainable fishery concepts (e.g. no-take zones with emphasis on mangroves and other spawning and aggregation sites, off-seasons, non-destructive fishing methods etc).
- **Logging**  
Continue dialogue with Papua New Guinea Forestry Authority to clarify relationship between forest management areas and protected areas, and using legislative or policy means, aim to protect all protected areas from forestry operations.

- **Develop land use classifications**

Develop classifications for all conservation planning regions to facilitate representative protection of all ecosystems (especially forest ecosystems). This process must begin with a regional cases study of Western Province, conducted by the Department of Environment and Conservation and the Papua New Guinea Forestry Authority.

- **Mining**

Initiate dialogue with Department of Mining, and Department of Petroleum and Energy, to clarify relationship between mining operations (including exploration) and protected areas, and using legislative or policy means, aim to

protect all protected areas from mining operations.

- Map threats from mining to protected areas (including downstream impacts).

- **Climate change**

Adopt climate adaptation strategy for protected area network. Note – this will be undertaken as part of the national protected areas policy.

- **Invasive species**

Compile and maintain inventory on all invasive species including range (or field observation points) and impacts. Note – the existing Species Information Management System, maintained by the Department of Environment and Conservation, can be used for this purpose.

## 5.0 FOLLOW UP ACTIONS

The recommendations put forward during the final RAPPAM workshop in the six thematic areas must now be perused and pursued in earnest by all concerned agencies and organisations. DEC as always must take a lead role and conservation organisations including WWF and others will adhere to provide support to government agencies. Their willingness would be determined on assurance, goodwill and political will from the PNG Government.

With biodiversity encompassing a broader social and biophysical sphere, there is

potential funding from a lot of multilateral financial institutions such as the World Bank and GEF. PNG should pursue these options under the CBD goals. The terrestrial and marine goals can be met if all concerned party's work together.

An action plan must be structured under each of these thematic areas. Discussions from the Kamiali meetings are a tremendous start and must continue with interactions with a wider audience comprising provincial and local level government officials among others.



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- **All workshop participants**



# ANNEX 1: Protected Areas Covered by RAPPAM in PNG

	NAME	TYPE	PROVINCE	AREA (HA)
1	Tonda WMA	WMA	Western	590,000
2	Crater Mountain WMA	WMA	Chimbu, Eastern Highlands, Gulf	270,000
3	Hunstein Range WMA	WMA	East Sepik	220,000
4	Maza WMA	WMA	Western	184,230
5	Kamiali WMA	WMA	Morobe	65,541
6	Crown Island Wildlife Sanctuary	S	Madang	58,969
7	Pirung WMA	WMA	North Solomons	43,200
8	Ranba WMA + Sanctuary	WMA	Madang	57,646
9	Lake Kutubu WMA	WMA	Southern Highlands	24,100
10	Oi Mada Wara WMA	WMA	Milne Bay	22,840
11	Lihir Island	PA	New Ireland	20,208
12	Bagiai WMA	WMA	Madang	13,760
13	Siwi-Utame WMA	WMA	Southern Highlands	12,540
14	Pokili WMA	WMA	West New Britain	9,840
15	Garu WMA	WMA	West New Britain	8,700
16	Ndrolowa WMA	WMA	Manus	5,850
17	Klampun WMA	WMA	East New Britain	5,200
18	Mojirau WMA	WMA	East Sepik	5,079
19	Jimi Valley National Park	NP	Western Highlands	4,180
20	Neiru (Aird Hills) WMA	WMA	Gulf	3,984
21	Iomare WMA	WMA	Central	3,828
22	Lake Lavu WMA	WMA	Milne Bay	2,640
23	Tavalo WMA	WMA	East New Britain	2,000
24	Mc Adams National Park	NP	Morobe	1,821
25	Zo-oimaga WMA	WMA	Central	1,510
26	Mt Kaindi WMA	WMA	Morobe	1,503
27	Variarata Nat. Park	NP	Central	1,063
28	Mt Wilhelm National Reserve	NP	Western Highlands	817
29	Sawataetae WMA	WMA	Milne Bay	700
30	Balek Wildlife Sanctuary	S	Madang	470
31	Hombareta WMA	WMA	Oro	130
32	Loroko National Park	NP	West New Britain	100
33	Mt Gahavisuka Pro. Park	PP	Eastern Highlands	77
34	Baiyer River Sanctuary	S	Western Highlands	64
35	Mt Susu National Reserve Par	NP	Morobe	49
36	Moitaka Wildlife Sanctuary	S	National Capital District	44
37	Baniara Island WMA	PA	Milne Bay	37
38	Namanatabu Reserve	R	Central	27
39	Nuraseng WMA	WMA	Morobe	22
40	Paga Hill Nat. Park Scenic R	NP	National Capital District	17
41	Nanuk Island Reserve	R	East New Britain	12
42	Talele Is. Nat. Park Reserve	NP	East New Britain	12
43	Kokoda Historical Reserve	R	Oro	10
44	Cape Wom Memorial Park	MP	East Sepik	2
45	Wewak Peace Memorial Park	MP	East Sepik	2
46	Kokoda Memorial Park	MP	Oro	1
47	Kavakuna Caves	WMA	East New Britain	-
48	Kau Wildlife Area	Informal	Madang	-
49	Managalas Plateau	Proposed	Oro	-
50	Tonda Extension	Proposed	Western	-
51	Mt Bosavi	Proposed	Southern Highlands	-
			TOTAL	1,642,826

MP – Memorial Park, NP – National Park, PA – Protected Area, PP - Provincial Park, R – Reserve, WMA – Wildlife Management Area, S – Sanctuary

## ANNEX 2: RAPPAM Process in PNG

<b>1. Launch</b> <i>January 2004</i>	Terms of Reference agreed
<b>2. Revision of RAPPAM questionnaire</b> <i>April 2004</i>	<p>The RAPPAM questionnaire was trialled and adjustments made to better accommodate its use in the context of PNG's unique tenureship and cultures. These included:</p> <ul style="list-style-type: none"> <li>○ Representation of landowners and landowner committees among PA staff</li> <li>○ The role of compatible development activities in achieving PA objectives</li> <li>○ The processes for community engagement and mobilisation as essential to the effectiveness of individual PAs</li> <li>○ Traditional land use, beliefs and rites</li> <li>○ Clan compatibility / rivalry within individual PAs</li> </ul> <p>Questions had less relevance</p> <p>Facilitator's notes were prepared to help Working Group members in conducting the assessment questionnaire with communities.</p>
<b>3. Information Collection</b> <i>January to Oct 2004</i>	<p>Development of the following products</p> <ul style="list-style-type: none"> <li>○ Database and shapefiles of existing and proposed PAs (WWF and DEC)</li> <li>○ Analysis of past and predicted vegetation loss (DEC and Environment Australia)</li> <li>○ Analysis of the representativeness of PA coverage by ecosystem and ecoregion (WWF and Environment Australia)</li> <li>○ Examination of WWF/DEC CASP Recommendations (DEC AYAD)</li> <li>○ Poster map of existing PAs (WWF)</li> <li>○ Review of lessons in protected area management (TNC)</li> </ul>
<b>4. Introductory Meeting</b> <i>March 2004</i>	RAPPAM methodology defined, workplan established and confirmation of the confirmed the revised questionnaire.
<b>5. Local Protected Area Workshops</b> <i>April – October 2004</i>	Visits by individual PAs and the conduction of small workshops at the community level.
<b>6. Mid-Term Meeting</b> <i>July 2004</i>	PA assessments reviewed and further training in the process of PA assessment and questionnaire interpretation.
<b>7. Workshop and Draft Report</b> <i>February 2006</i>	<p>Final RAPPAM workshop, facilitated by Liza Higgins-Zogib of WWF to:</p> <ul style="list-style-type: none"> <li>○ bring together the results of the first-phase assessments</li> <li>○ identify the system-wide trends in PA management in PNG</li> <li>○ identify follow-up activities based on the RAPPAM recommendations</li> </ul>
<b>8. Final Report and Follow Up Activities</b>	Draft report sent to the Steering Group members for review and comments incorporated into the final report. Final report published in paper and pdf format. Follow-up activities (identified in the final workshop - preparation and submission of funding proposals; training activities for staff; confirmation of partnership agreements, etc).

## ANNEX 3: Matrix of Area Based Conservation Options Under Various PNG Acts

Options for Reservation	Applicable Act	May protect	Land ownership	Management/enforcement	Applicable to marine resources?	Is hunting /fishing allowable?	Level of protection
<b>National Park/ Nature reserve</b>	<i>National Parks Act</i>	All biodiversity and scenery	Government	Government	Probably	No	High
<b>Sanctuary</b>	<i>Fauna (Control &amp; Protection) Act</i>	All fauna	Landowners or Government	Government	Yes	No	High for fauna Low for flora
<b>Protected Area</b>	<i>Fauna (Control &amp; Protection) Act</i>	Selected fauna	Landowners or Government	Government	Yes	Within regulations set by DEC	High for some fauna. Low for flora and other fauna
<b>Wildlife Management Area</b>	<i>Fauna (Control &amp; Protection) Act</i>	Selected fauna	Landowners	Landowners/ in WMC Government	Yes	Within regulations set by WMC and DEC	Variable for fauna; Low for flora
<b>Conservation Area</b>	<i>Conservation Areas Act</i>	All biodiversity and scenery	Landowners or Government	Landowners/ Government	Yes	Within regulations set by DEC and resource owners	Variable
<b>Section 30</b>	<i>Fisheries Management Act</i>	All marine biodiversity and scenery	Resource owners	Resource owners	Yes	Within regulations	Variable
<b>Conservation Deed</b>	<i>Law of Contracts</i>	Wide range of possibilities	Resource owners	Resource owners	Yes	Within regulations set by the deed	Variable
<b>Provincial Parks and Reserves</b>	New Organic Law section 42	Unclear as no legislation has been developed	Landowners or Government	Unclear	Probably	Unclear	Unclear
<b>Local-level Government laws</b>	New Organic Law section 44	One legislation has already been developed	Landowners or Government	Unclear	Probably	Unclear	Unclear

Source: Van Helden 2001 adapted from Ellis 1999 and Whimp 1995

## ANNEX 4: Vegetation Change in New Britain/New Ireland CPR

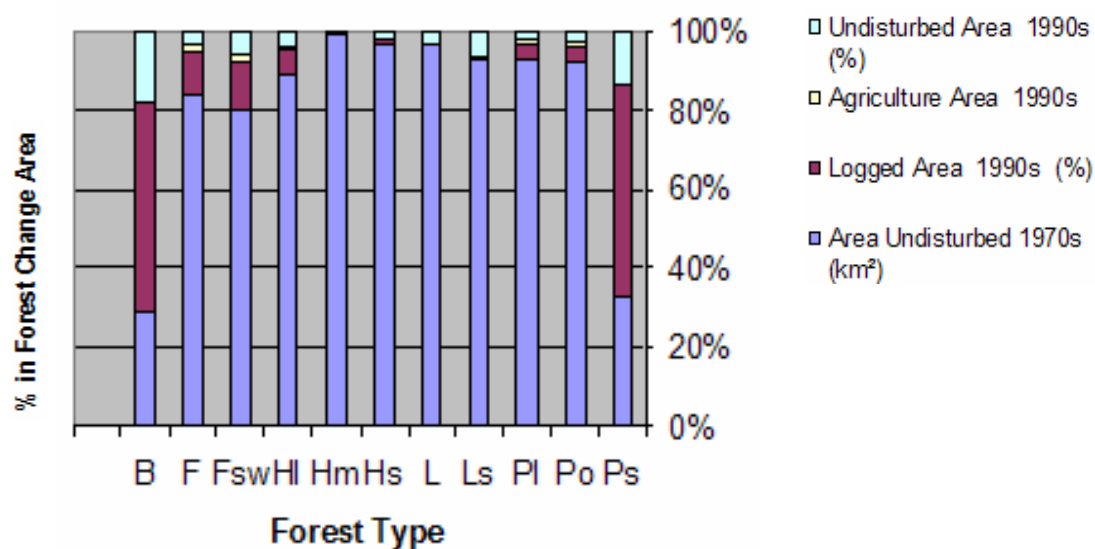
New Britain/New Ireland CPR – Change in forest type

Forest Type	Area Undisturbed 1970s (km <sup>2</sup> )	Logged Area 1990s (%)	Agriculture Area 1990s (%)	Undisturbed Area 1990s (%)
<b>B</b>	40	75.0	0.0	25.0
<b>F</b>	520	67.3	11.5	21.2
<b>Fsw</b>	390	56.4	12.8	28.2
<b>HI</b>	840	60.7	6.0	33.3
<b>Hm</b>	28270	31.5	4.8	63.6
<b>Hs</b>	3260	30.7	1.8	67.5
<b>L</b>	3150	0.6	0.3	99.0
<b>Ls</b>	1400	6.4	0.7	92.9
<b>PI</b>	1210	59.5	18.2	22.3
<b>Po</b>	1090	57.8	15.6	26.6
<b>Ps</b>	50	80.0	0.0	20.0

\* See Hammermaster & Saunders (1995) for a full description of forest types

\*\* (This is the area of each forest type, which was undisturbed at 1975)

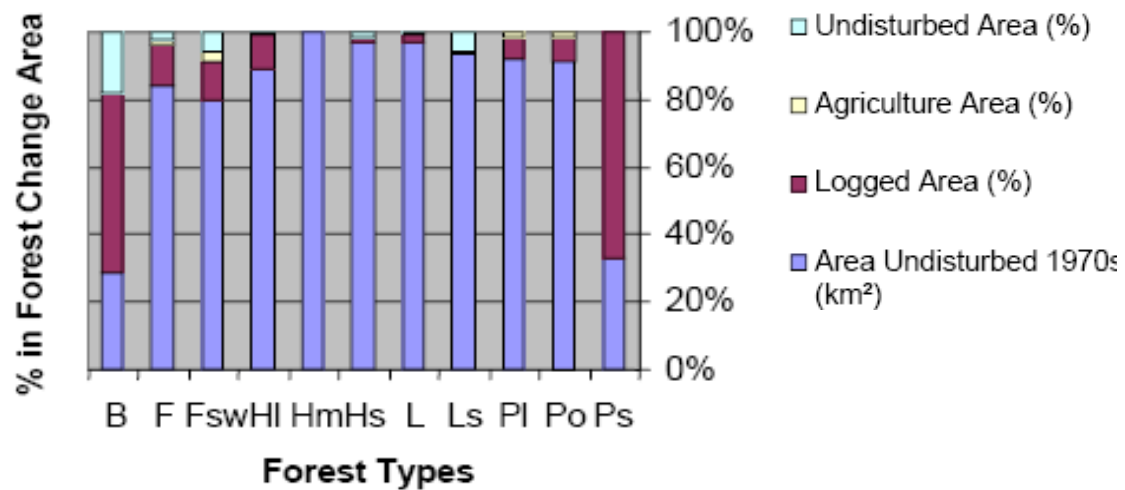
Forest change since 1970



### Projection scenario

Forest Type	Area Undisturbed 1970s (km <sup>2</sup> )	Logged Area (%)	Agriculture Area (%)	Undisturbed Area (%)
B	40	75.0	0.0	25
F	520	76.9	11.5	11.5
Fsw	390	56.4	12.8	28.2
HI	840	90.5	6.0	3.6
Hm	28270	84.8	4.8	10.4
Hs	3260	52.8	1.8	45.4
L	3150	73.7	0.3	26.0
Ls	1400	14.3	0.7	85.0
PI	1210	81.0	18.2	0.8
Po	1090	83.5	15.6	0.9
Ps	50	100.0	0.0	0

### Projection scenario for logging and agriculture beyond 2005



### Land Use Change for New Britain/New Ireland CPR

