South Pacific Regional Environment Programme

Proceedings of the

Fourth South Pacific Conference on Nature Conservation and Protected Areas

Volume III: Papers - Themes and Case Studies

Held at Le Lagon Resort,
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Foreword

The Fourth South Pacific Conference on Nature Conservation and Protected Areas held in Port Vila, in 1989, continues the series of "National Parks and Reserves" conferences held in New Zealand (1975), Sydney, Australia (1979), and Apia, Western Samoa (1985). The decision was made at the Apia conference to change the name to its current title, to better reflect the importance of the wider issues of biological diversity conservation to the region. Tonga has offered to host the Fifth Conference in 1993.

The theme of the Fourth Conference was "the role of protected areas in sustaining Pacific island societies". The principal objectives were, in summary, to facilitate appropriate action in the region to conserve biological diversity; and, specifically, to review and revise the Action Strategy for Protected Areas in the South Pacific.

This is Volume Three of three volumes which comprise the full conference report. It contains the remainder of the theme papers and case studies presented. Volume One summarises the sessions and records the highlights of the papers presented, principal points of discussion and the resolutions and decisions. Volume Two contains key note papers, and the first theme papers and case studies presented.

Copies of the three volumes of this conference report, the *Action Strategy for Nature Conservation in the South Pacific*, and any other SPREP publications, are available from the South Pacific Regional Environment Programme, P.O. Box 240, APIA, Western Samoa.

Since this conference, a number of events have confirmed the importance of biological diversity conservation (or nature conservation) to the region and to the world:

- Both the SPREP and Apia Conventions have come into force after having been ratified by the required number of countries.

- The South Pacific Biodiversity Conservation Programme, a 5-year, US$ 10 million concerted effort to protect the biological diversity of the region, is being created. This is funded by the Global Environment Facility, established by a group of industrialised and developing countries in 1990 to assist developing countries to address environmental issues of global concern; and jointly administered by the World Bank, the United Nations Environment Programme and the United Nations Development Programme.

- The developed and developing nations negotiated an international Convention on Biological Diversity, now ready for signature. Nine Pacific Island countries have already signed.

- The United Nations Conference on Environment and Development, held in Brazil in June 1992, represents the largest ever gathering of world leaders meeting to discuss environmental issues. The Pacific Island Countries made a significant contribution to this process.

In the light of these, the foresight of the Pacific Island countries in holding these regular nature conservation conferences is to be commended. The conferences enable the region to discuss common issues relating to the conservation and sustainable development of natural resources, in particular in relation to the difficulties facing small island countries as they struggle to meet the needs of their people at the same time as conserving biological resources for now and for the future. Such conferences also enable the region to speak with one voice on the world stage - a contribution whose value is greater than the small numbers of people and area of land would suggest.

Vili Fuavao
Director, South Pacific Regional Environment Programme

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Part 4

Conservation Policy and Practice in Oceania

THEME PAPER: CONSERVATION POLICY AND PRACTICE IN THE SOUTH PACIFIC ISLAND REGION

G. B. K. Baines
3 Pindari St
The Gap
BRISBANE
Australia 4061

Policy for conservation

It is accepted that the ideal situation is for conservation efforts to be undertaken in the context of a comprehensive statement of an approach to the subject - a statement which is a government's commitment to conservation and which binds its various departments to act in accordance with this policy. Few island governments have made such comprehensive policy statements. Nevertheless, all have, through some specific, if isolated, statement, through administrative reform, through the adoption of certain legislation of colonial origin, or through the enactment of new legislation, brought into existence some form of conservation policy.

Papua New Guinea, quite rightly, is often referred to in complimentary terms for its innovative approach to conservation policy, based on its enlightened 1975 constitution. Vanuatu, too, has used a constitutional approach. Among the fundamental duties which its constitution (s 7) stipulates for "Every person.....to himself and his descendants and to others" is:

> "(d) to protect Vanuatu and to safeguard the national wealth, resources and environment in the interests of the present generation and of future generations."

This contains the basic elements of environmental management:

* protection of the environment and its constituent species;

* forms of resource use which minimise social and environmental disturbance; and

* a long-term view embracing the concept of balanced resource development.

At the other extreme, for the past 13 years Fiji has conducted its official conservation activities with no clear statement of policy but on the basis of an interdepartmental consultative committee which has no enforcement powers, and an agency (the Town and Country Planning Directorate) which has limited jurisdiction over less than 20% of the country's land, and none of its sea. A statutory body, the National Trust for Fiji, with little support and no real powers, is expected to carry responsibilities for nature conservation.

These examples serve to represent conservation policy extremes in the island region. The question remains as to how effective conservation efforts have been where policy has been clear and farsighted, and, on the other hand, whether significant conservation achievements have been possible even where policy has been obscure and practical provisions weak. Kisokau reviews the Papua New Guinea experience in a paper presented at this conference. The Fiji experience deserves closer study as a comparison.

Development plans as policy

The four- or five-year development plan has become the policy and programme focus for island governments. It is to a nation's development plan that aid agencies and other outsiders initially turn for an indication of conservation policy. These plans have a rigid sectoral basis, designed to serve economic development objectives. Over the years, however, some measure of the social and environmental aspects of development has been added.

Fiji's shortcomings in conservation policy were referred to earlier. Yet a reading of that country's seventh development plan (1976-80) would have given the impression of innovation and environmental farsightedness. A whole chapter of that plan was devoted to the subject of "Environment and Development", promising an environmental administration, mangrove protection and conservation areas. Virtually none of these indicated objectives is said to have been achieved before the end of the plan period and few since. In the subsequent eighth plan (1981-85) provisions for conservation were reduced to something more in line with practice - a few lines in a secondary section titled "Leisure, recreation and the environment".

An environmental management chapter with innovative conservation provisions and intended as a supplement to an earlier Solomon Islands development plan was approved by Cabinet, yet never reached print.

It could be expected that Vanuatu's enlightened constitutional provisions for environment would necessarily lead to clear and strong statements of conservation policy in its development plans. The first of these, prepared in 1981, was a disappointment in this respect. A comprehensive environmental management section was, indeed, prepared and submitted. In those early days of a country finding its feet after a traumatic entry into independence, an expatriate head of planning from an industry background, dismissive of the section as irrelevant to the plan, successfully prevented its inclusion.

These three examples suffice to make the general point that, while it is reassuring to see conservation policy spelled out in a development plan, what is or is not contained may be a poor guide to conservation practice.

The policy-practice gap

Irrespective of the quality of conservation policy, all conservation staff of island governments face a number of inhibiting factors which diminish their capacity to be effective. The difference between conservation policy and conservation practice can be great, the frustrations endured by conservation staff acute and debilitating.

On the basis of my own 17 years of conservation work in the island region in teaching, advisory and administrative roles with the governments of four island nations, I offer here some frank observations on the policy-practice gap. It is my intention to help island conservation staff to recognise and deal with the difficulties they face, which are sometimes too close and familiar to be seen for what they really are. It is also important this experience should be available to guide those who wish to assist island and conservation initiatives towards a better understanding of this type of impediment to effective conservation.

Limited expertise

It is widely recognised that there is inadequate conservation expertise available to island governments. There is a continuing heavy demand by all sectors of government for the services of islander personnel educated and trained in any field at all. Since conservation has lower priority than sectors whose activities produce short-term economic gains, relatively few appropriately trained staff are placed in conservation posts. Having been placed there they are able to avail themselves of not inconsiderable opportunities - usually away from home - for training in conservation matters. Yet this potential benefit involves a cost which can be quite considerable - the loss of conservation effort at home while the officer is away. And this loss may be compounded by the eventual transfer of trained conservation staff to another sector. In small conservation administrations this can mean starting all over again; employ a fresh graduate, train him, and then face the prospect of losing him.

Problems of small scale

In terms of the subject matter covered, the administration of a nation of ten thousand people, or of 100 thousand, is no less complex than in one of 100 million, requiring a similar spread of expertise. This strains the capacity of the limited pool of trained personnel, and often results in officials having to assume multiple roles. One Solomon Islands conservation officer, for instance, deals with environmental assessment for what should include all logging, mineral prospecting and mining, energy and industrial development in the country - and the field monitoring of these activities. He is still in training, so spends time at courses, and is also called on by his superiors to deal with other conservation matters from time to time. The Conservation Act, 1987 of the Cook Islands is an innovative piece of legislation with an integrative coastal zone emphasis, the effective implementation of which requires considerable interagency coordination, planning and assessment innovation and conservation programming. These far-ranging responsibilities are in the hands of a single person. His experience in the administration of this legislation is presented in another paper of this conference.

One of the disturbing consequences of the multiple roles requirement of small-scale administrations is that conservation staff, through no fault of their own, become desk-bound, and can find little opportunity to undertake the necessary fieldwork. For those unfamiliar with the situation it needs to be specifically stated that in most cases they have no field staff.

Aid and counterparts

Island conservation agencies now have fairly good opportunities for obtaining overseas assistance to build up their administrative capacity. Gaining access to this assistance may, however, be difficult. First, a multiple roles officer has to stretc.h his time even further to do the not inconsiderable work required to prepare a proposal for assistance. He then has to spend time in "nursing" the proposal through "the system" of his own government. There will be formal procedures for this, but one of the realities of Pacific islands administration is that personal interaction, rather than paper, constitutes the main form of communication. And since conservation sector proposals are not classified as "income generating", they tend to need more "nursing" than others.

Most assistance agencies quite rightly insist on the identification of a counterpart to work with any overseas expert who might be part of an assistance project. This often causes difficulties where the very few staff are already

fully committed. Even where a counterpart is identified, he or she may be transferred during, or even before, the expert's assignment. While the counterpart requirement is important, it must be handled with flexibility. Such assistance projects should be prepared so that an overseas expert does not assume that the single identified counterpart is the person for the job. Part of the training effort should be at a less involved level, for individuals with related roles. In this respect it might be noted that conservation training opportunities could be spread wider than they are at present, a point taken up below, in the section "Territoriality".

Careers in conservation

A serious difficulty faced by conservation officials is the limit on career development which arises from rigid public service structures. Conservation posts in a small island administration are few, and the most senior post may be at several levels below that to which those of the administrative cadre may aspire. There are few opportunities for a conservation career in these circumstances, something which staff find very discouraging. The frustration is even greater where trained officers are brought in to fill junior posts in a conservation administration where senior posts are already occupied by less qualified officers, but who may remain "locked in" to their posts. Nor is it unheard of for such seniors to deal with the unease which arises from their technical inadequacies by frustrating the work and ambitions of their junior staff. One consequence of this is the transfer of enthusiastic and competent conservation staff to other sectors of government - with the corollary that the less able stay put.

The "perks" syndrome

One of the consequences of the fairly liberal measure of international assistance for Pacific island conservation is that government officials may tend to become dependent on the "perks", or perquisites, of overseas travel and meetings. Participation at these meetings is not normally funded on the basis of actual costs to a participant but to presumed costs - the so-called "per diem", or daily allowance, which is based usually on the needs of a quite comfortable lifestyle. Not often is it necessary to use the full per diem amount.

It is good that, in the course of upgrading their conservation knowledge and skills, or in representing their governments on important issues of regional conservation, participants at overseas meetings should have the incidental opportunity to supplement their rather low salaries. The danger lies in the fact that the allure of travel and financial "perks" can, among the less discerning, become the main reason for choosing to attending an overseas meeting, rather than its conservation significance.

Conservation officers need to be honest about this, and rigorously examine the relevance of each offered overseas meeting to national conservation objectives.

Territoriality

One of the iniquitous features of the public service systems which independent Pacific island nations have inherited from their colonial days is a sense of competitive territoriality based upon notions of power and influence - and the need to compete for a satisfactory slice of the annual budget. It is an established feature of public administration, with which, and to an extent by which, conservation staff must live. Nevertheless, there is still scope for a

good measure of the interactive, selfless cooperation between agencies which effective conservation requires. Too easily do conservation staff lapse into the "them-and-us" mode of thought; too infrequently do they seize opportunities for sharing the involvement in conservation.

One area for such sharing is in training. It is not unusual for a conservation service to pass up an opportunity for training simply because staff cannot be spared. There are times, too, when an officer will attend a course which is not appropriate to his or her needs. The worst of the problems that this creates could be that even more time is taken away from the always urgent conservation tasks at home. And yet these training course places represent excellent opportunities for furthering conservation by involving staff of other, relevant, agencies. Should, for instance, a place be available, then a forester or a lands officer might be interested to benefit from the opportunity. It certainly would be helpful to the conservation agency if individuals of other agencies had been trained and sensitised to national conservation issues - all potential support. But if the conservation agency thinks only in terms of its own "territory" rather than of national conservation needs it will not make the effort to involve other agencies.

External conservation initiatives

The requirements of conservation initiatives involving, and perhaps helpful to, an island nation may nevertheless be a troubling distraction for small conservation administrations. Inevitably, conservation staff become involved in servicing demands for information and advice - from international agencies, graduate students, or companies engaged in environmental assessments. UN agencies, in the course of surveys require data on legislation, on the use of toxic chemicals, on national policy on the ozone layer, on local pollution. Graduate students ask for data for their theses or for detailed accounts of how and where they might undertake research - and would the conservation service please obtain all the necessary approvals. Most enquiries are relevant and conservation staff would like to be able to help. And they certainly would like to have the information sought - which often they don't because they rarely get the chance for systematic data collection.

In these circumstances it should not be wondered at that, though sympathetic to the objectives of international conservation initiatives such as the Convention on International Trade in Endangered Species, island governments are not rushing to become parties to the treaties involved. The associated obligations, for understaffed conservation agencies, are too much.

Again, the problem of lost conservation effort at home, arising from the absences of officers attending meetings overseas must be emphasised. Once, when asked to advise a Permanent Secretary on whether one of his conservation staff should attend yet another meeting I surprised even myself when I calculated that in the previous year almost 50 per cent of the working time of his conservation staff had been spent on short period activities outside the country.

Information for conservation

All Pacific island conservation agencies face an acute problem of inadequate information on which to plan and conduct conservation activities. Few have the capacity to undertake the needed research, so must continue to depend on outsiders to do this. Yet in some island nations there is suspicion about research and a distrust of researchers - even resentment. This arises partly from misunderstandings, and partly from the arrogant "academic right to know" of some insensitive researchers. Unfortunately, this has led to a situation

where research is sometimes actively discouraged, even where procedures provide for it - under a Ministry charged with responsibility for what in at least one island country is termed "research control".

This, then, is another of the frustrations which face conservation agencies needing researchers to survey the status of traded wildlife or, perhaps, the populations of species of customary totemic or dietary significance. Effort is needed - by islanders themselves - to place research in a more positive light, demonstrating how it can be used to contribute not only to conservation objectives but to national development objectives as a whole. The researcher who submits to the host country nothing more than a copy of a paper published simply to serve career or academic objectives is contributing little to that country. Much of the information that is collected in the course of research but not included in published papers can, and should be, reported in ways which serve the interests of national conservation agencies.

Research by outsiders must certainly be guided, but in positive ways. A conservation agency could, for instance, take the initiative to establish a framework for a National Environment and Conservation Survey of which all outsider research on the natural environment and its contained species would be part, and subject to appropriate conditions regarding the planning, conduct and reporting of that research so as to directly serve conservation needs. The agency would work out its research and survey needs and, perhaps through its links with the SPREP network - the Association of South Pacific Environmental Institutions - the required effort could be arranged.

Another important observation that needs to be made is that to some extent the information which does exist is not properly used. There is a disconcerting tendency for some government officers to take action on the information contained in the most recent folios on a file, without fully investigating the background to the issue in question - which may be contained in earlier parts of the same file, or in files which have been officially closed. "Closed" should not be taken to mean "finished and irrelevant", but that is how they are sometimes regarded.

Familiarity with one's national archives can be of assistance with conservation work. Archives are not simply raw material for historians. They contain potentially valuable information about land ownership and resource use rights, the early events in issues that may since have attained conservation significance, statistics on early trade in wildlife products such as turtle carapaces. It must be added, too, that chance discoveries of conservation significance can be made through national archives. A case in point was the recent inadvertent discovery in the archives of the Solomon Islands of a classified World War II memo which revealed that artillery shells containing dangerous nerve gas had been stored by the US military on Guadalcanal. Since substantial amounts of surplus American explosive ordnance remained in the Solomons after the departure of American forces the question raised, and as yet unanswered, is whether there is an as yet unrecognised and unlocated environmental health threat from nerve gases somewhere on or in the Guadalcanal Plains.

Development pressures

The economic development pressures which help to frustrate conservation efforts are akin to those prevailing everywhere, not only in the so-called "developing world". South Pacific island countries, having little in the way of industrial or service industries as a base for making export earnings, are driven by increasing levels of national debt to exchange raw materials for foreign exchange.

The countries with bigger land masses have forests from which hardwood logs can be taken for export, and some have minerals to be extracted. A number of countries have significant fish resources - mainly skipjack tuna. At least it is possible, with care and foresight, to manage the latter as a renewable resource - in comparison with industrial logging of the region's tropical rainforests, which clearly is a wood mining activity. Deforestation is a major cause of loss of biological diversity, while mining wastes are a major concern in respect of their capacity to damage aquatic and, especially, marine ecosystems, - though on a smaller scale then logging. Some fishing technologies, too, are detrimental, depleting marine mammals, turtles and non-target fish species.

Economic assistance agencies have been in the forefront of those who exert pressure on island governments to quickly exploit natural resources. Recently, however, there has been some change of institutional attitude. So, from the ranks of the international development banks which once had such a narrow and short-term perspective on development in the region - and sometimes inconsistent with conservation objectives - now come innovative policy changes designed to foster conservation action by loan-recipient countries. A recent case in point: a liberally funded provision for the establishment of an environmental management capability in Fiji, as part of a major economic development assistance loan by the Asian Development Bank.

One must be realistic about the fact that development pressures, so easy to recognise in their overt form, also operate at a much more subtle level, changing attitudes. This has led to a degree of erosion of traditional Pacific islander attitudes to environment and conservation, replacing this with the now discredited thinking of the inevitable necessity of continued economic growth.

Nowhere in South Pacific island societies is this phenomenon more readily apparent, nor so potentially damaging, as among the educated elite. Sadly, some islander government officials have succumbed to these influences to the extent that they have difficulty in appreciating the conservation significance of their actions and decisions. This is a significant threat to the integrity of the island nations' environment-resource base and a major frustration for their colleagues in conservation agencies.

A similar threat exists at another level. A distinctive new approach to the development of resources under traditional jurisdiction has emerged recently in Melanesian countries, and it is particularly threatening to rural communities. The threat originates externally but is expressed through individuals who are members of groups with traditional resource rights. These are individuals with greater knowledge than others in their lineage about commercial possibilities for the group's natural resources. They have access, often through foreign intermediaries, to capital and technology, and are adept at influencing administrative decisions. They are the manipulative contemporary equivalent of the nineteenth-century Melanesian opportunists who, through monopolising communications with European traders, greatly enhanced their power and wealth at the expense of their own people.

Conservation agency staff generally appear to be sympathetic to the requirements of traditional landholding groups, even if they are at times frustrated by the difficulties of achieving conservation objectives in areas under customary jurisdiction. Some are beginning to appreciate the potential in a community approach to conservation. That potential is under serious threat from the "manipulators".

CASE STUDY: COOK ISLANDS CONSERVATION SERVICE TWO YEARS UNDER THE 1986/87 ACT

Gerald McCormack
Ministry of Internal Affairs and Conservation
P. O. Box 98
RAROTONGA
Cook Islands

Introduction

This paper describes the Cook Islands Conservation Service, its development and experience over the last two years. It also provides a list of Review Recommendations considered important to add strength and effectiveness to the protection of the natural environment of the Cook Islands.

THE CONSERVATION SERVICE

The Conservation Act which establishes the Service applies in whole only to Rarotonga and Aitutaki and covers the coastal waters of all the Cook Islands, details in later sections.

The Conservation Service was established under the Conservation Act 1986/87 as a corporation, making it independent of the Cook Islands Public Service. The Corporation, funded by Government, is under the control of a Conservation Council, which consists of five members appointed by the Minister for Conservation. The Chairman of the Council, who is also the Director of the Service, is the administrative head of the Corporation.

The activities of the Director are subject to the consent of the Council, and in appointing new staff his decisions are also subject to the approval of the Minister.

The function of the Conservation Service is to promote the conservation of the environment of the Cook Islands for the use and enjoyment of present and future generations. Within the Conservation Act there are specific regulations concerning some aspects of the environment, and the Act also outlines the procedure by which the Service can establish additional regulations.

At present, the Conservation Service is composed of a Director, Deputy Director, Senior Conservation Officer, Wildlife Officer, Herbalist, Secretary/typist and a Conservation Officer on Aitutaki.

DEVELOPMENT OF THE CONSERVATION SERVICE

Although the Cook Islands Constitution and local Island Council Ordinances provide for the reservation of land for public purposes, the passing of the 1976 Conservation Act was the first major attempt to protect and conserve the natural resources of the Cook Islands under law.

This Act emerged from reports made by Australian environmentalists whom the Cook Islands Government had asked to address the environmental issues of the country.

Under the 1975 Act a Director was established as a corporation and performed the functions and exercised powers conferred upon him under the Act subject to the directions of the Minister.

In general, the Act contained no specific regulations, and its implementation was expected to be done along the traditional lines of discussion with community leaders.

Unfortunately, conflicts of interests made the implementation of conservation measures different.

As a result, the Director and his Public Service appointed staff were mainly involved in educational and Public Awareness programmes.

CONSERVATION ACT 1986/87

The Conservation Act 1986/87 emerged from the experience of implementing the 1975 Conservation Act. Some of the more important changes were:

1. The new Act states "This Act shall bind the Crown" - although this fundamental requirement was implied in the earlier Act, it was not explicit.

2. The earlier Act stated that the Director was a corporation, while the new Act states that the whole Conservation Service is a corporation, and thereby independent of the Public Service.

3. The new Act establishes a Conservation Council, appointed by the Minister of Conservation, to take full responsibility for the administration of the Act, instead of the Director of Conservation as under the earlier Act.

4. Under the new Act the Director is responsible to the Council, rather than the Minister, except for the appointment of staff and the employment of consultants. Under the earlier Act the Director was responsible to the Minister.

5. The new Act differs from the earlier Act in providing specific provisions for some aspects of the environment, namely:- COASTAL ZONE (PART VI), POLLUTION OF SEAS AND INLAND WATERS (PART VII), MARINE CASUALTIES (PART VIII) AND CONTROL OF LITTER (PART X).

6. The new Act does not provide for the protection of Historic sites as it did specifically in the earlier Act, however it gives regard to such sites in the preparation of management plans.

In a similar manner to the earlier Act, the new Act outlines the procedure whereby the Service can establish protected areas with Management Plans, and establish Management Plans for other aspects of the environment.

The new Act also maintained the section which enables the Service to establish regulations to conserve aspects of the environment not detailed in the Act itself.

TWO YEARS AFTER

I will deal here with only two important aspects, namely; the independence of the service and regulations concerning the coastal zone.

1. **Independence of Conservation Service**

The independence of the Cook Islands Conservation Service under the control of a Ministerially appointed Council is the strongest legal tool given by the Act. It is however important that the Council be conciliatory in action or it could find itself ineffective through isolation from various Government Departments.

For example, because the Secretary of Works is on the Council we have dealt with all matters relating to that Department in a low key semi-official manner, while in contrast Marine Resources and Trade, Labour and Transport have been dealt with in a more official and, from their point of view, antagonistic manner.

2. **Coastal Zone (Foreshore Zone plus Coastal Waters)**

This forms one of the specific regulations which controls activities on the coastal zone. While this section is effective, it is cumbersome and often antagonistic.

The regulations relating to the coastal zone have been the most widely discussed aspect of the new Act, and their implementation has been the major task of the service. The provisions establish a basis for conserving the coastal zone of Rarotonga, which consists of a persistently receding shoreline and an already seriously degraded lagoon.

In the Act the foreshore zone is defined as the area extending 50 metres landward of the Mean Low Water Mark including all streams and the area extending five metres landward of the stream edge.

Coastal Waters is defined as the area seaward of Mean Low Water Mark to the outer limit of the territorial sea (i.e. 12 nautical miles outward from the outer edge of the reef), including every lagoon and the bed of such sea or lagoon.

In summary, the Act states that no alterations are to be carried out in the Foreshore Zone or Coastal Waters, "without prior written consent" of the Conservation Council.

This section of the Act is still widely misunderstood despite much publicity to clarify the law and its intent.

The law is to enable the Conservation Council to use scientific knowledge and local experience about the natural processes which maintain the foreshore, and to prohibit developments which disrupt these processes.

Unfortunately, there are already numerous foreshore structures, mainly wave-reflecting seawalls, which are disrupting these natural processes and causing damage to the beaches of neighbouring properties.

In addition, poorly implemented developments in the river valleys allow excessive amounts of volcanic soil to escape into the lagoon where its acidic and clogging nature kills coral, the basis of the entire coastal ecosystem.

Most of the business in each Council meeting concerns activities in the Foreshore Zone. During 31 Council meetings 37 applications were considered and of these, 45 per cent were approved, 30 per cent approved with modifications, 9 per cent disapproved and 16per cent were investigated with no action required.

The Council also dealt with 15 complaints from the general public in relation to the foreshore zone.

REVIEW RECOMMENDATIONS

The following areas of the Conservation Act have been specifically looked at based on experiences in the past two years, and the ways in which we feel the Act should be changed.

1. to reconsider the 50 metre Foreshore definition and ways of protecting this fragile zone,

2. to enable conservation parks and reserves to be established under shared-management regimes with the landowners,

3. to extend representation on the Conservation Council to include senior personnel from all major government departments and important public organisations,

4. to extend the definitions of environment to include fishing in the marine environment,

5. to include EIA as a basic process for all development projects,

6. to include provisions for the development of Conservation Plans to address the conservation issues in the outer islands.

RECOMMENDATIONS IN DETAIL

1. To reconsider the 50-metre foreshore definition and ways of protecting this fragile zone:

   Permit system

   In reviewing this section we have recommended that government organise meetings to obtain public input. The idea of a permit system for public and government considerations will be forwarded.

   It may prove more effective and easier for the public to understand if we issued "permits" rather than "prior written approvals." The Service could develop a permit system for minor and major actions.

   Instead of regulations (Sections 33 and 34) prohibiting all activities within the foreshore zone, we could provide a list of categories of structures and actions which would require permits.

   In the process of considering a permit, the Service should also decide whether a preliminary EIA should be prepared, and based on the finding of the PEIA it would decide if the developer should present a full EIA.

2. To enable conservation parks and reserves to be established under a shared-management regime with landowners.

Shared management of Conservation Areas

The Service is interested in establishing Parks/Reserves on native freehold lands and customary land (uninvestigated) in co-operation with the owners. There is no intention to take land by warrant for conservation purposes.

The concept being developed is one of leasing land, and having a shared-management regime involving representatives of the Conservation Service and the landowners. It is recognised that the conservation and protection of special aspects of the environment depends upon a commitment by the community, especially the landowners, as well as the dedication of the Conservation Service.

Whether such a system can be achieved under the various Acts already in force, or whether it will require an Amendment is still being investigated. The most important point is to offer reasonable protection to areas of conservational significance while ensuring that landowners are fully involved.

To extend representation on the Conservation Council to include Senior personnel from all major Government Departments and important public organisations.

Broad-based Council

This system is preferred for three reasons:

(1) It enables the functions of the Council to be more effectively integrated into the operations of government departments and other large organisations, and thereby be involved earlier in projects which may have adverse impact on the environment.

(2) The Service becomes better able to represent the environmental aspirations of the whole community, and

(3) It is more likely to be effective in the long term by being more conciliatory, rather than antagonistic.

The system under consideration involves the minister responsible for each government department to nominate a person (and one alternate person) to the Council. Also, major organisations such as the House of Ariki, Te Koutu Nui, the Chamber of Commerce and the Tourist Authority would also each nominate representatives.

It is suggested that the Conservation Council would then appoint sub-committees to guide the Director of Conservation and his staff in areas of special interest or concern.

To extend the definitions of environment to include fishing in the marine environment.

The Marine Environment

Despite the intention of the Conservation Act to have the Conservation Service promote the conservation of the environment of the Cook Islands, the Act excludes provisions for the Service to conserve the marine environment.

The exclusion is highlighted in Section 55 which states: "nothing in this Act shall affect the right of any person to fish in any Cook Islands waters, and this refers to "Fish of any kind, including, but without limiting the generality of the term, shellfish, crustaceans and turtles."

This means, for example, that the Conservation Service cannot control or monitor commercial activities within the degraded Rarotonga Lagoon, such as the export of coral, rori (sea cucumbers,) and aquarium fish. It also means that the Service cannot establish marine reserves, or apply any type of raul, in an effort to increase the amount of fish in the lagoon. Nor could it put any restrictions on the practice of spearfishing on SCUBA, which may limit the fish available to ordinary spearfishermen.

This section also prevents the Service from controlling the taking of green turtles in Suwarrow National Park, the Cook Islands' only conservation reserve.

In the same way as the Service monitors the activities of Public Works and other government departments on land, it needs legislation to monitor the activities of the Department of Marine Resources and others as they strive towards the "maximum sustainable yield" of the marine environment.

5. To include Environmental Impact Assessment (EIA) as a basic process for all development projects.

EIA procedure

Without doubt a more broadly based Conservation Council would be the ideal administrative body to operate an EIA process for the benefit of all decision-makers involved in projects which may have adverse impacts on the environment.

If the Council considered that a project may have serious impacts on the environment, it would require the developer to prepare a Preliminary EIA (PEIA) in accordance with Conservation Service PEIA Guidelines. If the PEIA showed that adverse impacts might be serious and had not been adequately minimised, then the Council would require the developer to submit a full EIA to analyse the predicted impacts of the project, and show how they are to be minimised.

The details and format of the PEIA would be determined by the Conservation Service, so they could be modified in the light of experience, rather than in legislation.

The legislation would merely indicate that all development projects require a PERMIT from the Conservation Council, and before a permit is issued the Council may require the developer to submit a PEIA, and where adverse environmental impacts are expected to be great, a full EIA will be required.

6. To include provisions for the development of Conservation Plans to address conservation issues in the outer islands.

Island Conservation Plans

In contrast to the progressive nature of the Act, it should be noted that it applies in full only to the islands of Rarotonga and Aitutaki, leaving the outer islands with inadequate environmental protection.

As a result of approaches made by officials from Mauke in 1987 and recent discussions with the Aitutaki Island Council, the Service has started the preparation of separate conservation plans for these islands.

Each plan will be prepared in full consultation with the Island Council and will reflect the environmental concerns of the people of that island.

When complete each island conservation plan will consist of a set of by-laws administered by the Conservation Officer on behalf of the Island Council and the Conservation Service.

The preparation and negotiation of the conservation plans for each island will be a major undertaking during the next few years.

CONCLUSIONS

The two most important aspects of Cook Islands Conservation are that the Conservation Service is run by a Council which is, in most areas, independent, and administers an Act binding equally on government departments and the general public. In theory this is a perfect basis for a strong and healthy conservation programme. In practice, as the Service is funded by government, the minister and cabinet can exert considerable control over the Service's everyday programmes.

CASE STUDY: THE ROLE OF VANUATU GOVERNMENT'S ENVIRONMENT UNIT

M. R. Chambers, E. Bani and D. Esrom
Environment Unit
Ministry of Lands
Private Mail Box 007
PORT VILA
Vanuatu

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1. INTRODUCTION

1.1 The Environment Unit was established in October 1984 under the Ministry of Lands, Energy and Rural Water Supply. This has not been functional due to lack of staff. In addition, a National Advisory Committee on Environment was appointed by the Minister of Lands, Energy and Rural Water Supply in late 1985 in accordance with the power vested under the Planning Procedure. This committee comprises representatives from the environment-related agencies namely, the Department of Agriculture, Education, Fisheries, Forestry, Geology, Mines and Rural Water Supply, Industry, Local Government, National Planning and Statistics, Physical Planning and Ports and Marine. This committee has not been actively functioning due to appropriate powers.

2. SUBSTANTIVE ISSUE

2.1 Vanuatu has been experiencing rapid economic development and this is expected to be greatly enhanced under the Second Five Year Plan which is currently being formulated. The Plan is ambitious, and entails essentially the development of the following sectors:

(i) Agriculture
(ii) Tourism
(iii) Forestry
(iv) Industry Development
(v) Mining
(vi) Fisheries
(vii) Transport and Other Infrastructure Development

The above Development Plan is bound to give rise to several environmental issues which could cause significant impact on the environment which, unless timely action is taken to mitigate them, will relegate the benefits of development. In this respect the Ministry of Lands, Energy and Rural Water Supply, in anticipation of these problems, initiated several actions to forestall them through properly planned environmental management.

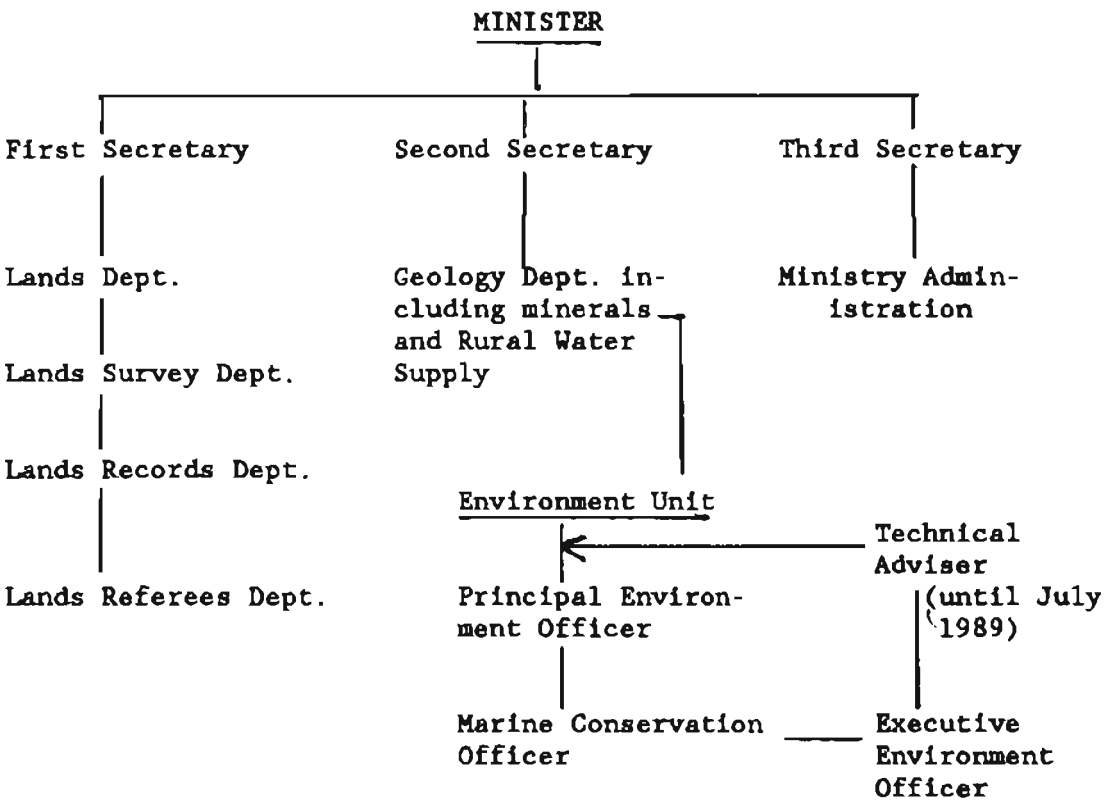
3. STAFF STRUCTURE

3.1 As from September 19, 1986 the Vanuatu Government appointed an Environmental Technical Adviser under the Commonwealth Fund for Technical Cooperation (CFTC) for an initial period of two years. A one-year extension was given to the adviser to the end of July 1989.

In January 1987 two officers joined the unit, one as Principal Environment Officer (Counterpart) and an Executive Officer. A further recruitment to the unit was made in August 1988 when another staff member, a Marine Conservation Officer, joined the unit. At present the Environment Unit has two professional staff holding degrees with one having suitable post-graduate education in Terrestrial Conservation and Resource Management. (Fig. 1)

THE ENVIRONMENT UNIT WITHIN THE STRUCTURE OF THE MINISTRY OF LANDS, GEOLOGY, MINERALS AND RURAL WATER SUPPLY
(Simplified)

Figure 1.



4. THE ENVIRONMENT UNIT - FUNCTION

4.1 The Environment Unit is responsible for advising the Government of Vanuatu on a wide range of environmental issues and for developing policies, programmes and projects concerned with environmental management. This is to prevent avoidable degradation of the nation's natural resources of flora, fauna, reefs, rivers, forests, lagoons etc..

4.2 Policies and programmes include surveys of flora and fauna, new legislation and development of environmental impact studies. Thus the unit is concerned with planning for the management and development of Vanuatu's natural wildlife resources particularly in the rural environment.

5. THE ENVIRONMENT UNIT - PROBLEMS

5.1 The main problem of the Environment Unit is its small size. Therefore it does not have a powerful voice. The unit acts in an advisory capacity only; it has no statutory powers.

5.2 The 1989 budget removed the unit's individual budget allocation. A permanent solution to funding the unit has yet to be finalised.

5.3 A further potential problem may arise if mining ever commences in Vanuatu. The Minister for Lands will be responsible for developing mines on the one hand and for controlling pollution on the other. In such cases it may be better to have separate Ministries involved.

6. SUGGESTED MERGER OF THE ENVIRONMENT UNIT (EU) OF THE MINISTRY OF LANDS, GEOLOGY, MINERALS AND RURAL WATER SUPPLY AND THE PHYSICAL PLANNING UNIT (PPU) OF THE MINISTRY OF HOME AFFAIRS

6.1 Informal discussions have already taken place within the two Ministries regarding the possibility of merging the above units. There seems to be a general consensus of opinion that such a merger would have a number of benefits both to the government and the staff involved.

6.2 At the present time the Environment Unit and the Physical Planning Unit work closely together on a number of interests of mutual concern. The overall aims and objectives of the two units regarding planning, use and conservation of natural resources very much overlap. Both units are comparatively new, small, have limited qualified local staff, limited resources and are both operating professional skills relatively new to Vanuatu. Both units are having to promote themselves to ensure that other ministries, developers etc.. are aware of their existence and function. Being small and separated unfortunately contributes to the units being less prominent and probably thus less effective.

7. REASONS/ADVANTAGES IN COMBINING

a) Overlap of duties

7.1 To some extent the duties of the Environment Unit and the Physical Planning Unit overlap. Both are concerned with the protection of the environment in its broadest sense, and both are involved in efforts to achieve the sound, acceptable and beneficial development of Vanuatu's natural and environmental resources. EU is at the present time most active in the rural areas and the PPU mainly in the urban areas. However the Physical Planning Act allows physical planning to be introduced to any part of Vanuatu with the agreement of custom owners and Local Government Councils. It is very likely therefore that in the future the activities of both units will become even more closely related. Even at the present time the EU is often concerned with urban issues (e.g. water pollution, industrial development, etc..), whilst PPU is often called to comment on rural developments.

b)

7.2 Although EU and PPU are small units (two and three professional staff respectively) they have considerable technical skills, all existing staff holding a degree. EU Staff have received suitable postgraduate education in marine and terrestrial conservation and natural resources management.

7.3 Throughout Vanuatu, the Pacific and the world, environmental and planning matters are becoming increasingly important. It is therefore essential to develop the skills and cooperation needed to produce an effective agency.

c) Sharing facilities

7.4 A combined agency would make more economic and efficient use of office facilities, copying, typing, filing etc.. than two separate agencies. Closer day to day technical and administrative contact would help improve staff skills and awareness of environmental concerns.

d) Greater Prestige

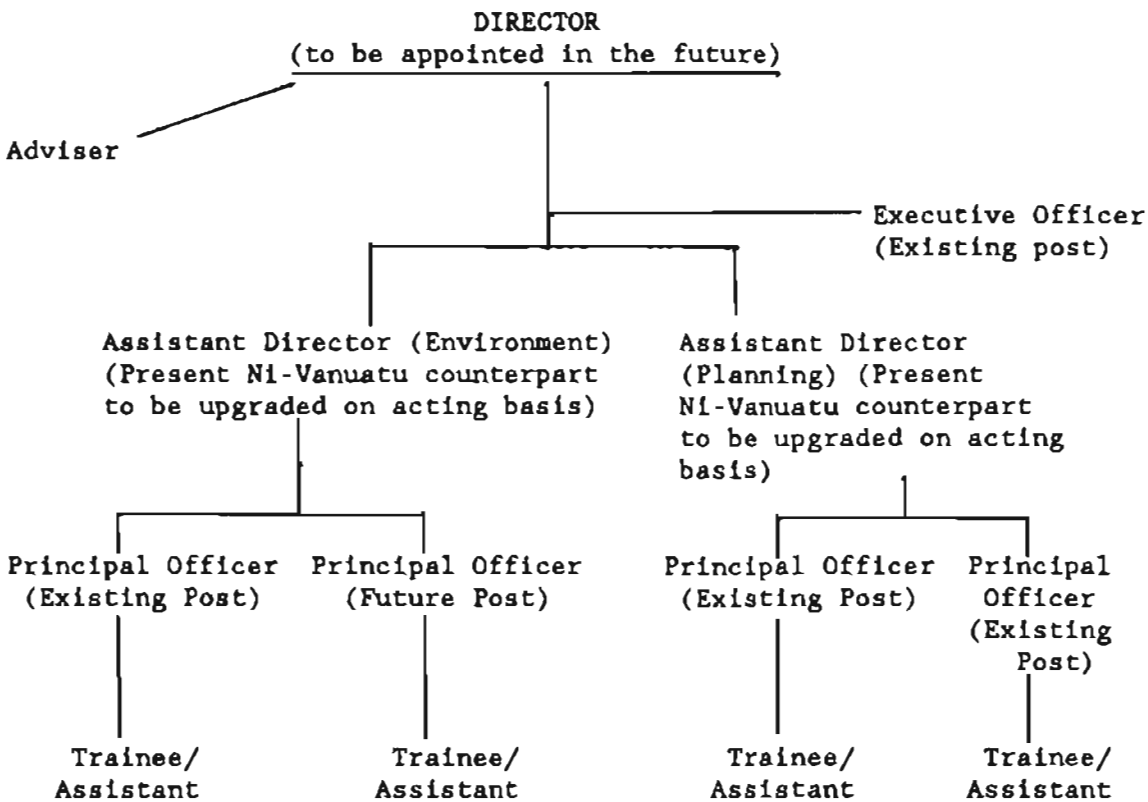
7.5 A joint department would warrant having, in due course, its own Director. Under a Director, the department could consist of two units, one concerned with environmental issues, the other primarily with physical planning in the knowledge that these duties frequently overlap or are closely related. It is considered that a joint unit would benefit NI-Vanuatu staff, development in Vanuatu, and provide a focal point where government and private developers can obtain environmental and planning advice from a central source.

e) Common Legislation

7.6 As Vanuatu's development programmes and legislative controls become more complex, so stronger government agencies are required to monitor them. New legislation is being planned to introduce a range of statutory powers relating to such matters as environmental impact, national parks and pollution.

SUGGESTED STAFF STRUCTURE FOR A COMBINED DEPARTMENT.

Figure 2.



(All trainees are suggested future posts as the work expands)

CASE STUDY: WILDLIFE MANAGEMENT IN SOLOMON ISLANDS
SPREP PROJECT No PA 17

Tanya Leary
Environment and Conservation Division
Ministry of Natural Resources
HONIARA
Solomon Islands

INTRODUCTION

There is no other place in the world, not even the Galapagos islands, where biological phenomena of speciation and population variation among islands in birds are as obvious as in Solomon Islands. Of the 163 species of land birds that breed in the country, 72 species or 44 per cent occur nowhere else in the world. Sixty-two species or 38 per cent occur elsewhere but are represented in Solomons by unique races or sub-species. Only 29 species of bird or 18 per cent are identical to birds living elsewhere (Diamond 1976). Likewise the reptiles, mammals and insects of the Solomons are distinctive. For example, 10 species or 15 per cent of the 65 land dwelling reptiles are found only in Solomons. Yet little is known of the ecology of Solomons Islands' fauna and more species are yet to be found and described.

BACKGROUND TO THE PROJECT

There is increasing overseas demand for Solomon Island wildlife - particularly reptiles and amphibians. Export of live wildlife recommenced in 1987 before legislation or adequate administration structures were in place.

A comprehensive literature search reveals that most of the references and information dealing with Solomon Island fauna are of a taxonomic nature only, i.e. they merely describe the species appearance. Knowledge of the ecology and status and distribution is limited. The Solomon Island Government's recognition of the need for such basic information for effective wildlife management prompted the proposal of this project to the South Pacific Regional Environment Programme for funding. Basic information is needed on the fauna to provide background for the development of wildlife management policy, legislation and regulation, not only with respect to wildlife trade but with respect to wildlife management issues in general.

SPREP agreed to fund this project and with the cooperation of the Overseas Service Bureau and the Australian Volunteer Abroad Programme recruited a wildlife ecologist to undertake this project in conjunction with the Solomon Island Environment and Conservation Division. Work on this project commenced in February 1989, and it is anticipated that it will run to February 1990.

OBJECTIVES OF THE PROJECT

The objectives may be summarised as follows:

1) to document past and present trade and trade practices;
2) to identify species which may be traded on a sustainable basis, and to set quotas where appropriate;
3) to provide information on the status and distribution and habitat requirements of key trade species;
4) to provide recommendations for trade practices which will ensure minimal wastage of wildlife resources and the equitable distribution of commercial profits;

5) to provide recommendations and guidelines for the preparation of legislative protection and management of fauna and for the control of wildlife trade;
6) to provide guidelines for the establishment of an efficient administrative structure to regulate and monitor wildlife trade;
7) to identify species threatened by factors other than trade, and, where appropriate, to make recommendation for the diminution of such threats and for the management of threatened species;
8) to identify species or areas of special faunal interest which require more detailed study;
9) to clarify, document and publicise culturally significant fauna; and
10) to increase community awareness of the role of indigenous fauna in the environment and the relationship between fauna, the health of the environment and the community.

WILDLIFE MANAGEMENT ISSUES IN SOLOMON ISLANDS

Wildlife management issues in Solomon Islands result from actions pertaining to one of the following categories: 1) wildlife trade; 2) changes to traditional usage; and 3)habitat destruction.

1) Wildlife trade

To date, the majority of work on this project has been concentrated on matters of trade. The justification for wildlife trade has been its ability to provide a cash income for those with little capital resources. Yet the equity of distribution of income is questionable. For example, the average price received for a monitor lizard (*Varanus indicus*) is $2.50 to $20 SI by the collector in the village, $14 to $28 by the Solomon Islander licensed exporter and $300 US or approximately $840 SI by the American importer. Future work needs to examine the feasibility of price control to ensure more equitable returns.

Three classes of wildlife products are exported from the Solomons:
a) products of dead animals, namely crocodile skins and Hawksbill turtle shells;
b) whole live reptiles and amphibians for pet owners and animal collectors; and
c) butterflies and other dead insects for curios and collectors' specimens.

Figure 1 shows the volume of Hawksbill turtle shell (Kg) and crocodile skins (inches) exported from Solomon Islands since 1983 and 1985 respectively. Figure 2 shows the number of live reptiles and amphibians exported since August 1988. The live reptile trade has been steadily rising. The species exported is also diversifying. Initially only the prehensile-tailed skink (*Corucia zebrata*) and Pacific boas of the genus *Candoia* were regularly exported. Now species exported are: gekkos including *Gekko vittatus*, *Gehyra oceanica*, *Gehyra mutilata*, *Lepidodactylus guppyi*, and *Crytodactylus* sp.; skinks including *Corucia sebrata*, *Lamprolepis smaradgina*, *Eugongylus albofasciolatus*, *Prasinohaema virens*, and *Emoia* sp.; the Agamid or dragon lizard *Gonocephalus godeffroyi*; the monitor lizard *Varanus indicus*; snakes including *Candoia carinata*, *C. bibroni* and *Acrochordus granulatus*; and frogs including *Discodeles guppyi* and *Ceratobrachus guentheri*.

Management of this trade is hampered by lack of distributional and status data and general ecological information. This project seeks to partially address these deficiencies, and thus to provide information to identify species which can be traded on a sustainable basis. Animals which have

limited distribution, rare status, low population densities, a low reproductive rate or whose habitat is limited and/or threatened by development should not be exploited.

Effective management of trade will require the number of individuals exported of some species to be limited. This can be achieved by establishing quotas. However, quotas on total numbers or on numbers exported by individual dealers will not prevent some areas from being depleted due to the manner of the operations of licensed exporters. There is one licensed exporter per province. The operations of the licensed exporter are not confined to that province or to one area. Monitoring of the area of purchase is required. This will allow areas of concern to be identified, and the effects of collection on populations to be monitored. Some areas which are regularly collected in have already been identified, and monitoring should be undertaken in these areas. Only continued monitoring of the wildlife trade will ensure that species and/or localised reptilian and amphibian populations are not threatened. Careful management of these resources is needed if their usage is to be sustainable.

2) Changes to traditional usage of fauna

Traditional conservation practices have long been a part of the Solomon Islanders' resource management. Tambus are still often effective in giving protection to specific areas or species of wildlife. However, many traditional conservation practices have begun to break down with the introduction of a cash economy and of new technologies, and a high population growth (3.5%) exerting more pressure on limited resources.

The changes to traditional usage of wildlife in some cases has now become a threat to the status of those animals being utilised, as self-regulating traditional conservation practices are no longer in place and the number of people exploiting the resource has risen. Examples of species that are now, or are in the future, likely to be threatened by what was once traditional usage include the megapode (*Megapodius freycinet*), large pigeons such as the grey pigeon (*Ducula pistrinaria*) and turtles (*Chelonia mydas* and *Eretmochelys imbricata* in particular).

Sustainable usage of resources such as megapode eggs, which are of dietary importance in some areas such as Simbo and Savo needs to be encouraged. The concept of wildlife management areas modelled along the lines of PNG's wildlife management areas may provide the means to diminish the threats to these types of resources. Given the public's current understanding and awareness of conservation ideas, in the short term wildlife management areas are the conservation areas most likely to succeed on customary lands. Providing use of resources is managed rather than totally prohibited, and that management is beneficial to the resource in the long run, an incentive will be provided for the conservation of resources, and support for the wildlife management area concept should be forthcoming.

3) Habitat Destruction

In the Solomons shifting agriculture and forestry operations are the two most widespread causes of habitat destruction. Lowland primary rainforest contains the habitats most threatened. It is difficult to estimate the percentage that has already been logged or cleared for agriculture as there is no up-to-date forest data inventory.

Species whose distribution is restricted to primary lowland rainforest and likely to be threatened by further habitat destruction need to be identified. It is hoped that this project will be able to identify such species.

Means of diminishing such threats is not however easily achievable. In the Solomon Islands only 9 per cent or 246,000 ha is owned by the government. Of this 117,616 ha or 48 per cent is committed to forestry plantations or operations, and there is therefore a shortage of uncommitted government-owned land. There appears, at present, little potential for development of representative conservation reserves on government-owned land. This leaves the prospect of development of reserves on customary land. Currently, there is inadequate legislation and little incentive for land owners to reserve their land for conservation purposes.

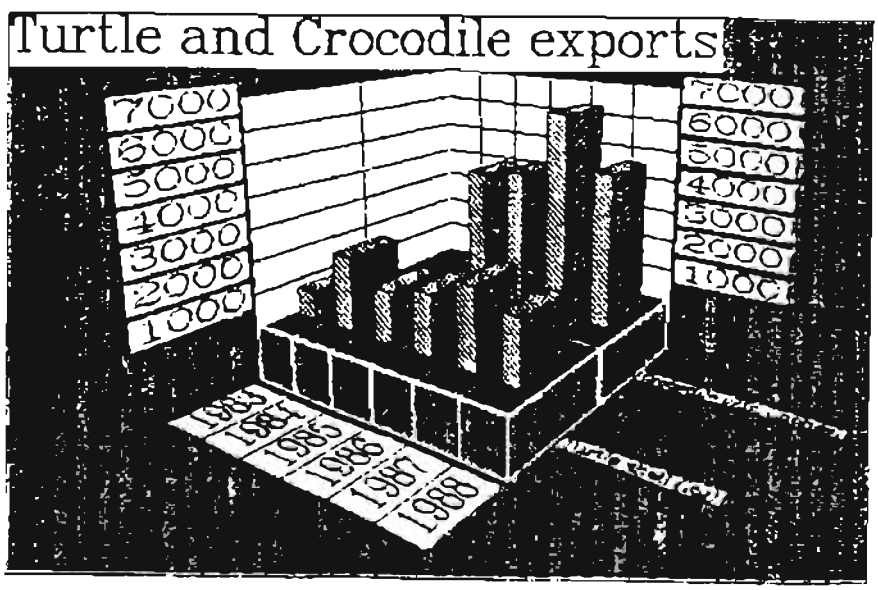
CONCLUSIONS

Basic information on the ecology, status and distribution of Solomon Islands fauna will provide background for the development of national wildlife management policy, legislation and regulation. If Solomon Islands unique fauna, a valuable part of its heritage, is to be maintained, threats to species need to be identified, and actions taken to diminish these threats. This project aims to redress these informational deficiencies, and to provide guidelines for the sustainable use and management of Solomon Island fauna. Integral to the implementation of sustainable resource use and effective wildlife management in the Solomon Islands is the need for a National Policy on Environment and Conservation. This should be a precursor to the drafting of environmental legislation. It is hoped that work on a National Policy on the Environment and Conservation will commence in the near future.

References

DIAMOND, J.M. (1976) A proposed forest reserve system and conservation strategy for the Solomon Islands. Unpublished report.

Figure 1. Kilogrammes of Hawksbill Turtle shell and inches of crocodile skin exported from Solomons from 1983 and 1985 respectively.



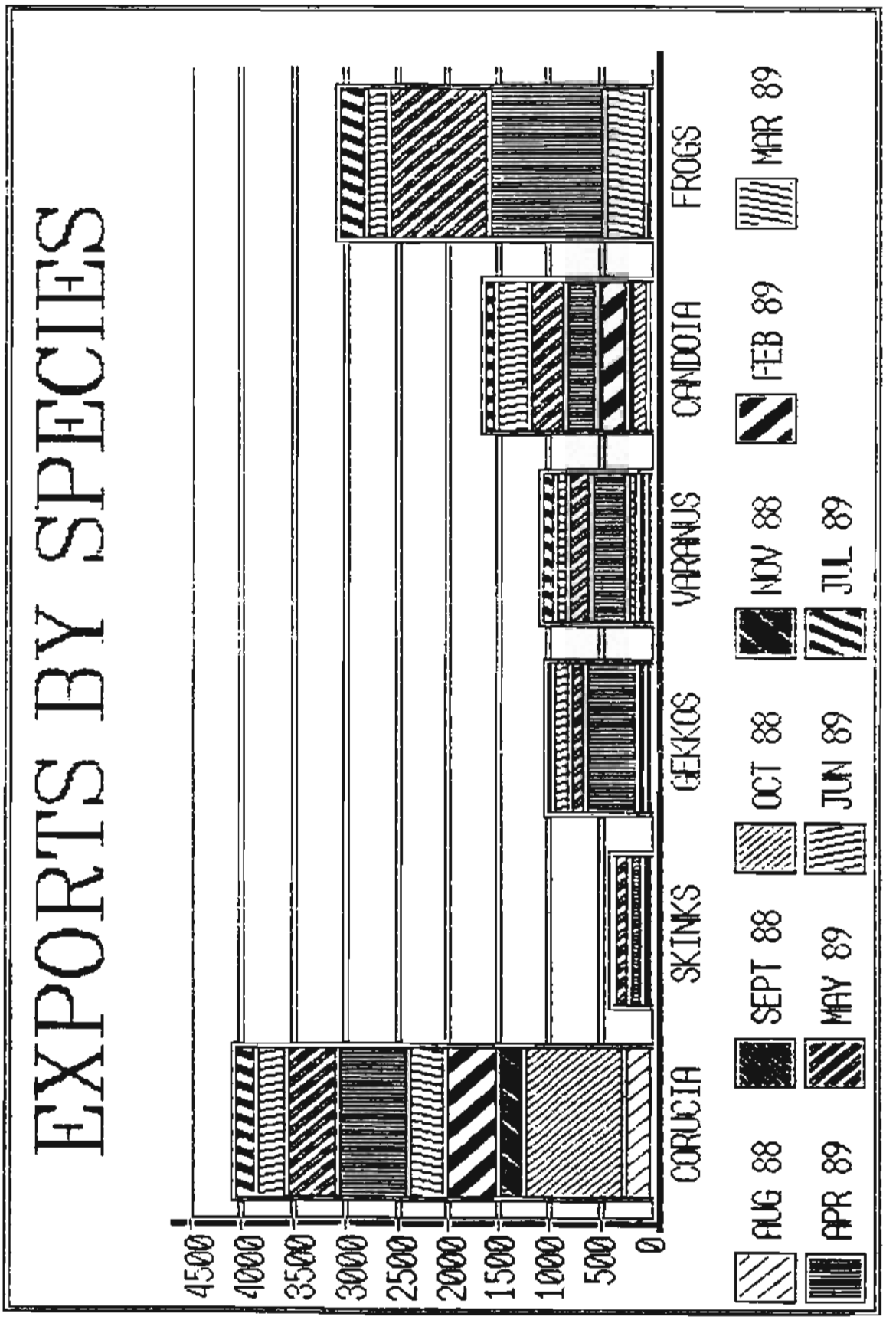


Figure 2: Numbers of live reptiles and amphibians exported, from August 1988 to July 1989.

CASE STUDY: CONSERVATION IN PALAU - REBUILDING THE CONSERVATION SERVICE

Ngemei Otobed
Chief Conservationist
Bureau of Resources and Development
KOROR

INTRODUCTION

As reported in the Palau Country Review papers, Palau has various conservation laws which are supposed to be enforced by the personnel of the Bureau of Public Safety. However, due to the very limited number of personnel in the bureau, only very minimal enforcement is carried out. In addition to the limited number of employees, the policemen are not adequately trained to handle conservation matters.

We have two designated protected wildlife preserves. One, the Ngerukewid Wildlife Preserve and, two, the Ngerumekool/Channel Grouper spawning area. The former encompasses an area of about 259 ha, and is composed of a group of rock islands and the marine area surrounding the islands. The latter one is a small part of our Western Barrier reef, called Ngerumekool. From April to July there is no fishing of grouper in this area.

There are also many protected sites which are mentioned in the Palau Country paper. However, these are under the Ministry of Social Services, Bureau of Community services. These, too, are to be protected, and need some sort of enforcement officials.

Some 21 trochus sanctuaries exist throughout Palau, and these are to be patrolled during trochus open season. Just recently, a moratorium in trochus harvesting was established for the next three years.

Other laws relating to the protection of certain organisms, i.e. birds, turtles, dugong, etc. must also be enforced.

Other environmental activities are handled by the Environmental Quality Protection Board. This Board has staff, laboratory and an office. It receives federal grants.

Government agencies like Health Services, Environmental Health, Forestry, Agriculture, Land and Surveys and the states, etc. are also implementing certain conservation work. This, of course, includes the inadequate enforcement done by the Bureau of Public Safety under the Ministry of Justice.

PREVIOUS CONSERVATION PROGRAMME

The Conservation Programme for Palau was in place in the 60s and 70s as a part of the over-all Trust Territory Conservation Programme. Toward the end of the 70s, the conservation programme ceased to exist as the Republic became a constitutional government. The former office, a laboratory and various documents and files were left with only one employee who could not do or carry any conservation programme for lack of adequate knowledge and ability. The laws that were in effect were enforced by the Bureau of Public Safety, which, as mentioned earlier, did almost nothing in the conservation programme in enforcement of conservation laws.

NEW CONSERVATION PROGRAMME

Because of a great need to enforce and protect our resources the former Vice-President and President, the Honorable Thomas O. Remengisau, issued an Executive Order No. 70 to create the Division of Conservation and Entomology in the Bureau of Resources and Development within the Ministry of National Resources. Among its many responsibilities, the division is to prepare plans and direction for the Republic-of-Palau-wide conservation programme involving all resources, and to establish a national scheme for the enforcement of conservation laws and regulations, etc. The programme is about 10 months old now.

REPUBLIC of PALAU
Office of the President

Thomas O. Remengesau
President

P.O. Box 100, Koror, Palau 96940
Phone: 488/403 Telex: 728-6914

EXECUTIVE ORDER NO 70

Amending Executive Order No. 9, as amended, by formally establishing Division of Conservation and Entomology and Division of Mineral Resources within the Bureau of Resources and Development, Ministry of National Resources.

WHEREAS, Article VI of the Constitution of the Republic of Palau mandates the National Government to take positive action to attain national objectives and implement national policies including conservation of a beautiful, healthful and resourceful natural environment; and

WHEREAS, on August 31, 1981, the late President Remeliik issued Executive Order No. 3 - Organization of the Executive Branch - Government of the Republic of Palau - under which "Division of Conservation" was listed under the Bureau of Resources and Development, but said reference was inadvertently omitted in the formulation of Executive Order No. 9 when promulgated on September 29, 1982; and

WHEREAS, Executive Order No. 9, as amended, Part V, Section 1 lists as among the duties and responsibilities of the Bureau of Resources and Development "...the promotion, exploitation, development and conservation of the natural resources of the Republic, including marine and fisheries, agricultural, forestry, mineral and other land-based and ocean resources;" and

WHEREAS, since the establishment of the constitutional government on January 1, 1981, responsibilities for conservation of natural resources and enforcement thereof including entomology and development and exploitation of mineral resources have not been clearly defined and no agency or government instrumentality has been charged with carrying out duties and functions relating thereto;

NOW, THEREFORE, by virtue of the authority vested in me by the Constitution and laws of the Republic of Palau, it is hereby ordered that Executive Order No. 9, as amended, is further amended in the following particulars:

1. Added to Part V, Section 1, is a new division as follows:

"(c) Division of Conservation and Entomology. Headed by a Chief who is responsible to the Director of the Bureau of Resources and Development, the Division of Conservation and Entomology shall have the following duties and functions:

i) Prepare plans and directions for the Republic of Palau-wide conservation program involving soil, resources, water, archaeological remains, flora and fauna;

ii) Prepare plans and directions for the Republic of Palau-wide entomological program involving insects, pests, weeds and related control measures;

iii) Provide technical assistance and guidance to the three branches of the National Government and State Governments, and their appropriate agencies, in matters relating to conservation, including establishment of a national scheme for the enforcement of conservation laws and regulations;

iv) Provide technical assistance and guidance to the Division of Agriculture and Forestry, State Governments or other governmental agencies or private agriculture projects or programs relating to entomology;

v) Establish and maintain contacts with entomologists and other scientists and conservation-oriented national, regional or international organizations which can be of aid in solving conservation and entomological problems and needs of the Republic;

vi) Develop and organize education programs on the principles, objectives and practices of conservation and entomology for schools, museums, other government activities or locally established groups and organizations;

vii) Coordinate entomological works with the Division of Agriculture and other governmental agencies dealing with entomology and related pest control problems, including amendments to or enforcement of Plant and Quarantine Rules and Regulations of the Republic, and

viii) Perform such other duties, functions or responsibilities that may from time to time assigned by the Bureau Director or the Minister of National Resources."

Part 5

Environmental Education and Training

THEME PAPER: ENVIRONMENTAL EDUCATION AND TRAINING

Neva Wendt
Environmental Education Officer
South Pacific Regional Environment Programme (SPREP)
South Pacific Commission (SPC)
P. O. Box D5
NOUMEA CEDEX
New Caledonia

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1. INTRODUCTION

Since the Programme's inception, SPREP has been actively involved in environmental education. The last four years since the third parks conference has seen an acceleration of this work culminating today in an extensive range of education material, in both written and audio-visual form, together with a variety of training workshops and courses, aimed not only specifically at protected area management but also at wider environmental concerns.

SPREP's mandate, given by the governments of the region in 1982 at the Conference on the Human Environment in the South Pacific, held in Rarotonga, Cook Islands, stated that priority should be given throughout the education systems, through primary, secondary and tertiary institutions and in the various media for public information and education, to provision of relevant environmental education material. At that time, the governments expressed concern that insufficient material existed, and where it did exist, much was irrelevant to the specific needs of the island environment.

This mandate was further strengthened in 1985 when an independent evaluation of SPREP reported member governments' desire for a greater share of funding to be allocated specifically to environmental education. Again, at the third parks conference, in Apia, Western Samoa, the wish to strengthen environmental education was reiterated when delegates made 'Goal A' of their Action Strategy for Protected Areas in the South Pacific Region, the "implementation of programmes to expand efforts in conservation education and to increase public awareness of the values and benefits of environmental concerns including protected areas".

It is with this appreciation and awareness of the requirements and wishes of our member governments that SPREP has embarked on an extensive programme of regional environmental education projects at the primary, secondary and tertiary education levels; at government administration level; at the wider community level; as well as giving support to specific in-country environmental education initiatives. SPREP is only at the beginning of this aspect of its work, and we foresee, in line with current trends elsewhere in the world, an accelerated, well-funded and expanded environmental education, information and training programme over the next four-year period which will bring us up to the 5th South Pacific Conference on Nature Conservation and Protected Areas.

2. Specific Activities Undertaken

2.1 Printed and Audio-visual Material Production

Production of material on a region-wide basis, suitable for the specific needs of twenty-two different countries is initially a daunting task. For whilst 'relevance' of material to the specific features of the island environment serves as the overall guiding principle, other secondary criteria such as differing levels of technological development; different languages, sometimes mul-

tiple within one country; different education systems; and different cultural systems serve to complicate production of material suitable for the entire South Pacific Region. This, then, necessitates a high degree of flexibility in environmental education material production, with adoption of several 'formats' in the case of audio-visual material, several 'languages' in the case of posters, and provision of 'additional material' which, in our more developed neighbouring countries, would be automatically available. These features serve to significantly increase costs of regional material production. The support, therefore, of international organisations and donor governments, has been, and will increasingly become, important to SPREP's continuation and expansion of work in this area. To date considerable 'regional' material has been produced by SPREP with specific financial support from the United Nations Environment Programmes (UNEP), the International Centre for Ocean Development (ICOD), the Government of the United Kingdom and technical assistance and expertise from the universities and other research and training institutions who jointly form the Association of South Pacific Environmental Institutions (ASPEI). Examples of this material include:

Fact Sheets - On the subjects of Forests, Coral Reefs, Soils, Conservation, Pesticides and Mangroves. Initially developed as an aid for radio broadcasters who required factual, yet simply written background material for use in producing environmental radio broadcasts, these are now distributed widely in response to requests from teachers and the general public.

Environmental Case Study Leaflets - A series of five major environmental issues on topics such as the effects of nickel mining in New Caledonia, atolls and the cyclone hazard, the effects of phosphate mining in the region, the effects of gold mining in Papua New Guinea, to name only some, all serving as technically explicit, yet simply written, resource material for use by high-school and university students.

Coral Reef Kit - With financial assistance from the United Nations Environment Programme (UNEP) and from the Government of the United Kingdom, a variety of material, aimed at various audiences from young children through to government officers, has been produced and is distributed widely in an easily handled and durable kit format. Slide sets, posters, booklets, stickers, colouring sheets and student exercises have been made available on this topic which is of specific relevance to the island environment.

Coastal Zone Protection Kit - In the same format, this material produced with financial assistance from the Canadian-based International Centre for Ocean Development (ICOD) contains booklet, student exercises, posters, a jigsaw, leaflets, and, like its Coral Reef counterpart, is widely distributed, particularly to the region's schools.

'The Story of an Island' and 'Your Changing Island Environment' - The subject of videos with a specific Pacific Island flavour which, together with slide sets on 'Forestry', 'Coral Reefs' and 'Problems in the Pacific Island Environment' attempt, via the audio-visual media, to raise awareness throughout the region of specific South Pacific environmental concerns.

These are a few examples of the attempt being made through SPREP to redress a situation well recognized by our member governments, of a dearth of specific Pacific Island material. Yet our efforts are small and the requirements of the region large. Thus, we have recognized that environmental awareness will only be adequately raised when the pool of trained environmental educators and environmental managers, in each country, is significantly increased. It is for this reason that we regard TRAINING as an increasingly important undertaking for our programme.

2.2 Training Courses

In some of the region's smaller countries, the training of, say, fifteen people in environmental management, environmental education and awareness-raising can significantly influence the future direction of environmental protection of that country. Training, whether it be of teachers, radio broadcasters, government officers, community groups, has become, and will continue to be, a priority for our activities. As well we have come to recognize that more value can accrue from in-country workshops, seminars and meetings. For whilst training a person in their own country, you are also consciously or unconsciously training those around him/her, and enabling the training to take place within the context in which the lessons learned will later be applied. Whilst benefits, too, obviously result from sub-region and regional meetings and workshops, allowing for a broader perspective to be obtained, it is often difficult on returning home for the trainee, unless he/she is in a senior decision-making position, to fully implement the new-found expertise and skills.

Commencing with the Training Workshop for Protected Area Managers which took place in Apia immediately following the Third South Pacific National Parks and Reserves Conference, training activities have been steadily increasing. In Apia, valuable assistance was provided by the Government of New Zealand, the International Union for Conservation of Nature and Natural Resources (IUCN) and the United States National Parks Service in developing a specific training manual for managing protected areas - the first of its kind in the region.

In the ensuing four years training has been undertaken in Coastal Resource Management Planning through a series of SPREP training workshops, supported by the Economic and Social Commission for Asia and the Pacific (ESCAP), and held in Tonga, the Federated States of Micronesia and here in Vila. In each case approximately 16 participants (with the addition of some sub-regional representatives) have been trained in resource management, drawing on expertise and examples from within their own country. Such training is proving a valuable adjunct to increasing the pool of future 'managers' capable of ensuring that adequate conservation of resources is regarded as a priority activity.

Protected Areas Management Training has been undertaken with assistance from both the Governments of Australia and New Zealand, who have encouraged and financially supported Pacific island participation at such courses in their respective countries. The most recent of these undertakings will be held, in Australia, by the South Australian National Parks and Wildlife Service following our current Conference. Pacific island participation has been made possible through Australian government aid.

South Pacific Protected Area Management Training Needs were further assessed last year when the East-West Center organised a workshop in Armidale, Australia. The results of this workshop form the subject of a case study paper to be given later by our East-West Center representative.

A Teacher Training Programme has been developed as a result of a regional workshop in 1988 involving representatives from education departments and their curriculum development units. At that workshop, the region's teachers stressed the need for further training to ensure that conservation messages became well integrated into the classroom on a day-to-day basis. Teachers stressed that cognisance be given to the value of teaching traditional conservation techniques and that environmental messages be integrated not just into the science/geography/community studies subjects but also form topics for school readers, language studies, etc. A training manual was accordingly developed for a series of forthcoming workshops in which teachers will be trained in integrating a conservation message into both their classroom and field activities.

Training in Environmental Impact Assessment (EIA) of development projects within the region, is another and more recent training initiative undertaken by SPREP, supported by organisations such as the Asian Development Bank, the East-West Center, the United Nations Environment Programme, the University of the South Pacific and the University of Papua New Guinea. The conservation of natural resources is the underpinning principle from which such assessments emanate, and this training goes a long way towards strengthening in-country expertise in ensuring sustainable development and environmental protection of the region's scarce resources.

Training of Radio Broadcasters has been undertaken in recognition of the far-reaching nature of this communication medium within the region. This has formed an important part of overall training activities, aimed specifically at reaching the grass roots and strengthening community awareness.

The activities of SPREP in undertaking environmental education and training are only one part of the wider regional picture. Already countries, either with support from SPREP or of their own volition, have undertaken significant programmes of environmental education and awareness-raising. For example, the Government of Tonga has been in the forefront of this work with its well-established National Environment Week activities of which we will hear more in a case study paper. Other countries, too, have undertaken significant work, whether it be through promotion of a National Conservation symbol; a seminar to promote sustainable development; production of material aimed at tourist appreciation of natural resources; or community awareness-raising via something as simple as an aluminium can recycling project. All form a significant and impressive contribution to environmental education, training and awareness-raising within the region.

A growing number of non-government organisations, either with a specific environmental protection orientation or as one strand of their community development work, have been established. Groups like SPACHEE (The South Pacific Action Committee for Human Ecology and the Environment); Le Vaomatua in American Samoa; the Melanesian Environment Foundation in Papua New Guinea; the Solomon Islands Development Trust; Atuatu Te Natura in French Polynesia; the National Trust for Fiji; Greenpeace; the Fiji Council of Social Services, to name but some, are among the increasing number of groups undertaking environmental awareness-raising projects. However, at both a government and non-government level, considerable work still needs to be done, and it is for this reason that the remainder of this paper will suggest future directions for the region's Environmental Education, Training and Awareness-raising activities.

3. Future Directions

As stated earlier, one of the major goals for the region should be the building up of a pool of trained manpower with expertise in environmental management and protection and environmental communication skills. This training, together with relevant material support, could be directed at four major groups:

As stated earlier, one of the major goals for the region should be the building up of a pool of trained manpower with expertise in environmental management and protection and environmental communication skills. This training, together with relevant material support, could be directed at four major groups:

a) Government Departments/Units specifically charged with responsibility for environmental matters.

Already existing in some of the countries of the region, and currently being established in others, these departments are essential if governments are to seriously embrace sound environmental management and protection. The continued training of the staff of these departments in such matters as Environmental Impact Assessment (EIA) of development projects, Protected Area Management to safeguard the growing number of the region's protected areas, general pollution monitoring (essential as industrial activities within the region increase) and communication with the public in raising the community's environmental awareness are matters of priority.

b) Teachers/Pupils. Continued incorporation of environmental content into school curricula and provision of material support with associated teacher training are a further priority. Concentration now on educating children about the environment is a sound investment for the future, as it decreases environmental damage and reduces the need for large-scale environmental awareness-raising activities later. The celebration of a National Environment Week/Day, undertaken in association with other community groups, has substantial and long-term benefits for usually only small amounts of expenditure.

c) Communicators. Training and encouraging radio broadcasters and newspaper publishers to incorporate environmental material into their programmes and publications has obvious widespread benefits. One of the best-placed people to provide this information is a member of the government environment department who can filter through material which the often small/overworked radio-programme producer or newspaper editor is only too happy to accept. Training of government officers in suitable presentation of environmental news is, therefore, an important undertaking.

d) Community Groups/Grass Roots Organisations. Last, but certainly not least, is the need to strengthen support and provide material to the strong network of community, church, women's and youth groups - an influential force in many Pacific countries.

These four major groups are not seen as working in isolation but rather constantly interacting with each other. The National Environment Week activities, for instance, involving schools and community groups in tree planting, essay/poster competitions, involving churches in special environmental services broadcast over radio, involving the wider public in government seminars, is just one example of this joint environmental awareness-raising potential. By interacting also with SPREP, and through us gaining the technical support, much can be achieved.

To ensure the continued conservation of nature and the establishment of protected areas in the South Pacific, it is necessary to train Protected Area Managers, and to produce specific literature on the various aspects of conservation. But it is also essential to undertake a major thrust aimed at educating and training the entire community - government officers, teachers, school children, communicators and the plethora of people organised in community groups.

CASE STUDY: TRAINING AND EDUCATION IN RESOURCES AND PROTECTED AREA MANAGEMENT FOR PACIFIC ISLAND COUNTRIES

Lawrence S. Hamilton
Research Associate
East-West Center
Environment and Policy Institute
HONOLULU
Hawaii

It is fitting to address this topic in 1989 at the Fourth Conference not only because of its timeliness today, but partly because four years ago in Apia the subject of training in conservation area management in the South Pacific Region was emphasized as Key Issue Number 11 by Peter Eaton (1985). Moreover at the same conference, Jim Thorsell presented a "Case Study: Options for Training of Protected Area Managers in the Pacific" (Thorsell 1985). It seems appropriate to review what has transpired in this arena in the past four years, and to assess whether anything has really improved. I shall try not to repeat things so well stated in those two excellent papers, except where absolutely necessary to make a point. I prefer to ask those of you particularly interested in this topic to re-read those presentations, which are still relevant. I have brought a few copies of each of them for those of you who do not have them back home in the files.

Recall that the 1985 Apia Conference developed an "Action Strategy for Protected Areas in the South Pacific Region" (South Pacific Commission 1985), and objective D.3 was set forth as follows: "to develop training programmes to ensure the availability of adequately trained manpower." The specific "activities" listed at national, regional and international levels were:

1. Encourage the inclusion of appropriate protected area management skills in relevant educational curricula.

2. Publish and distribute a training manual on protected area management in the South Pacific.

3. Develop and undertake in-service training programmes to develop protected area skills drawing on appropriate regional expertise. Emphasis to be placed on the practices of traditional use and their incorporation into contemporary park management procedures.

4. Encourage participation of staff at regional and international training programmes.

5. Encourage bilateral training involving secondment of officers, from countries within and outside the region, to facilitate on-the-job training of local staff.

6. Undertake a regional manpower requirement survey to identify future training needs and opportunities.

7. Provide basic reference manuals and publications on protected area management to all park officers in the region.

I think that it is fruitful to use these seven activities as a framework to assess what has been happening over the past four years, and will so structure this paper. A lot has been accomplished!

1. Educational Curricula

Some real progress has been made in putting more protected area management into relevant educational curricula. In point of fact, some new curricula, specifically focussed on protected area and national park management, have been recently developed and are available at the technical diploma, undergraduate and graduate levels. For instance, in 1989 a new bachelor's degree programme in Applied Science (Parks and Wildlife Management) was launched at Queensland Agricultural College, Gatton, Australia. A course leading to a Bachelor of Parks and Recreation Management was begun at Lincoln College, New

Zealand, in 1988. The University of the South Pacific has established a Bachelor of Science in Environmental Studies which combines natural sciences with social science and human dimensions. A new course on Park and Wildland Management has been put in place in the Natural Resources Bachelor's degree programme at the University of New England (Australia). James Cook University (Australia) has undergraduate subjects now in National Parks and Wilderness Issues and Recreational Tourism. It is also probing a training programme in conjunction with the Queensland Barrier Reef Marine Park Authority aimed at practical skills for coastal and marine protected area managers. The University of Hawaii at its Hilo campus is proposing a new undergraduate certificate major and a M.S. programme aimed at protected area management. A Bachelor of Applied Science (Parks and Recreation) which began in 1987 in an external studies mode, began to cater to full-time, part-time and external students in 1988 at Riverina-Murray College of Advanced Education.

The East-West Center joined with the University of New England in October of 1988 in convening a workshop of those institutions offering training or education for protected area professionals in the Pacific Region. A matrix listing these institutions and the type of programmes offered is given in Appendix 3. It is a fairly impressive list, and by no means covers all of the possibilities available for training or education, e.g. many mainland U.S. universities. A conclusion of the workshop was that: "Among the institutions represented at the workshop and others in the region unable to attend, there is an excellent capability for training and education programmes and activities at all educational levels, and for all levels of potential trainees. The quality of the existing offerings by the institutions is high, as indicated by the program and course descriptive materials which were distributed." (Hamilton 1988). That is not to say that there is not room for improvement, particularly in two areas; first, getting more protected area management and conservation material into the curricula of the traditional natural resource management programmes (forestry and range, wildlife and fisheries management); second, further development of "distance" education (particularly with computer, self-operated programmes), because travel in the Pacific is so expensive; third, providing training programmes at the ranger level (it is recognized that educational institutions may not be able to undertake this technical level responsibility).

2. Training Manual on Protected Area Management in the South Pacific

In response to this recommended action, SPREP joined with CNPPA (IUCN) to fund the compilation of, and then with the help of the U.S. National Park Service publish, a training manual which appeared in 1987. Compiled by Rex Mossman (1987) it is entitled "Managing Protected Areas in the South Pacific -- A Training Manual." It is in modular form with various lesson plans. I would very much like to have any feedback from individuals who have used this as either teachers or learners.

3. In-Service Training Emphasizing Skills and Traditional Use Practices

It is difficult to assess how much of this has taken place since Apia, but I have a very strong impression that the number and quality of these has been greatly accelerated in the past few years. A few examples will indicate the variety. SPREP has developed or funded several such activities. Special reference might be made of the in-country (sub-regional) training sessions on coastal area management held in Tonga, Federated States of Micronesia and Vanuatu over the past three years. These had a major component in protected area management. The East-West Center designed and carried out in 1987 a six-week training programme in Honolulu for young area professionals, on the topic of "Biological Diversity in Protected Areas." A three-week in-service course

on "Ocean Resources Management" was held in early 1988 in Vanuatu, sponsored by the Government of Vanuatu, South Pacific Forum Fisheries Agency and University of the South Pacific.

The U.S. National Park Service has continued its International Seminar sessions. Its 1989 seminar focussed on management plans for coastal protected areas, and was held in Florida. Pacific Island professionals are encouraged to apply for this training activity.

The core activity of the School of Environmental Conservation and Management (Ministry of Forests, Bogor, Indonesia) is an eight-month international training activity on "Nature Conservation and Wildlife Management". It emphasizes field practicality in the humid tropics. The objectives are to provide in-service training to personnel employed in the field of nature conservation in order to improve their managerial skills. Participants from Papua New Guinea and the Solomons have gone through this training activity.

Nine of the institutions listed in Appendix 3 currently sponsor short courses and training workshops. There has been one major loss, hopefully a temporary one. The New Zealand Department of Conservation had made a conscious effort to open up its fine in-country training programmes to Pacific Island management professionals, and in 1987 had hosted a specific international training course (15 countries participated with 20 officers). However, recent budget constraints and reorganisation have severely restricted the international effort. It is hoped that the representatives from New Zealand at this conference will have hopeful news for us, beacause they had a fine operation in place.

7. Reference Manuals and Publications for Park Officers in the Region

This activity suggested that basic publications be provided to all park officers - a formidable task. It is an excellent idea, that a basic bookshelf of good materials be in the hands of all park professionals. Actually a start was made in this process, when the recently published (1984) IUCN book "Marine and Coastal Protected Areas: A guide for Planners and Managers" (by Salm and Clark) was distributed to all attendees at the Apia conference. SPREP has subsequently distributed additional copies in the region, as has the East-West Center. Copies of Dahl's Protected Area System Review for Oceania have also been widely distributed in the Region. However, this is an expensive and ambitious objective, and no grand systematic programme has been implemented by any institution. Particularly valuable at the present time would be such additional books as:

"Managing Protected Areas in the Tropics" by J. and K. MacKinnon, G. Child and J. Thorsell, 1986, IUCN.

"The Traditional Knowledge and Management of Coastal Systems in Asia and the Pacific", eds. K. Ruddle and R. Johannes, 1983, Unesco.

"National Parks, Conservation and Development" eds. J. McNeely and K. Miller, 1984, Smithsonian Institution.

"Human Impacts on Coral Reefs: Facts and Recommendations" ed. B. Salvat, 1987, Antenne de Tahiti Museum.

"Handbook for Mangrove Area Management," eds. L. Hamilton and S. Snedaker, 1984. East-West Center.

There are many other important works of course. The Topic Reviews of SPREP are probably adequately distributed, and are most valuable.

Protected area officers also benefit by receiving and reading newsletters, journals and other publications on nature conservation. Yet I have encountered all too many parks officers in the Pacific (and Asia) who seem to be completely cut off from these information networks. They often feel professionally isolated, especially if in remote areas, or in agencies with other primary interests. A partial listing of such periodical material which is available free or at low cost has been compiled, and is appended to this paper as Appendix 1. Additions or corrections are welcomed by the compiler.

An encouraging development is the recent upgrading of the FAO regional newsletter "Tigerpaper", out of Bangkok, and its conscious attempt to include more material from the Pacific Islands. The number of NGO newsletters in the Pacific has increased since 1984, and these provide often good sources of information even beyond national borders (e.g. SPACHEE Newsletter in Fiji, Rainforest Echoes in American Samoa, Koko's Call in the Marianas). This "gain" however was offset by the discontinuance of the international journal "Parks", - a most serious loss.

Conclusions

There now seem to be generally adequate opportunities in the protected area management arena for training and education. These include tertiary degree curricula, diploma programmes, short courses, correspondence courses, workshops, conferences and symposia. There may be a need in some countries for more in-service training courses, within country, even though some regional institutions provide activities that are in the nature of in-service training. Indeed, as I survey the year ahead, I have the impression that there may be too many workshops, symposia, conferences and seminars for the region that are germane to protected area management. Moreover, there seems to me to be some excess capacity and overlap in offerings by educational institutions. They could benefit by greater collaboration, even twinning, to develop joint programmes that would benefit students through faculty, course or student exchange. Arrangements to emphasize different aspects (e.g. tropical vs. temperate, marine vs. terrestrial), yet a unified overall programme in a joint degree or diploma, would seem to be a fruitful direction. Institutions attending the East-West Center workshop last October were encouraged in this kind of venture, and at least two such arrangements are being discussed.

Most urgently needed is more financial support for developing country trainees and students, to permit them to take advantage of this capacity. Protected area and conservation related training needs to be placed more prominently on the agenda of donor and assistance organisations. A strong recommendation to this effect might well be in order for this Fourth Conference at Port Vila.

I feel that the interaction between tourism and the natural environment (especially protected areas) which is often a basic reason for tourism needs to receive greater attention in training and education. Those taking tourism business programmes need to be much more sensitised to nature conservation and the concepts of carrying capacity, cumulative effects, limits of acceptable change, minimum impacts on environment and culture, restoration, and landscape integration (or ecology). Similarly, in view of the present and likely future importance of tourism to island economies, those in protected area management programmes need to know more about the nature of tourism and the tourism industry, and how impacts can be monitored. The programmes at Lincoln College and at Queensland Agricultural College seem to have achieved this through common courses and exchange lectures in these two curricula, but it is much needed elsewhere. A major international Congress in May of 1990 in Honolulu will be co-sponsored by the East-West Center and the University of Hawaii Sea

Grant Project (and hopefully others) with the theme "Coastal Area Tourism". Protected area managers and administrators from the Pacific are especially encouraged to help plan, and to attend.

There is a lack of sufficient international professional journals of an applied management nature at no cost or low cost for parks officers. Not only are these excellent sources of information, but they offer outlets for ideas and experience reporting by managers of protected areas. It is hoped that the list provided in Appendix 1 will be of use. However, two things are badly needed: the resurrection of the IUCN journal "Parks" on a secure financial footing with donors providing funds so that it is available to park officers at no cost or very low cost, and greater financial and personnel support so that the SPREP Newsletter is more regularly and widely available throughout the region.

It is urgent that by whatever arrangement, and at whatever level by which training and education are provided, resource management understanding and skills be strongly augmented by an understanding of people, of community development processes, of culture, and of how to communicate and facilitate. Protected area managers, especially in the Pacific Islands, must be more than experts in biophysical aspects. They must be listeners who can elicit cooperation from landowners and neighbours by making the protected area valuable to these people so that they are supportive rather than hostile to nature conservation.

Finally, I have to confess, I have been dragged with great reluctance into a new perspective on professional training and education in the Pacific. I have come to realise that perhaps the most important work can be done at the high-school level. It is from high school graduates, who have caught fire with the importance of protected areas, that the much needed ranger cadre will come. Most protected-area systems currently need educated and dedicated rangers more than they need college graduates from parks programmes in my opinion. These young men and women can be trained in-service, and at some point, the best of them sent to short courses, diploma programmes and the like. They represent one of the best hopes against the increasing bureaucratisation at central office - rather than real growth of management competence in the field. Moreover, it is in high schools that career aspirations for professional training in natural resource and environmental management are engendered. We have therefore been using a large share of a MacArthur Foundation grant designated for work in the U.S.-affiliated Pacific, to encourage the inclusion of tropical, traditional, and local knowledge into high school science curricula. Existing materials were largely U.S. mainland based, dealing with temperate zone, continental situations, and are almost guaranteed to turn tropical island students off. We have just completed field testing a module on "forests" in Palau, and have the support and commitment to use it from both teachers and educational administrators. Next year we hope to move to other areas, and have a request from Federated States of Micronesia. These materials will be made available to SPREP, and if we secure additional funding we might be able to do a similar kind of thing for other Pacific countries.

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Sheppard, D. 1987. Training of Protected Area Managers in the South Pacific. Topic Review No. 29. South Pacific Regional Environment Programme, Noumea. 33 pp.

South Pacific Commission, 1985. Action Strategy for Protected Areas in the South Pacific Region. SPC, Noumea. 21 pp.

Thorsell, J.W. 1985. Options for training of protected area managers in the Pacific. Third South Pacific National Parks and Reserves Conference. Vol. 2, 187-188. South Pacific Regional Environment Programme, Noumea.

Appendix 1

PARTIAL LIST OF JOURNALS AND PERIODICALS RELATING TO PROTECTED AREA MANAGEMENT (That may be relevant to the Asia-Pacific Region)[1]

1. AIN News. 6/year. $15 to non-members; institutions $30. Association of Interpretive Naturalists, Inc., 6700 Needwood Rd., Derwood, MD 20855, USA. Country.

2. Ambio. A journal of the human environment, research and management. Bi-monthly. $35 to individuals, institutions $95. Royal Swedish Academy of Sciences, Box 50005, S-104 05 Stockholm, Sweden. International.

3. Asian Environment. Quarterly. Journal of environmental science and technology for balanced development. $30 to libraries. Asian Environment Journals, P. O. Box 90MCC, Makati, Philippines. Regional.

4. ASPEI Newsletter. Association of South Pacific Environmental Institutions. Newsletter. Regional.

5. Australia Ranger Bulletin. Australian National Parks and Wildlife Service, G.P.O. Box 636, Canberra, A.C.T. 2601, Australia. Quarterly. Country.

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1. Product of regional workshop for institutions engaged in Protected Area Training and Education, Armidale, N.S.W. October, 1988.

6. Australian Parks and Recreation. Training, education and awareness. Quarterly. Aus$30. Royal Australian Institute of Parks and Recreation, National Exhibition Centre, Flemington Rd., Lyneham, ACT 2602, Australia. Country.

7. Biological Conservation. Monthly. 185(US$250). Elsevier Applied Science Publishers Ltd., Crown House, Linton Rd., Barking, Essex 1G11 8JU, England. International.

8. Biological Conservation Newsletter. Monthly. Smithsonian Institution, Department of Botany, National Museum of Natural History, Washington DC20560, USA. International.

9. Bulletin de Documentation de l'Environnement. 5/yr. 215Fr. Ministre de l'Environnement, Service de Documentation. Documentation Franaise, 29-31 Quai Voltaire, ;75340 Paris Cedex 07, France. Country.

10. CAMP Network. Bulletin of coastal area management and planning. International National Park Service Cooperative Programme, University of Miami, School of Marine and Atmospheric Sciences, Miami, FL33149, USA.

11. Canadian Society of Environmental Biologists Newsletter. Quarterly. Can$20 to non-members. Canadian Society of Environmental Biologists, Box 962 Sta.F, Toronto, Ont. M4Y 2N9, Canada. Country.

12. Centenary News. Department of Conservation, Private Bag, Wellington, New Zealand. Country.

13. Coastal Zone Management. Newsletter of coastal resource development, conservation and enhancement. Weekly. $295. Nautilus Press, Inc., 1056 National Press Bldg., Washington, DC20045, USA. Country.

14. Connect. Quarterly. Unesco-UNEP environmental education newsletter. Free. Unesco, 7-9 Place de Fontenoy, 75700 Paris, France. International.

15. Coral Reef Newsletter. University of Guam, Mangilau-Guam. International.

16. Ecos. A review of conservation. Quarterly. Membership. British Association of Nature Conservationists. Packarg Publishing Ltd., 16 Lynch Down, Funtington, Chichester, Sussex PO18 9LR, England. Country.

17. Ecos. Quarterly. Aus$12. Commonwealth Scientific and Industrial Research Organisation, P.O. Box 225, Dickson, A.C.T.2602, Australia. Country.

18. Environment and Ecology. Quarterly. Rs.125(US$125) to institutions; individuals Rs.20($25). M.K.K. Publications, 91A Ananda Palit Rd., Calcutta, West Bengal 700 014, India. Country.

19. Environmental Awareness. Indian Society of Naturalists (INSONA), Oza Bldg., Saiatwada, Baroda 390001, India. Country.

20. Environmental Conservation. The scientific journal dedicated to global survival. Quarterly. Foundation for Environmental Conservation, Elsevier Sequoia S.A., Box 564, CH-1001 Lausanne 1, Switzerland. International.

21. Environmentalist. The international journal concerned with environmental awareness. Quarterly. $90 to individuals, institutions 90FR. Science and Technology Letters, 12 Clarence Road, Kew, Surrey TW9 3NL., England. International.

22. ESCAP Environment News. Environmental issues and awareness. Environmental Coordinating Unit, ESCAP, United Nations Building, Rajadamnern Avenue, Bangkok 10200, Thailand. Bulletin. Quarterly. Asia and the Pacific. Regional.

23. Flora Malesiana. LIPI, Bogor, Indonesia. Journal. Regional.

24. Forest and Bird. Quarterly. NZ$250. Royal Forest and Bird Protection Society of New Zealand Inc., Box 631, Wellington, New Zealand. Country.

25. Forest Ecology and Management. 16/year. fl-600. Elsevier Science Publishers B.V., Box 211, 1000 AE Amsterdam, Netherlands. International.

26. Habitat Australia. Journal of Education and awareness. Bimonthly. Aus.$25. The Australian Conservation Foundation, 672B Glenferrie Road, Hawthorn, Victoria 3122, Australia. Country.

27. International Wildlife. Dedicated to the wise use of the world's natural resources. Bi-monthly. $10.50. National Wildlife Federation, Inc., 8925 Leesburg Pike, Vienna, VA 22180, USA. International.

28. Island Plant Conservation Newsletter. Free. Exotic plant problems and management in natural areas. Dept. of Botany, Univ. of Hawaii, Honolulu, HI96822 U.S.A. Quarterly. International.

29. IUCN Bulletin. Quarterly. 66Fr.(US$30). International Union for Conservation of Nature and Natural Resources, World Conservation Centre, Ave. du Mont Blanc, CH1196 Gland, Switzerland. International.

30. Journal of Environmental Economics and Management. Quarterly. $90(Foreign $108). Academic Press, Inc., Journal Division, 1250 Sixth Ave., San Diego, CA 92102, USA. International.

31. Journal of Environmental Management. 8/yr. 103(US$195). Academic Press Inc.(London)Ltd. 24-28 Oval Rd., London NW1 7DX, England. International.

32. Journal of Tropical Ecology, Quarterly. $99. Cambridge University Press, Edinburgh Bldg., Shaftesbury Rd., Cambridge CB2 2RU, England. International.

33. Journal of World Forest Resource Management. Semi-annual.37(US$24). A.B. Academic Publishers, Box 97, Berkhamsted, Herts. HP4 2PX, England. International.

34. Korean Nature. Quarterly. Korean Association for Conservation of Nature, Pyongyang, N. Korea. Country.

35. Leisure Sciences. An interdisciplinary journal of education and the environment. Quarterly. $48. Crane, Russak and Co., Inc., 3 E.44th St, N.Y., N.Y.10017, USA.

36. Loris. A journal on Sri Lankan wildlife. Semi-annual. $5 membership. Wildlife and Nature Protection Society of Sri Lanka, Chaitiya Rd., For, Colombo 1, Sri Lanka. Country.

37. Malaysian Naturalist. Natural History Journal. Quarterly. Malayan Nature Society, P.O.Box 10750, Kuala Lumpur 50724, Malaysia. Country.

38. Man - Environment Systems. Bi-monthly. $25 to individuals; libraries $37.50; students $15. Association for the Study of Man-Environment Relations, Box 57, Orangeburg, N.Y. 10962, USA. Country.

39. Natural Areas Journal. Quarterly. 15. Issues on identification, evaluation, management and protection of natural areas. Natural Areas Association, 320 South Third Street, Rockford, Illinois 81108, USA. Country.

40. National Parks. Bi-monthly. $22. National Parks and Conservation Association, 1015 31st St. N.W., Washington, DC 20007, USA. Country.

41. National Parks Journal. 6/year. Aus$25. National Parks Association of N.S.W., PO Box A96, Sydney South 2000, Australia. Country.

42. Natural World. 3/yr. Royal Society for Nature Conservation. 20 Upper Ground, London SE1 9PF. England.

43. Nature and Resources. International news about research on environment, resources, and conservation of nature. Quarterly. 48F. UNESCO, 7-9 Place de Fontenoy, 75700 Paris, France. International.

44. Nature Canada. Quarterly. Can$25. Canadian Nature Federation, 75 Albert St., Site 203, Ottawa, Ont.K1P 6G1, Canada. Country.

45. Nature Conservancy News. Bi-monthly. $10. The Nature Conservancy, 1800 N.Kent St., Arlington, VA 22209, USA. Mainly Country.

46. Naturopa. 3/year. Free. Council of Europe, European Information Centre for Nature Conservation, B.P. 431R6, 67006 Strasbourg Cedex, France. Regional.

47. Nepal Nature Conservation Society. Semi-annual newsletter. Rsd.5. Nepal Nature Conservation Society, Box 229, Kathmandu, Nepal. Country.

48. New Zealand Environment. Quarterly. NZ$10. Environmental Publications Trust, 11 Manapau St., Meadowbank, Auckland 5, New Zealand. Country.

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L. S. Hamilton
D. H. Grossman

East-West Center
November, 1988.

Additions or suggestions are requested. Please send complete information on any additional publications to: L. S. Hamilton at EAPI, East-West Center, 1777 East-West Road, Honolulu, Hawaii, 96848, U.S.A.

Appendix 2

RECOMMENDATIONS

1. Protected area management agencies in the South Pacific should be encouraged to employ staff with relevant protected area management skills. (3.3)

2. Training programmes in the South Pacific should initially concentrate on the development of practical all round skills in protected area management. (3.3)

3. A strategic plan for training protected area managers should be prepared by SPREP, under the co-ordination of the Protected Area Management Officer. This plan should be based on the priorities outlined in Section 4 of this report. (4.3)

4. The best strategy for implementing training courses in the South Pacific should involve a mixture of: secondment of staff from island countries to Australia/New Zealand; regional training courses; and secondment of staff from Australia/New Zealand to island countries. (5.2)

5. There are a number of guidelines that should apply to training Protected Area Managers in the South Pacific. These include:
   * there should be an emphasis on "follow up" of case studies.
   * overseas seconded staff should work closely with local island staff.
   * where possible, experiences from regions of the world with similar problems should be used in training. (5.2)

6. Options for reducing training costs, such as outlined in 6.3.1., should be investigated. (6.3)

7. Specific sources for external funding should be identified by SPREP and approached. (6.3)

8. The existing SPREP allocation for training should be increased. (6.3)

9. A specific training course for protected-area training should be developed within the South Pacific region. Existing institutions listed in 7.1 should be approached by SPREP with a view to initiating such a course. (7.1)

10. The role of universities in the region in the area of short-term intensive training for protected area managers should be investigated. (7.1)

11. SPREP should continue their liaison with the Lincoln College in New Zealand to ensure that their training courses adequately reflect the requirements of South Pacific countries in the Protected Area Management area.

12. The Riverina CAE in NSW, Australia should be approached with a view to developing a correspondence course for protected area managers in the South Pacific. (7.2)

13. Course co-ordinators for relevant short courses in Australia and New Zealand should be approached by SPREP to ascertain course details and assistance available. (7.3)

Appendix 3

Top part of the above Appendix 3 (to be carried out by SPREP secretaries, please!!!

Also, I cannot type the capital letters to be placed in the little boxes, because these little boxes are not yet there. I'm so sorry.

1. Queensland Agricultural College
2. N.Z. Department of Conservation
3. University of New England
4. Canberra College of Advanced Education
5. Riverina College of Advanced Education
6. Lincoln College
7. East-West Center
8. University of Hawaii
9. Bogor School of Envir. Management
10. Wildlife Institute of India
11. U.S. National Park Service
12. South Pacific Regional Envir. Programme
13. University of the South Pacific
14. James Cook University
15. Northern Rivers College of Advanced Educ.

P = Proposed
X = Offered

CASE STUDY: VANUATU - RESOURCES, DEVELOPMENT AND ENVIRONMENT
A SEMINAR TO PROMOTE SUSTAINABLE DEVELOPMENT

M.R. Chambers, E. Bani and D. Esrom
Environment Unit
Ministry of Lands
Private Mail Box 007
PORT VILA
Vanuatu

INTRODUCTION

The conference, "Vanuatu - Resources, Development and Environment", was held in Port Vila, Vanuatu, on 24-25 September 1987. The overall theme of the meeting was sustainable development of Vanuatu's natural resources, and was the first of its type to be held in the country. This paper briefly discusses the rationale and planning for, participation in and follow-up to the conference.

RATIONALE

The general desirability and necessity for promoting the sustainable development and utilisation of natural resources are well known, and do not need to be elaborated in this presentation.

For the specific instance of Vanuatu, there is a good awareness of and concern for these needs at the technical, scientific and political levels. This is evident from policies and programmes contained in such diverse documents as the Constitution, the First and Second 5-year National Development Plans, various pieces of legislation and reports and recommendations by local personnel and overseas consultants.

It is also apparent that in Vanuatu each of the government ministries has duties and responsibilities that are in one way or another concerned with natural resource exploitation, development and management. This is illustrated in Table 1. Thus in Vanuatu as elsewhere, the protection, management and development of environmental resources is very much a collective cross-sectoral responsibility. However, contact and consultation between ministries and their departments and agencies is often limited. The holding of a

Table 1. Environmental responsibilities within the Ministerial Portfolios, Government of the Republic of Vanuatu, as on 10 March 1989.

Ministry	Environmental Responsibilities
Public Service and Planning	Approval for all legislation Approval and planning for all resource development.
Agriculture, Forestry and Fisheries	Management and development of primary resources. Administration of protected areas.
Education	Curriculum development.
Finance	Priorities for funding.
Foreign Affairs	International treaties.

Health	Environmental health.
Home Affairs	Culture, physical planning.
Lands, Geology, Minerals and Rural Water Supply	Land, natural and mineral resources, conservation, rural water supply.
Public Works, Communications, Transport, Civil Aviation, Tourism	Meteorology, tourism, urban water supply, road building.
Trade, Commerce, Cooperative, Industry, Energy	Energy resources, industrial development.

conference to which all these ministries are invited to attend and participate is one way in which all can be made aware of their joint responsibilities for environmental issues.

Thus a major objective of the conference was to gather together local experts concerned with of environmental study, management and development. This would present an opportunity for them to discuss their work and concerns. In addition, the participation of government administrations would make this knowledge and concern more widely available to the decision makers. Clearly, such consultations should extend beyond the duration of the conference.

PLANNING

The conference was conceived and organised by the Environment Unit of the Ministry of Lands, Geology, Minerals and Rural Water Supply. This is the only government agency charged with cross-sectoral responsibility for environmental issues.

Information circulars were prepared and distributed to:

- all government agencies concerned with resource management and development, via departmental directors and political secretaries.
- many individuals within these agencies.
- regional agencies based in and outside Vanuatu, e.g. SPREP, ORSTOM, ESCAP, Asian Development Bank, Australian International Development Assistance Bureau (AIDAB), World Health Organisation (WHO), Commonwealth Development Corporation (CDC), Institut de Recherches du Caf et du Cacao (IRCC).
- non-government organisations (NGOs) in Vanuatu, e.g. Science Society, tourism operators, Chamber of Commerce, Agricultural Society.

The first circular, sent out about six months before the conference, outlined its rationale, provisional programme and preliminary arrangements, and called for speakers to volunteer to give papers. Over the succeeding months further circulars were sent out to all the same people reporting on the arrangements as they firmed up.
The Environment Unit had a good idea of the types of papers it wished to be presented. Accordingly, many people were asked directly if they would contribute on a particular topic. Invariably, they agreed to do so, and generally welcomed the opportunity to speak on the environmental aspects of

their work. Thus the final list of contributors consisted of those who had volunteered to speak without being asked directly and those who had agreed on being requested.

Each contributor was asked to submit a short abstract of their presentation before the conference. Nearly all did so, and these were copied and compiled and made available to all who attended the meeting.

The conference was held over two days, and the papers organised into four subject categories.

- Physical environmental resources (geology, meteorology, seismicity and energy resources of Vanuatu)

- Biological and primary resources (coconut crab, agriculture, forestry, quarantine and land tenure in Vanuatu)

- Human considerations (culture and environmental health in Vanuatu).

Each session was chaired by an appropriate expert.

PARTICIPATION

Over the two days of the conference, 18 papers were presented within the four subject categories. Of these, 13 were presented by government agencies, and one each by CDC, IRCC, ORSTOM, SPREP and WHO. The latter all tailored their contributions to issues of specific importance to Vanuatu, and reviewed global/regional issues of environmental concern in some instances. Each paper was followed by a general discussion. In total, 61 people attended the sessions over the two days. Most were from government agencies and were evenly divided between technical and scientific, economic, administrative and political personnel.

Thus a major objective of discussing an extensive range of issues before a wide cross-sectoral audience was achieved. It was the first time that such a conference had been held in Vanuatu. At the end of the conference, a number of recommendations for future action and consideration were proposed. Many participants commented on the value of the conference. Specifically, many mentioned the usefulness of being informed of the environmental work and concerns of other agencies, and of being able to discuss these with colleagues from across government and development and research agencies.

The press and radio were also invited to attend the conference and the issues raised were well covered by them.

FOLLOW-UP

All contributors were asked to provide the manuscript of their talk, and nearly all complied by the deadline. These were then edited by the Environment Unit and printed by ESCAP, 130 copies in total. Covers for the Proceedings were paid for by the Rotary Club of Port Vila. Copies were then distributed to each of the contributors, to ESCAP, to all government ministers and first secretaries, departmental directors, local libraries and regional libraries and agencies. In addition a summary and review of the conference was printed in ESCAP Environment News and readers invited to ask for a copy of the full publication, of which some did. Of the conference recommendations, a number have already been implemented, some are under active consideration,

whilst the remainder await action. Undoubtedly, environmental issues are now more fully considered in Vanuatu than before, and some, though not all, of the credit for this is due to the conference and its participants.

CONCLUSIONS

The conference provided a useful get-together of the many agencies and personnel concerned with resource study, development and management. For the first time in Vanuatu, the very significant extent of the cross-sectoral nature of environmental management and development, its issues and concerns, were publicly discussed.

Very nearly all the participants came from Vanuatu. The conference showed that it is quite feasible and highly desirable to have a meeting of this type organised by and for local personnel. At large internationally-attended meetings there may sometimes be a tendency for local contributors to be overshadowed by visiting participants. Issues specific to a particular country are best discussed by people with an intimate knowledge of that country. In a case such as this, overseas contributors should also have a good knowledge of Vanuatu, which in fact they all did.

The conference was very cheap to organise. Pre-conference expenses were easily absorbed into the Environment Unit's normal running costs. The hire of the government's own conference facilities cost only about US $25 for the two days. As most participants came from Port Vila, there were no accommodation or subsistence costs involved with them. Participants from elsewhere in Vanuatu and overseas paid their own costs. ESCAP and Rotary Port Vila paid for the cost of printing the Proceedings. Thus there is no reason why such a conference could not be organised by any other country in the southwest Pacific.

As this confearence was generally successful, it would be useful to have a similar one perhaps every four or five years. Then progress and constraints in environmental issues can be regularly monitored.

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CASE STUDY: **ENVIRONMENTAL EDUCATION: AN EXAMINATION OF CONSERVATION WEEK ACTIVITIES 1987**

Kalati Poai
Chief Parks Officer
Western Samoa

The promotion of conservation has been a government-sponsored project for the past ten years. In that time, the Ministry of Agriculture, Forests and Fisheries has been the lead government agency in promoting conservation. In the past years, the programme has had essay and song writing, school competition and poems for the school children. Nothing was ever developed for the adult population, nor was there any interaction between government and the people.

In 1987 the chairman of the Conservation Week Committee decided the programme needed more interaction between government and local leaders and different programmes for the school children to generate more enthusiasm for conservation.

With these ideas in mind, the Conservation Week Committee developed and produced a programme that had never been tried in Western Samoa. It was a multi-faceted programme trying to reach several segments of the population that had never been reached.

Conservation Week 1987:

During committee discussions several ideas were addressed and accepted for the programme. The programme would develop these main activities:

a) a two-day programme about the importance of conservation, to which village leaders would be invited.

b) promotion of the National Conservation Symbol

c) promotion of conservation through a nationwide programme in the development of conservation postage stamps for the Post Office.

d) Development of a poster and brochure for teachers. The poster and brochure would introduce good and bad conservation practices to lower and junior secondary students.

e) Emphasize the same theme/ideas throughout the programme.

With these objectives set, the committee members went about developing a slogan for the week's activities. Committee members felt there was a need to make people aware of their daily activities and the impact they had upon the island environment. The slogan:

O Oe ma Lou Siosiomaga (You and Your Environment)

was created. Six areas were developed that would emphasize the importance to people of their island environment. These six important areas were:

i. Conservation of Water
ii. Conservation of Marine Resources
iii. Conservation of Wildlife
iv. Conservation of Culture
v. Conservation of Soils

vi. Conservation of Forests

The first activity to be developed was the postage stamp contest. This required a three month development period. Schools and the public needed to be notified of the contest, as well as time allowed at the end for judging the drawings. The Committee created few restrictions for entry. Paper size, colouring material and artistic merit were not critical. The message the picture portrayed would be the determining factor in choosing the winner. (The Philatelic Bureau staff had stated that the pictures might have to be redrawn by the printer for printing detail.)

The committee received 150 entries for all six categories. Some areas were more difficult for the entrants to draw than other areas. Nevertheless, all the entries were given equal consideration. The committee members asked local artists for their input into the judging. However, their criteria were based upon materials and artistic merit. Committee members felt the message the entrant was trying to draw was more important than the materials or artistic skill.

At the opening day program, the winners received their cash prizes. The first-second-and third-place winners had their drawings shown at the opening programme. Afterwards, the drawings were displayed in the library for the rest of the week.

The First Day Cover of this stamp design programme can be viewed in Port Vila.

Once the Stamp Design Programme was underway, the main thrust of the 1987 conservation programme was the two day conference about conservation. The intent was to bring village leaders to Apia, and to discuss with them the importance of conservation to their villages. This had never been done before in Samoa.

Since this was new and financing was not secure, the programme was developed for village leaders of Upolu island. The leaders identified to participate were the village mayors (pulenu'u) and the president of the village women's committee. These people make daily decisions, directly or indirectly, in village affairs that affect the quality of our island environment.

Members of the committee were assigned one of the six main topics. They had 15 to 20 minutes to talk about the importance of the natural resource, daily activities of people that affect the resource, and how people in their daily lives can waste or protect the resource. After the presentation, the following 45 minutes were open for questions, and comments. The committee members found the questions challenging and thought provoking. At the end of the two day conference, delegates noted that another programme of this type would be greatly appreciated. They really had not understood why it was important to protect and/or conserve the island resources before this programme.

In 1985, the Conservation Week committee had established a programme for the development of a National Conservation Symbol. The symbol, Olo-Tu le Lupe was developed, but never really promoted nationwide. The Committee in 1987 thought it was time to promote the symbol nationwide. Committee members decided a story should be developed to introduce Olo-Tu to the public. The story would be told over national radio, while pictures of Olo-Tu in the form of bumper stickers would be given out at the major banks and stores to reinforce the story. Staff of the conservation committee began developing a story that would be acceptable in Samoan culture. After three weeks of development and comment, one of the committee members, a village orator, took the story out for comment from several village chiefs (matai). When the orator returned from his research, it was found that the story was good, but there was a tradi-

tional Olo-Tu story. The village chiefs felt the developed story would not be accepted by the people due to the fact that there already existed an Olo-Tu story. If this original story could be found, it would then be proper to make a commentary at the end of the Olo-Tu story concerning conservation. Staff went about looking for this story. To this day (1989), we have not been able to locate the traditional Olo-Tu le Lupe story.

Without the true story, the committee did not broadcast the developed story. The bumper stickers were printed and distributed through the banks and major stores during the Conservation Week Programme.

Even though this programme has not developed fully, the promotion of Olo-Tu has continued. On all publications of the National Parks and Reserves, when staff speaks to school children or when staff is able to speak on the national radio, we display and promote the symbol of Olo-Tu le Lupe. We are in the process of developing a cartoon of Olo-Tu to be placed in the local newspaper. This would not only help promote Olo-Tu as the conservation figure but also promote parks and conservation, too. We have several trials of cartoon frames that are being reviewed at this time.

The last major project for the 1987 programme was the development of a conservation poster for the teachers to use during the school year. A booklet for teachers to use as a guide in teaching good and bad conservation practices was also developed. The poster was divided into our six main conservation areas. Each subject had a good and bad conservation practice photo on the poster. The teacher would review the pictures with the students. The teacher was directed to discuss with the students why the activity was good or bad. Then as an extra curricular activity, the students would go home and ask their parents/family members how they practice conservation of ... or ask how the task was performed traditionally. A sample poster and brochure are here at Port Vila for examination.

There were other activities that were undertaken during this 1987 programme.

On the first day of the programme (Sunday), the minister who would be speaking on the national radio was contacted. His sermon reflected the importance of conservation to the people of Samoa.

School children from Upolu were invited to attend a Conservation Quiz Programme in Apia. Over 200 students attended the afternoon programme. Certificates and books were given out to the first three winning teams in each of the three divisions. The questions were related to the six main themes of the conservation programme.

Each day a conservation message was broadcast over the national radio. The message reflected one of the six important conservation themes.

It is sad to note the Conservation Week Programme was halted in 1988. The government is in the process of reassigning conservation activities and responsibilities to the Ministry of Lands and Survey. Until such time as the responsibilities are settled, the continuation of this programme is nil.

(Although the Conservation Week activities are no longer being developed, the national parks staff has continued to develop information programmes for lower and junior secondary school children. Two educational units on General Conservation and Soils have been developed. The units are used by staff when they go to schools to speak on the above two subjects. Samples of these units are presented for your examination.)

Part 6

Traditional Knowledge and Conservation

THEME PAPER: TRADITIONAL KNOWLEDGE AND RESOURCE CONSERVATION AS A BASIS FOR SUSTAINABLE DEVELOPMENT

William C. Clarke
University of the South Pacific
SUVA
Fiji

ABSTRACT

Although not perfect conservationists, traditional Pacific Islanders developed detailed environmental knowledge and effective resource-conservation strategies and techniques over thousands of years in response to their diverse island environments. Alone or combined with introduced knowledge, these traditional ways could serve the cause of sustainable development. It is also argued that even with a synthesis of traditional and introduced/modern knowledge, "sustainable development" may remain largely a rhetorical buzz word rather than a truly sustainable path to the future unless we borrow from the past or create anew the tradition that we human beings belong to and are responsible for whole landscapes that are *integral*, that have *limits*, and that are valued for their *beauty*.

INTRODUCTION

It is a principle of the science of ecology that all animals require a suitable habitat if they are to live healthy lives, and if their species is to survive. Ecologists would assert, too, that all animals modify their habitat, at least to some extent; they prey on other animals or act as parasites, they compete, they consume and excrete, they displace or exclude other species, they build nests, they respire, or breathe. All these actions are part of the reason that an "ecosystem" is defined in terms of the interrelationships, or the dynamic interactions, of its component plants, animals, and physical environment.

The human species is apart from other animals not only for more greatly modifying its habitat than does any other species but also for almost wholly replacing existing habitats and ecosystems with new ones designed to serve human purposes. We humans have been at this process of modification and manufacture of ecosystems for a very long time, and some of our human-dominated ecosystems have lasted for a very long time and have provided us with a suitable habitat in which we could live permanently and sometimes prosper. The human part of the management of these long-lasting human support-systems has depended on traditional knowledge, that is, knowledge passed from generation, orally and by example.

Although scientific theorists may demean much traditional knowledge of the environment and resources on the grounds that it grew out of empirical observation and unrigorous trial and error, it nonetheless has much to offer the modern, rapidly changing world because traditional knowledge has developed over a long period of time (many observations) and because the people developing it have had a very intimate association with their surroundings (finely detailed knowledge). Present-day conservationists and resource managers, who see sustainability slipping away as the environment is rapidly degraded and resources are depleted, recognise the value of this detailed knowledge and the need for quick action to conserve as much traditional knowledge as possible.[2]

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2. To this end, a Conference on the Science of Pacific Islands Peoples will be held at the University of the South Pacific in December 1990. See author of

However, it should also be said that traditional knowledge, although valuable, is not a panacea for all present-day puzzles of resource management and conservation. Nor should we romanticise traditional peoples as perfect conservationists who lived in an ecologically harmonious Garden of Eden. Traditional Pacific peoples, like all peoples, were always in dynamic interaction with their environments, and some of their actions were destructive of resources in ways that would arouse concern in a present-day Environmental Impact Assessment. There is ample evidence that along with or prior to the development of sustained-yield production systems, traditional Pacific Islanders also caused accelerated soil erosion, degraded the natural vegetation, and exterminated species (Blaikie et al. 1987; Clarke 1986; Kirch 1984; 139-151).

In other words, in their transformation of natural landscapes into cultural landscapes, the early inhabitants of the Pacific often did considerable damage to other forms of life and caused land degradation, just as we continue to do today. But the sustained-yield systems that they also developed made good and wide use of local resources. Some of these systems, or components of them, could be of great value to us today, when our modern technologies, rapidly growing populations (in some islands), and the development imperative have increased the magnitude of environmental damage and the speed of environmental change. We need knowledge and ideas from any source and certainly should make use of whatever we can learn from, or carry forward from, the past.

LEARNING FROM THE PAST: TECHNIQUES, KNOWLEDGE, AND SPECIES

In this section I will describe a few examples of environmental knowledge and resource-management techniques that were used in the traditional Pacific and that could be of use today. Detailed information on many, many more techniques is available in published sources, some of which are listed in the bibliography of this paper; a much fuller list of sources of relevant information will become available soon in the annotated bibliography that is now being prepared for the Conference on the Science of Pacific Islands Peoples, to be held at the University of the South Pacific in December 1990 (see Note, p. ?).

Study of traditional knowledge and techniques shows clearly that because they were site-specific and based on a fine-scale familiarity with particular ecosystems, a great deal of the knowledge and many of the techniques relate to particular species of plants and animals. Without those species, the techniques and knowledge may not be of as much use.

Agriculture.

The time has passed when traditional agricultural systems were generally condemned as primitive and inefficient except by a few eccentric field anthropologists and geographers who had studied them. The merits of traditional polycultures, the often high energy-return rates of non-industrial agriculture, the avoidance of agricultural toxins, the maintenance of genetic diversity, the fine-scale planting of specific crops in micro-habitats, the often high elasticity of supply - all of these and more can be seen as benefits (environmentally if not economically) compared with the contrasting costs of industrialised agriculture. Even in the harsh environment of atoll islets, sustained-yield agroecosystems were developed traditionally: for example, the wide use of food-bearing trees and the unique pit-excavation cul-

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this paper for details.

tivation of *babai (Cyrtosperma chamissonis)* that made effective use of limited water resources, and created a soil (in a near-soilless environment) capable of
producing sustained yields of a staple crop by using only local organic materials (Klee 1980; Barrau 1961; Small 1972).

The best general review of traditional resource management in the Pacific is the chapter on "Oceania" in World Systems of Traditional Resource Management (Klee 1980). In that chapter, which reviews many of the written sources on traditional resource management in the Pacific, Klee (1980: 274) suggests with regard to agriculture that:

> Almost all traditional soil and water conservation techniques that have been identified (e.g., terracing, mulching, rotating fields, and so on could be likely revived without much difficulty. . . . The whole idea would be to take an existing culturally acceptable practice and modify it only slightly to make it more productive or efficient, thus hopefully avoiding any disruptive side effects.

This sort of "progressing with the past" (Clarke 1987) seems feasible in the Pacific where much traditional knowledge of resources remains (though it is disappearing fast), where rural peoples are not generally so pressed against the edge of survival that they cannot risk innovation, and where small islands as well as small-scale tenure systems encourage or make possible experimentation on a less than agro-industrial scale.

Agroforestry and the Use of Wild Trees.

In Pacific communities, an immense contribution to ecological stability, to food supply and other material needs, and to the beauty of landscapes has always been made by the planting and protection of trees as integral components, in time and space, of polycultural agricultural systems. In a recent paper, Randy Thaman and I listed some fifty-six functions for trees (things such as soil improvement, fuelwood, boatbuilding, wrapping, fibre and fabric, medicines, perfumes) as recorded in a variety of Pacific-island environments (Thaman and Clarke 1987). In many Pacific communities, the existing forests are really humanised gardens in which almost all species are useful. Rather than being a compartmentalised sector of the economy, forestry is an integral part of agriculture, housing, medicine and the production of a wide range of material goods, while at the same time providing ecological services such as shading, erosion control, watershed protection, and habitats for wildlife.

Even what appear to be wholly spontaneous kinds of forest or woodland have an immense range of uses. See, for instance, Lessa's (1977) study of the traditional uses of vascular plants on Ulithi Atoll or J.M. Powell's (1976) ethnobotany of New Guinea vegetation or Thaman's (forthcoming) just completed study of the cultural utility of 140 species of plants widespread in the Pacific island mangrove and coastal vegetation. He found 69 different purpose/use categories, with the total individual uses for the 140 plants being 987, an average of 7.1 purpose/use categories per plant, ranging from no reported use for 4 species to 121 for the coconut if distinct uses within categories (e.g., tools with distinct functions) are counted.

In terms of specific uses, the most widely reported are for medicine, general construction, body decoration, perfume, fuelwood, ceremony, cultivated or ornamental plants, toolmaking, food, cordage, boat or canoe making, food parcelisation, fertiliser and mulching, animal feed and handicrafts. Loss of such utilitarian diversity either through the depletion of the species (e.g., mangrove clearance) or non-transmission of the traditional knowledge about the uses will only lock Pacific islanders more tightly into cultural and economic dependency. The great use value of such plant communities should also be kept

in mind when parks or reserves are contemplated in "largely unused" areas; it may well be that the area under consideration is a living reserve of usable and used foods and materials, a source of income in that it removes the need for cash expenditure for many necessities.

Marine Resources.

Traditional knowledge of their great resource, the sea, is legendary among Pacific Islanders and need not be even summarised here. For instance, Johannes's (1981) book Words of the Lagoon: Fishing and Marine Lore in the Palau District of Micronesia beautifully illustrates the encyclopedic knowledge of practical sea lore possessed by traditional fishermen in the Pacific. As Johannes has written of traditional fishermen in a later paper (1982: 258):

> Studying their knowledge during the past few years has provided a host of valuable insights into the nature of shallow-water tropical marine resources. Information obtained in this way is often superior in important respects to information gained by means of conventional resource surveys performed by imported consultants constrained by insufficient time and money. For example, what may look like an insignificant and relatively barren islet to a reserve planner during a site inventory made in one season, may be thronged with breeding sea birds, or in rarer cases, breeding sea snakes, in another. Certain otherwise unremarkable beaches may come alive with spawning land crabs during certain lunar periods and seasons or serve as rookeries for nesting sea turtles.

There could not be a better illustration of the value of fine-scale knowledge gained by empirical observation over the cycles of many years, which is what particularly characterises traditional knowledge. How can all this knowledge of the sea, marine life, land animals, plants, and soils be best put to use today? In their consideration of the implications and possibilities of the traditional knowledge base for contemporary Papua New Guinea, Lance Hill, John Pernetta and Barney Rongap (1982) suggested several possibilities:

> Traditional knowledge in synthesis with introduced knowledge. As has been illustrated in the work of many scientists, making use of traditional knowledge can provide a quicker way of developing an inventory of the physical and biological resources of an area. Traditional knowledge can also be synthesized with introduced knowledge in environmental plans, project regulations, and environmental monitoring. The use of traditional knowledge can also facilitate community participation, as in the wildlife management areas in Papua New Guinea (Eaton 1986).
>
> Use of traditional knowledge in education on environmental issues. The main purpose here is to use ethnoscience in the schools to prevent or slow the accelerated erosion of traditional knowledge and practice.
>
> Use of traditional knowledge and resource-use systems in assessing compensation for loss of natural resources. Just compensation for damage to resources through modern developments (coastal hotels on fishing grounds, dams on land and forest, mines) requires knowledge of the total range and quantity of resources available in the areas subject to environmental impact.

LEARNING FROM THE PAST: PRINCIPLES

The integration of traditional and modern environmental knowledge and conservationist techniques can undoubtedly strengthen modern resource-management science, with the traditional component perhaps being especially important in the preservation of the plant and animal species, whose characteristics and habits stimulated the knowledge in the first place.

There is also a broader use for traditional ways, and that is to extract from past knowledge and sustainable ways of living some principles that might serve as guides to an age whose actions bring ever greater and faster resource depletion and environmental degradation. This is not to suggest that we should live as our ancestors did but rather that there are certain ways of living that have been shown to ensure more permanence and sustainability than ours. It is also to suggest doubts about the principles underlying the catchwords "sustainable development", which have been especially promulgated by Our Common Future (World Commission on Environment and Development 1987). Our Common Future is a significant document in that it demonstrates clearly that environmental issues have finally reached the top of national and international political agendas. The Commission that created the book says that it is serving notice that "the time has come to take the decisions needed to secure the resources to sustain this and coming generations" (World Commission on Environment and Development 1987: 2). In Our Common Future, "sustainable development" is defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

This is nice rhetoric, and it is heartening to see an international body accept the significance of sustainability; it is less heartening to realise that the emphasis is on "development" rather than on "sustainable" and to read in Our Common Future comments such as (p. 206) that "many essential human needs can be met only through goods and services provided by industry" and (p.213) that "given expected population growth, a five- to tenfold increase in world industrial output can be anticipated by the time world population stabilizes sometime in the next century". This on top of the seven-fold increase in industrialisation since 1951!

How badly these notions mesh with the self-sufficient, ecologically diverse landscapes of the traditional Pacific where sustainable patterns of living did seem to exist. What alternative principles that promise permanence can be drawn from such landscapes and ways of life? A great many such principles are discussed in various ways in the new flood of utopian and "deep ecological" literature -- for example, Dauncey's (1988) After the Crash: The Emergence of the Rainbow Economy or Devall's and Session's (1985) Deep Ecology: Living as if Nature Mattered. What I want to do here is to try to draw these principles together very briefly, using only three concepts that signify important elements in traditional landscapes and ways of life in the Pacific Islands: Integration, Limits and Beauty.

Integration. Anyone who has lived in a traditional society knows how the economy is integrated into the whole landscape and daily life. The economy is not an abstraction that determines how the land and resources are used; it is not a method whereby human activities and the landscape are divided into abstract sectors of forestry, agriculture, industry, fisheries. Its immediacy and the absence of the distancing veil of money keeps "economic factors" from driving people to environmentally damaging actions. To stress the holism of the landscape is not to say that it is homogeneous: it is made up of many component biotic domains - all finely known by the human inhabitants. But each of these domains is clearly part of a larger whole and none draw heavily on outside sources of matter or energy (other than the evenly spread rain of solar radiation). Not using extra-system inputs, the yields of agricultural systems were strongly positive in energy terms. The whole landscape of a particular human community is, in other words, largely self-sufficient even

though certain kinds of trade were well developed traditionally. Everyone in the community is aware of the ecosystemic processes taking place and is aware that none can be exceeded without danger.

Limits. Knowing the resources and biotic domains well, and knowing what was going on in their own local ecosystems, meant that everyone realised that limits to growth existed. There was only so much energy available, so much food (though the supply was flexible), so much land, so many shellfish. The basic premise of our present-day industrial society -- the promotion of continuing material growth above all else -- could not be conceived of within the limits of small communities in bounded areas. The famed characteristic of Pacific voyagers of moving on to new lands rested in part on the recognition of limits.

So did the ideas of population control that have been described many times, as, for example, by Raymond Firth for Tikopia, where "not only is there a tendency for families to be regulated in size according to the quantity of their orchards and other ground, but there is a conception of a total population for which food has to be provided". Population was "measured according to the food" and there were strong injunctions against the anti-social behaviour of producing families larger than the limits (ideally one male, one female child, with their parents) of productive orchards (Firth's comments are summarised in Kirch 1984: 117-120). Precisely bounded island areas must, of course, impose the idea of limits, which larger parts of the wider world have been able to forget, temporarily, by drawing resources and energy from elsewhere. In small territories, resources must be looked upon as productive capital producing further income, as Papua New Guinean gardeners look upon the secondary forest fallow as a "garden mother" that will re-fertilise the soil for later use as gardens again (Clarke 1971). The clear recognition of limits points attention from quantity (the essence of materialism) to quality (the essence of beauty).

Beauty. Anyone who knows traditional ways or has walked about in a traditional landscape with one of its older inhabitants knows the enjoyment felt at the arrangement of productive diversity all around one. Medicine here, perfume there, fibre in the Hibiscus stem, fruit, timber, and so forth. There is a strong aesthetic element in this pleasure. Australian Aborigines speak, for instance, of "taking care of the country", meaning attending to its maintenance, as by annual burnings. This aesthetic feeling is not for the wild and distant sublimity of Nature untouched by humankind but for the designed Earth, the cared-for Earth, of which humankind is very much a part. It is a feeling that we are IN Nature, not separate, and therefore Nature needs attention, grooming, and care, as we ourselves need these things. This idea is now strongly expressed in the Gaia theory that all life on Earth forms a single organism (Lovelock 1988) or more simply by "Earth awareness" (Rivers 1988). Once this paradigm, which includes strong aesthetic values, replaces that of the Earth as use value, resource management and conservation will become integral to human life, not something always on the edge of threatening our material pleasures.

CONCLUSION

Specific traditional techniques and traditional knowledge can and should be used in conservation and resource management as much as feasible, and they have much to contribute. Beyond their use in piecemeal approaches is the contribution that a deeper understanding of traditional life and landscapes might contribute to the future. Conservation cannot succeed, or will certainly always be a hard, uphill battle, so long as our basic principles demand continued material growth and so long as we accept that the needs (never mind the desires) of ever-larger populations must continue to be met. Traditional

Pacific wisdom does not accept these tenets and also understood, as Ophuls (1977: 244) put it, that the Earth is, always has been, and always will be more beautiful than it is useful.

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CASE STUDY: TRADITIONAL ABORIGINAL LAND MANAGEMENT PRACTICES IN AUSTRALIAN NATIONAL PARKS

Con Boekel
Aboriginal Liaison Unit
Australian National Parks and Wildlife Service (ANPWS)
G.P.P. Box 636
CANBERRA A.C.T. 2601
Australia

INTRODUCTION

Over the past decade several trends have combined to increase the incorporation of Aboriginal traditional knowledge and skills in land management practices on protected areas. These include the following:

- an increasing recognition that Aboriginal traditional land management skills can play an important role in achieving park management objectives.

- the development of employment programmes designed specifically to enable Aboriginal people to work in land management areas. These employment initiatives may be coupled with training courses which have been designed so that Aboriginal skills and knowledge are accredited.

- the land rights movement which has led to Aboriginal traditional owners owning national parks and leasing them back to the governments.

- the growing recognition that the cultural values of many national parks are based on traditional Aboriginal culture.

This paper focusses on the increased recognition of the value of Aboriginal traditional land management practices, particularly the use of traditional fire practices in park management.

THE AUSTRALIAN LANDSCAPE

There is a view that Aboriginal people lived in harmony with the environment, as if Aboriginal traditional land management activities did not exist or had no observable effect. In this view, it is assumed that Aboriginals hunted and gathered in such a way that their activities did not affect the Australian environment. It is easy to understand why such a view could be maintained. The first non-Aboriginals found no cities, no industrial stench, no roads, no felled forest or dammed rivers. However, without realising the central importance of what they were witnessing, they did make reports of the frequency with which they saw fires and smoke. To them, and to many that followed, the land appeared as if pristine and untouched by humans. However, as a better understanding of the land is gained, this view is increasingly discredited. An increasing understanding of land dynamics is matched with a more thorough knowledge of traditional land management practices. The land is not pristine; it is cultured.

This view of non-existence or ineffectiveness of Aboriginal land use is also discredited by the Aboriginal view of their relationship with the land, involving, as it does, an active role in the union of the material and religious spheres. For example, Aboriginal people discuss traditional fire use in terms of how the fires affected the natural and spiritual worlds.

Although most pre-contact Aboriginal land-management practices are poorly documented and their effects on the land little understood, it is recognised that Aboriginals affected the state of the land in a variety of ways. The practices included the following:

- hunting and fishing
- gathering of plant foods
- the construction of dwellings, and hunting and fishing aids such as hides, weirs, fish traps and platforms in trees
- the maintenance of wells
- the use of fire
- the use of fish poisons
- the functions of ceremonies

It is clear that activities in each of these areas involved a series of choices, and that the choices made had impacts on the landscape.

This paper will now focus on the use of fire as a traditional land management practice and on the impact that fire has had on the landscape. It then focusses on how traditional fire management is used for park management.

TRADITIONAL BURNING PRACTICES

Fire was used extensively by Aboriginals. It was used to create enhanced opportunities for hunting. Burnt off vegetation resprouted with green shoots and concentrated game species for easier hunting. The smoke of fires was used to attract hawks to the vicinity of hides where they could be captured. In Central Australia fires placed in mature spinifex encouraged the propagation of a variety of plants which were edible, and which also provided shelter and food for a variety of desert animals. Fired country was easy to travel through. Fires were lit as part of religious ritual, to look after the country and to warn other humans and ancestral beings that they were being approached.

Aboriginals used fire to protect fire-sensitive vegetation. Mulga is valuable for its food, fuel and other material resources, but it is destroyed by wildfires. Stands of Mulga were protected by strategically placed patches burned around them. Areas of Monsoon forest, similarly rich in resources, were also protected by use of deliberately lit burns in the surrounding areas during cooler weather.

The timing of fires showed great awareness of the consequences. Some fires were timed for cool weather so that they would not damage flowers on trees, thus ensuring that fruit production was not diminished.

Throughout Australia fire plays an important role in the succession of species. Some plants require fire to regenerate, while others are replaced by fire-sensitive species if there is a lack of fire. Fires started by lightning as well as the activities of Aboriginal land managers have played an important role in shaping the landscape.

TRADITIONAL FIRE MANAGEMENT PRACTICES AND NATIONAL PARK MANAGEMENT

The implications of fire regimes for the management of protected areas and parks are correspondingly great. The landscape may now be regarded as being "manufactured". The impact of forty thousand years of deliberate burning has already altered the mix of plants and animals. Park managers are forced to choose between a range of fire-induced states of habitat.

If the aim of establishing a national park is to protect the animals and plants it contains, then the fire regime of the park must meet the needs of the animals and plants. This provides a further series of dilemmas for park managers. Parks are often adjacent to farm land and towns and there are demands that park managers prevent fires from burning out of parks into populated areas. Similarly, fires which are valuable from the point of view that they create ideal conditions for plants and animals may also threaten the timber values of adjacent forestry plantations and reserves.

ABORIGINAL INVOLVEMENT IN FIRE MANAGEMENT IN ULURU (AYERS ROCK/MOUNT OLGA) NATIONAL PARK

This park has been chosen as an example of the possible use of traditional land management practices because it is jointly managed, because Aboriginal skills are used extensively, and because it demonstrates the value of traditional Aboriginal skills. This is explicitly stated in the Plan of Management.

The objectives of Uluru National Park management are to (amongst others):

- provide for substantive Aboriginal direction and involvement in Park management;
- maintain the special significance of the land to Anangu (the traditional owners);
- to conserve its resources and the natural and cultural processes which are part of its ecosystems.

The Plan of Management is also specific in relation to fire. The objectives are to maintain the diversity of plant and animal communities, to attenuate the effects of wildfires, and to protect life and property. The implementation section goes on to state "Strategies and measures of the action plan will be prepared which will continue to utilise Commonwealth Scientific and Industrial Research Organisation studies and integrate these with Aboriginal traditional burning practices. Anangu will be encouraged to play a major role in fire management."

Currently, the Australian National Parks and Wildlife Service employs two men with long experience to give their fire skills while both younger men and older men are employed to go out and light the fires. The decisions about the fire regime involve co-operative planning beatween scientists and traditional owners. Scientific studies which have reinforced the traditional method of patch burning include studies by the Commonwealth Scientific and Industrial Research Organisation on the effects of fire on vegetation and studies on the effects of fire on the survival needs of the Rufous Hare-wallaby in the Tanami Desert in the Northern Territory by the Conservation Commission of the Northern Territory.

Most of the fires are lit in over-nature spinifex during set weather conditions. The fires burn into sand dune crests during the evening when temperatures are low, wind speeds are low and air-moisture contents are higher. The dune crests carry lower fuel loads. The fires are extinguished by these conditions. The fires are located in such a way that they protect fire-sensitive

vegetation such as Mulga. In addition they provide fire breaks against wildfires by reducing the fuel loads. The burnt areas form a series of patches of vegetation of different ages, thus providing a varied habitat of food and shelter for the park's animals.

It should be recognised that there are areas of uncertainty in relation to fire management. In some areas of Australia knowledge of Aboriginal traditional land management practices has been lost and can no longer be used in park management. In addition, virtually the whole of the Australian vegetation has been altered since colonisation and no-one can be completely sure what effects traditional burning will have on the new vegetation patterns.

LOCAL EXTINCTION AND FIRE REGIMES

A large number of medium sized desert animals have become extinct or very rare in the two hundred years since non-Aboriginal colonisation of Australia. Included here are a number of animals which used to be found at Uluru (Ayers Rock/Mount Olga) National Park. Although no-one is certain which factors, or combination of factors have caused these declines, it is generally believed that the absence of Aboriginal traditional burning practices played an important role. As European settlement extended across the continent, Aboriginals were no longer able to carry out their traditional burning practices which maintained essential habitat elements for desert animals. The vegetation was altered by wildfires, and the habitat deteriorated. The introduction of exotic animals made the situation worse.

THE RE-INTRODUCTION OF LOCALLY EXTINCT SPECIES

It is hoped that the re-introduction of Aboriginal burning practices, based on joint management and Aboriginal ownership of the land at Uluru National Park, will re-create conditions suitable for desert animals. Some of these are being bred in captivity and it may be possible to re-establish them at Uluru (Ayers Rock/Mount Olga) National Park.

TRENDS IN CO-OPERATION BETWEEN PARK AUTHORITIES AND ABORIGINAL PEOPLE

There is growing co-operation between Park authorities and Aboriginal people in the area of land management. This co-operation is being fostered in a variety of ways. There are a growing number of Aboriginal employees in national park organisations, including of Aboriginal contractors who carry out burning programmes.

There are more Australian national parks where governments have signed lease-back agreements with the traditional Aboriginal owners. The lease conditions generally include arrangements for a policy-making body such as a board of management which has Aboriginal membership. This provides an opportunity for Aboriginal people to ensure that their skills, interests and values are part of the decision-making process, including the development of plans of management.

Combined with the increase in employment and in jointly managed national parks, there is an increasing trend whereby training courses for Aboriginal rangers adopt, as a principle, the need to develop the courses in consultation with Aboriginal communities. Increasingly, these courses give formal accreditation to Aboriginal traditional skills and knowledge. Possibly the most advanced example of this is the newly developed Aboriginal Community Ranger

training course developed co-operatively by the Queensland Aboriginal Co-ordinating Council in co-operation with the Cairns College of Technical and Further Education.

These areas of co-operation in joint management, employment and training, along with the growing recognition that the landscape was the result of deliberate intervention, has, in turn, led to an increasing emphasis on the use of traditional skills of Aboriginal people in park management.

Aboriginal people are providing traditional knowledge and skills to park planning and management across Australia. The Australian Government has recognised the value of these contributions to nature conservation. In efforts to enhance the utilisation of Aboriginal knowledge and skills the Australian National Parks and Wildlife Service, on behalf of the Commonwealth Government, has established a special programme called the Contract Employment Programme for Aboriginals in Natural and Cultural Resource Management. This programme provides seeding money to State and Territory nature conservation agencies to enable them to use Aboriginal skills through contract employment. The nature and extent of Aboriginal input into nature conservation activities varies markedly because Aboriginal skills and knowledge vary from area to area, and because the policies of the State governments vary.

Examples where Aboriginals are providing traditional skills and knowledge through the Contract Programme include:

- Studies on fire management, habitats, behaviour and ecology of the Rufous Hare-wallaby in the Tanami Desert with the Conservation Commission of the Northern Territory.

- The development of park plans at Wildman River, Rainbow Valley, Coburg Marine Park and Keep River Park with the Conservation Commission of the Northern Territory.

- The study of the ecology of the Centralian Brushtail Possum with the Australian National Parks and Wildlife Service at Uluru National Park in the Northern Territory.

- The migration of birds in the Aurukun area in Northern Queensland with the Royal Australasian Ornithologists Union.

- Park management in the Central Sandstone area with the Queensland Department of Environment and Conservation.

- Planning for the proposed Maralinga World Heritage area with the South Australian National Parks and Wildlife Service.

- Little Corella research with the South Australian National Parks and Wildlife Service.

- Aboriginal site surveys with the Tasmanian Department of Parks Wildlife and Heritage.

- Turtle management in the West Kimberley area with the Western Australian Department of Conservation and Land Management.

- Planning study for the Buccaneer Archipelago with the Western Australian Department of Conservation and Land Management.

- The development of the Brambuk living cultural centre at the Grampians National Park with the Victorian Department of Conservation, Forests and Lands.

- The development of the Mildura cultural site management strategy with the Victorian Department of Conservation, Forests and Lands.

- The development of guided tours at West Head near Sydney with the New South Wales National Parks and Wildlife Service.

In addition, Aboriginal input is on going where Aboriginals are employed as rangers, and where Aboriginals have a formal role in park management structures.

Another point which should be noted is that Aboriginal people may provide a mix of both scientific and traditional management skills.

CONCLUSION

Traditional Aboriginal management practices helped to form the Australian landscape. When these management practices were stopped, plants and animals which had grown to depend on them were at a disadvantage. The removal of traditional fire regimes and the introduction of exotic predators has driven many animals to extinction or extreme danger of extinction. Across Australia, there is an increasing pattern of Aboriginal involvement, through training programmes, employment and in the management of national parks. A thorough understanding and proper use of Aboriginal traditional land management skills can be crucial to the attainment of National Park objectives and the continued survival of threatened species.

CASE STUDY: ASPECTS OF TRADITIONAL MARINE CONSERVATION IN TOKELAU

F. Toloa
Director of Agriculture and Fisheries
Office of Tokelau Affairs
APIA
Western Samoa

and

R. Gillett
Fisheries Development Adviser
Regional Fishery Support Programme
FAO/UNDP
SUVA
Fiji

ASPECTS OF TRADITIONAL MARINE CONSERVATION IN TOKELAU

F. Toloa and R. Gillett

Introduction

Tokelau consists of three atolls set on a northwest-southeast axis between 8 and 10 degrees south latitude and 171 and 173 degrees west longitude. Each atoll is made up of a number of reef-bound islets encircling a lagoon. These islets vary in length from 90 metres to 6 kilometres and in width from a few metres to 200 metres. At no point do they rise higher than 5 metres above sea level.

The total land area is 12.2 sq. km. Nukunonu, the biggest atoll, is 4.7 sq. km. Fakaofo is 4.0 sq. km. and Atafu 3.5 sq. km. The atolls are basically coral rubble and sand mixed with a thin layer of humus. Tokelau has an average mean annual temperature of 28 degrees C and an annual rainfall of 290 cm. The population is approximately 1700 for the three atolls.

Tokelau is highly dependent on its marine resources for protein and livelihood in general. The harvesting of marine resources is one of the most important aspects of the traditional Tokelau lifestyle, and there is a growing amount of literature on the subject. Conservation practices in Tokelau, however, have never been adequately documented.

Until fairly recently each of the three atolls of Tokelau had just one village. This may be one factor responsible for traditional conservation practices having a character somewhat different than in other areas of the Pacific Islands. For example, the concept of reef tenure does not exist. This departure from the more typical conservation systems may have caused some researchers to assume that there were no explicit marine conservation strategies in Tokelau. Alternatively, because some of the practices are quite subtle, they may have been overlooked by outside workers.

An understanding of the governing structure in Tokelau is a requisite for a discussion of conservation. Central governing authority in Tokelau is vested in a Council of Elders, comprised of most adult males over the age of sixty years. The Council, about 25 people on each atoll, historically has had total responsibility for the management of marine resources. In recent times, however, this authority has been somewhat eroded.

Many of the current conservation issues involve species where there is some degree of concern over the present abundance. Often this involves turtles (*Chelonia mydas* and *Eretmochelys imbrica*) and giant clams (*Tridacna squamosa* and *Tridacna maxima*). It is interesting to note that in Tokelau for the purpose of conservation, birds and land crabs are placed in the same category as marine organisms.

Marine Conservation Measures

In Tokelau traditional marine conservation measures can be considered in two categories: those that are specifically designed for conservation and those aspects of the Tokelau traditional system which indirectly result in a reduced amount of fishing effort on particular species.

Probably the most important explicit conservation measure is the "lafu" system whereby all types of fishing are banned in specific areas of the main reef. An example would be prohibiting activity on the entire windward reef shortly after the bi-annual change in direction of the prevailing wind. The decision to establish a "lafu" is made by the Council of Elders and an attempt is made to define the geographic area in such a way that no family will suffer a disproportionate amount of hardship by the ban. Although the "lafu" may be established for reasons other than a reduced abundance of a particular species, it is generally agreed that it results in a substantial increase in the availability of fishery resources in that area. At times a "lafu" may be established in anticipation of a future need. To assure that marine foods will be especially plentiful at an important festival, fishing may be banned from a section of the reef until just prior to the event.

Another specific conservation measure is the rejection of undersized fish when captured alive in most types of fishing. Fishermen believe that the potential benefits of returning the fish to the sea are worth the reduced catch. Scolding by one's father and elders serves to reinforce this practice.

For conservation purposes, destructive fishing methods are discouraged in the traditional system. The best example of this is the ban on the use of the toxins from beche-de-mer as a fish poison. Although the technique is highly effective in killing fish, it is thought that the use of the poison is detrimental to coral in the vicinity of its use and results in long-term negative effects.

In addition to the specific conservation measures above, there are a wide variety of practices in the Tokelau traditional system, which result in the conservation of marine resources through restricting the amount of specific fishing effort. Customs associated with turtle fishing illustrate how this

can operate. Green turtles are relatively easy to capture when they are copulating in the open ocean. However, not everybody is allowed to take turtles in this fashion, only certain highly respected masterfishermen. When somebody is successful in locating a turtle nest with eggs, he is traditionally obliged to capture the nesting turtle. As the exercise may require several nights of uneventful, boring waiting on the nest beach, it is in effect a deterrent to hunting for turtle eggs. Turtles in Tokelau are considered "sacred fish", meaning that a captured turtle must be divided among the entire community. This requirement results in a reduced incentive for an individual to participate in turtle fishing.

In Tokelau there is the perception that the pelagic fish (tunas and billfish) resources are far greater in magnitude than the reef and lagoon species. There are a number of mechanisms whereby offshore fishing effort is encouraged which, in effect, relieves pressure on the more vulnerable inshore species. The elevated status in the community of a good tuna fisherman serves to influence fishing effort. There is also the contention that many of the lagoon species should be reserved for harvesting only when weather conditions do not allow journeys into the open sea.

There are examples of attempts at marine conservation in Tokelau which, although they have a doubtful biological basis, demonstrate an intent to manage marine resources for conservation purposes. When giant clams are harvested, there is a requirement that the string of clam meat must be towed around the reefs where they were collected in order to release eggs from the harvested meat.

Modern Problems with the Traditional Conservation System

Recently there have been difficulties with the traditional marine conservation system in Tokelau. Probably the most serious is a general reduction in the authority of the Council of Elders which results in less effective management of marine resources. This diminished power is due to several factors including the introduction of a cash economy lowering respect for the now-salaried elders, venturing by the Council into non-traditional areas such as budgetary processes, having Tokelauans present on the atolls who were raised in New Zealand outside the traditional system, less severe punishment for violators which could consist of a relatively painless cash payment, the presence of an educated elite who can more easily escape the wrath of the system and the convenient option of escaping the authority of the elders by departing for New Zealand.

Another difficulty with the traditional conservation system concerns the development of overseas markets. The isolation of Tokelau has until recently resulted in all harvesting of marine resources for exclusively local use. There was no incentive for accumulating surpluses in excess of domestic needs. The improvement of the transportation situation has created the possibility of marketing marine products in Western Samoa. The demand for giant clams has grown tremendously, and is now far greater than what the resource can support, resulting in a marked drop in clam abundance.

The introduction of modern fishing gear has also created conservation problems. The virtual absence of pearl oysters in the lagoons has been attributed to diving goggles, unknown in traditional times. Gill nets and spearguns have also presented difficulties which the traditional system has yet to resolve.

With changes to the economic and educational systems there has been a marked deterioration in the level of fishing skills. Fishing effort is becoming more concentrated in the "easy" fisheries while the types of fishing requiring spe-

cial knowledge or intense physical effort, such as chasing giant maori wrasse or eel fishing, are being practised much less often. The end result is an excess of fishing effort on certain easy to capture fish, such as parrotfish.

Future Issues in Marine Conservation

The people of Tokelau feel that the traditional conservation system has served them well over the centuries. They are also aware, however, of the need for modification of the system to reflect recent changes.

Some Tokelauans believe that the foremost need with regards to traditional marine management is to restore the authority of the Council of Elders. Although this is an area of great controversy, many educated Tokelauans feel that this could be at least partially accomplished by restricting the Council's activities to those areas of their expertise and delegating responsibility for subjects alien to them, thus preserving the perception of the wisdom of the elders. It is also believed that the effective management of marine resources by the elders could be improved by establishing a more effective system of punishment for violators which could deal with both the traditional and introduced aspects of Tokelau life.

As the deterioration of traditional fishing skills is having a negative impact on marine conservation, there have been attempts to document the knowledge associated with particular fisheries. This has included the tuna, nearshore pelagic, and bottomfisheries in both written and photographic forms. There are plans to continue this work for reef and lagoon species.

It is important that aspects of marine conservation be introduced into the curriculum of primary and secondary schools. Presently, the science component includes conservation and there is instruction by Elders on fishing and marine resources, but there is potential for greater collaboration between the two subjects. Aspects of the abovementioned traditional fishing documentation projects could be effectively modified for use in schools.

It is believed that biological information from stock assessment studies could be used to enhance traditional management. Scientific studies have been carried out in Tokelau on tuna, baitfish, turtles, clams, beche-de-mer, coral, bottomfish and crabs. Although output from these studies has been utilised to some extent, a mechanism should be established so that the results are more fully incorporated in the Council of Elders management plans.

The positive value of traditional marine conservation in Tokelau is undisputed by the residents. The future challenge will be to modify the traditional framework to allow flexibility for the realities of modern life and to permit consideration of the results from scientific studies.

CASE STUDY: TORRES STRAIT ISLANDERS AND OUR TURTLES

Horace B. Nona[1]
Australian Fisheries Service
P. O. Box 376
THURSDAY ISLAND
Queensland 4875
Australia

The Torres Strait is made up of a group of 18 inhabited and dozens of uninhabited islands strung out over 32,000 sq.km of reef-strewn sea between Cape York Peninsula of Australia and Papua New Guinea. The islands are of four basic geological types:

- volcanic - typically rich soil and lush vegetation.
- coral Atoll - small, flat, infertile soil, sparse vegetation.
- mangrove - flat, muddy and water-logged.
- continental - large, dry, hilly, dry sclerophyll-type woodland.

Because of the generally poor soil and lack of water on the islands, few crops can be grown. Root crops such as taro, yam, sweet potato and cassava are the only crops grown. These crops form a major part of the islanders' staple diet. The three volcanic islands are the exception to this rule. Here crops such as corn, bananas, pawpaws, tomatoes etc. are easily grown.

Generally speaking, there are no land animals suitable as a food source. The exceptions are on Saibai and Boigu (Rusa deer) and on Badu and Moa islands (feral pigs).

There are 27 communities situated in the Torres Strait, including four communities on Cape York Peninsula. (fig. 1). The administrative centre for Torres Strait is Thursday Island with a total population of about 2500 people in three communities. The population of the remaining communities ranges from 50 to 800 people. The total population, including non islanders, of the Torres Strait and Cape York communities is about 6500 people.

Each community has a dry weather airstrip, one phone (often broken) and also one VHF radio in case of emergency. Supplies are brought to each community including Thursday Island by cargo vessel once a month. These vessels are all based and supplied in Cairns, some 1000 km to the south. There is no mains electricity in any community except Thursday Island, so each household supplies their own power with 2kva petrol generators. These are turned off during the day, and only used as a lighting plant during the night. This makes the operation of freezers for frozen products, meat, fish etc. very difficult.

TRADITIONAL USAGE OF MARINE PRODUCTS

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1. Mr. Nona is a Torres Strait Islander, born on Thursday Island. This paper is written from the perspective of a Torres Strait Islander who has actively participated in the fishing industries of the Torres Strait, and who recently obtained employment in the fisheries management of the Strait.

BACKGROUND

Sea-based resources are extremely important in the diet of Torres Strait Islanders. We have one of the highest seafood consumption rates in the world (Johannes and McFarlane in press; Poiner and Harris in press). Our most important resources are dugongs, green turtles and a variety of fin-fish, with the relative importance of each group varying both between island communities and within communities and at different times of the year (Poiner and Harris in press). For example, dugong meat is more important in the western islands where they are more plentiful (Marsh and Saalfeld 1989). Other marine resources that are used include gastropods (trochus, mud whelk), bivalves (clams, mussels) and crustaceans (crayfish, crabs and prawns).

In addition, sea-based resources are also important in the commercial and artisanal fishing activities of the Torres Strait, e.g. lobster, mother-of-pearl, mackerel, reef fish and trochus etc. (Storrs 1988)

MARINE TURTLES

Six species of turtles are found in the Torres Strait: green turtle (*Chelonia mydas*), flatback (*C. depressa*), hawksbill (*Eretmochelys imbracata*), olive ridley (*Lepidochelys olivacea*) and loggerhead (*Caretta-Caretta*). The leatherback (*Dermochelys coriacea*) is rarely seen in the Torres Strait. The green turtles are the only turtles taken for meat consumption, whereas the eggs of the green, flatback and hawksbill are taken.

Before European settlement and influence we (Torres Strait Islanders) did not have modern equipment such as outboards, dinghies etc. In those days turtles were abundant, and very few were taken.

The method used by the early islanders to catch turtles and also dugongs was to build a platform on the reef flat where the animals fed on the incoming tide. On this platform the hunter would wait till the tide was right and a dugong or turtle came close enough to the platform for him to spear it. Below this platform two other men would wait in a canoe to catch the turtle or dugong when the animal was speared. The spear or harpoon used is known to the Torres Strait Islanders as a whap. This is a long wooden pole with a detachable barb woven into a long rope, (originally made from coconut fibre). The barb is speared into the animal and the pole retrieved. The speared animal is then pulled in after it tires.

Another method that was used to catch only turtles is with a yellow sucker fish. This fish is caught and rigged with rope by the hunter in a special way. When a turtle is seen the fish is thrown at the turtle. The fish would then intercept the turtle, attaching itself to it, and the hunter would just pull the turtle in.

The knowledge and skill to take turtle and dugong by these methods was known by only a few who were esteemed in the community. With the introduction of modern equipment, hunting methods have changed considerably. It is now a lot easier with the outboard powered dinghies to catch dugong and turtle. Hunters simply chase the dugong or turtle, and either spear them or jump over and grab them after the animal has been tired out. These methods do not require any special skills, and no longer have status attached to them.

TURTLE MEAT DISTRIBUTION

When the hunters return from a turtle hunting trip, the turtle or turtles is/are then butchered and shared equally amongst the people of the village. There is no ritual involvement in the catching and butchering of the green turtle. Everybody gets a little piece from the different parts of the green turtle, and there are no special parts of the turtle reserved for any specific person or people.

Turtles are taken all year as they are an important source of protein and can be taken fresh as required (as mentioned earlier there are no facilities to store fresh meat). However, most of the turtle taken in the Torres Strait is in the latter months of the year (September to December), because these are the months when the green turtles mate and are always very fat. Also, this is when most of our festive celebrations are held, such as weddings, tombstone unveilings etc. Green turtles taken on these occasions are always used wisely and never wasted, because they can be used in a variety of different dishes suited to fat or lean turtle. At other times in the year lean turtles are not used.

Turtles and dugongs are not taken commercially in the Torres Strait, they can only be caught by the traditional inhabitants and used for their own consumption.

EGG HARVESTING

Of the six turtles found in the Torres Strait only the hawksbill, green and flatback nest here, therefore these are the only eggs eaten by Torres Strait Islanders. The loggerhead is known to migrate down the east coast of Queensland where it nests. The olive ridley is known to nest on the west coast of Cape York Peninsula through to the Northern Territory, and the leatherback doesn't nest in Australia.

Turtle eggs are only taken by islanders for their own consumption. Egg collecting is usually the minor part of a fishing trip, whether during crayfishing, line fishing, or a turtle or dugong hunting trip. People rarely go out just to collect turtle eggs and those eggs that are collected are used the same day. Nests are found by following fresh turtle tracks up the beach.

The Torres Strait is a nesting area of world significance for the flatback and hawksbill. There are three islands in the Torres Strait, (Kerr, Deliverance and Crab islands) that have the largest flatback turtle rookeries in the world.

Sporadic nesting of green turtles occurs throughout the Torres Strait, but none of the rookeries are considered to be of major significance. It is thus the harvesting of the hawksbill and flatback eggs that is of greatest concern.

Adding to human pressure, varanid lizards reportedly dig up and consume almost all eggs laid at some minor rookeries in western Torres Strait (Limpus and Parmenter, 1986). There are no other known predators of turtle eggs in the Torres Strait.

LEGAL STATUS

The taking of turtles in the Torres Strait is governed by laws instituted as a result of the Torres Strait Treaty between Australia and Papua New Guinea (ratified Feb. 1985). In the Australian part of the Torres Strait the commercial taking and use of all turtles and turtle products is totally prohibited by both Commonwealth and Queensland law. In the Papua New Guinea part of the Torres Strait a commercial catch of turtles is allowed provided they....."are consumed by residents of Papua New Guinea and are not exported".

CONSERVATION KNOWLEDGE

Like all other peoples, Torres Strait islanders are very unsure about conserving anything which has been taken for centuries, and is still taken today, with little effort.

Islanders say there is and always will be plenty of turtle in the Torres Strait because to them the numbers of green turtles do not seem to be decreasing. Islanders believe this, because whenever a turtle (green) is needed it can always be caught with very little effort. Because other species of turtles are not eaten, islanders do not know what the status of their population is. However, there has never been a shortage of eggs.

The indigenous harvest of green turtle (*C. mydas*) in the Torres Strait by Torres Strait Islanders and the Kiwai people of Papua New Guinea would be of the order of 5200 to 6300 turtles per year (Kwan 1989). To place this harvest in perspective an average of 60 tonnes of tortoise shell is exported worldwide each year (Anon 1989).

CONCLUSION

A fact that should not be ignored by conservationists is that turtles and dugongs are not just of cultural significance, they are our food. This source of food has been used by our fathers and their fathers before them. Turtle and dugong are taken for food as a necessity, because if this food source is taken away from the islanders, there is no other source of fresh meat. The nearest and only butcher shop in the Torres Strait is on Thursday Island, up to 250 km from the other inhabited islands.

As already mentioned, the consumption by Torres Strait Islanders of turtle and turtle eggs in the Torres Strait is relatively low, because there is no commercial industry. The conservation and preservation of turtles on a worldwide scale first requires the elimination of all full scale commercial (i.e. including the export of turtle products) utilisation of this resource, along with protection of major rookeries. These measures are of far more significance than concentrating on preventing a small annual harvest by subsistence fishermen.

If conservation projects are to be successful in the Torres Strait or anywhere else, the first step is to convince the people that there is a problem. It is easy for western societies to consider the residents of what are termed "underdeveloped" or "third-world" countries to be ignorant and unconcerned about conservation. The reaction of western societies to the availability of fossil fuels and timber are excellent examples of other people in "developed" countries ignoring warnings about shortages of supply.

Because of the cultural and dietary significance of turtles to Torres Strait Islanders, we want to see them preserved for our descendants. For us to play a part in the worldwide protection of this species we need to understand the extent of the problem. This can best be achieved by a low key approach to the education of our people, particularly throughout primary schools. The Australian Fisheries Services has implemented such a programme to cover dugong fishing in the Torres Strait. This programme was conducted by a Torres Strait Islander (Mr. Dana Ober), and copies of the material produced have been sent throughout Eastern Australia, Madagascar, California, Brazil, Papua New Guinea and SPREP.

Education will have two effects:

(1) Traditional peoples, including Torres Strait Islanders, will become more aware of what's happening around us.

(2) Because of our greater knowledge we will be in a better position to put pressure on those countries that are over-exploiting a resource that belongs to us all.

There are, of course, many different ways to achieve the various levels of conservation but whatever methods are developed, it is critical that the traditional users of the resource be consulted, because in the end, we have the strongest motive for making it successful.

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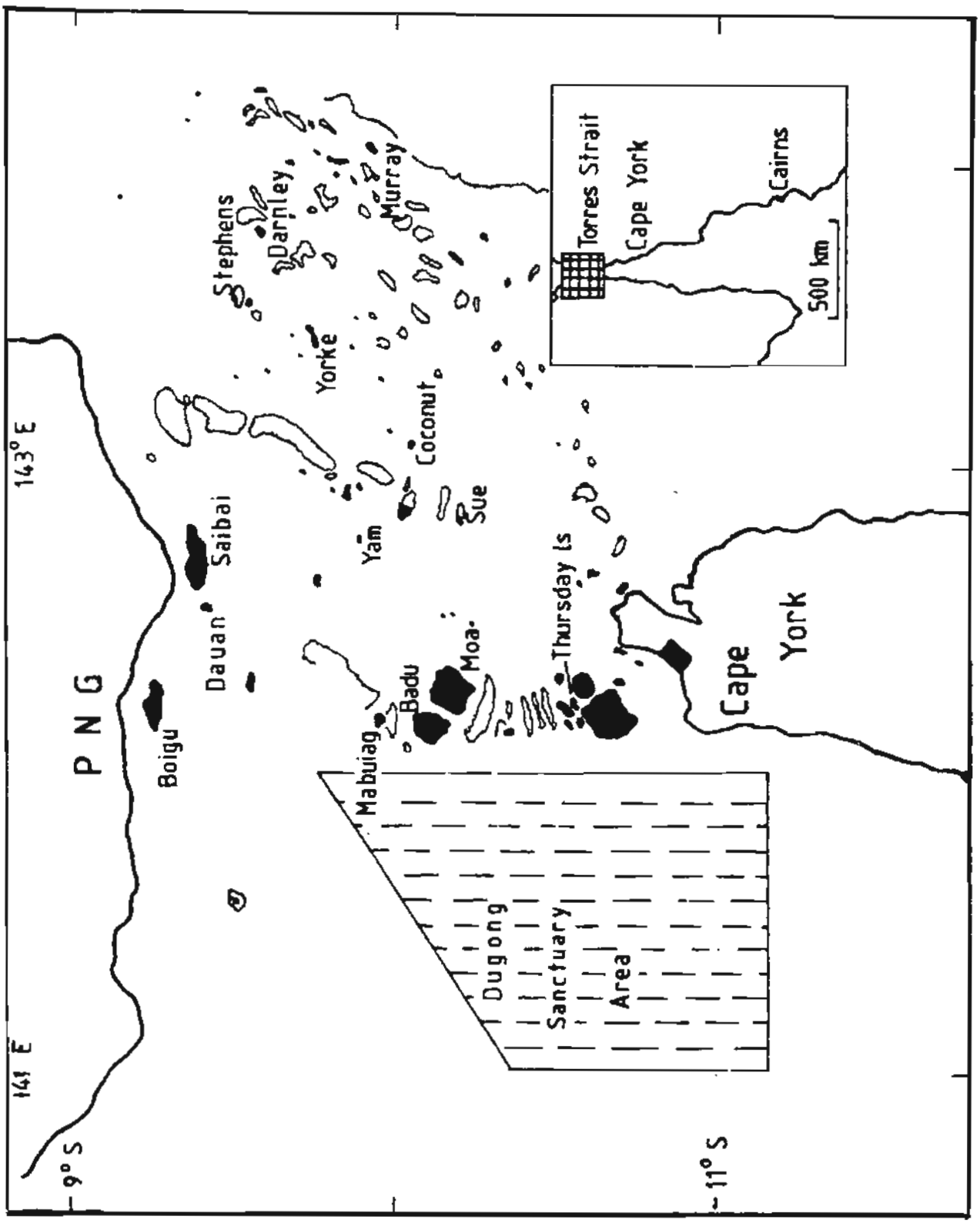
Figure 1: Map of the Torres Strait Islands, Australia.



CASE STUDY: **LAND OF HARAKEKE - A REVIEW OF TRADITIONAL USES OF PLANTS IN AOTEAROA (NEW ZEALAND) AS PART OF THE COMMONWEALTH SCIENCE COUNCIL'S BIOLOGICAL DIVERSITY AND GENETIC RESOURCES PROJECT***

Geoff Walls
Regional Botanist and
Co-ordinator CSC BDGR Project, Aotearoa
DSIR
HAVELOCK NORTH
Aotearoa
New Zealand

SUMMARY

People have always used and needed the plants around them. A thousand years of human settlement of Aotearoa have seen a thorough exploration of the uses of the native plants. It has also seen the plants and their habitats depleted to alarmingly low levels. Through cultural domination of the Maori inhabitants by later European arrivals, much traditional knowledge has been lost. A review of the current situation, identifying what is required to protect that which remains has been the focus of a three-year study carried out by the author and helpers. This paper backgrounds the study, describes its findings, and reports on the prime issues.

KEYWORDS: Plants, Traditional Uses, Review, Ethnobotany, New Zealand, Aotearoa, Conservation, Biological Diversity, Genetic Resources, Commonwealth Science Council, DSIR

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* Prepared for the Fourth South Pacific Conference on Nature Conservation and Protected Areas, Vanuatu, 4-12 September 1989

BACKGROUND

Aotearoa is at the southern tip of the Polynesian triangle, well south of the tropics. It has a temperate climate, varying from frost-free and mild in the far north to bitingly cold in the inland mountains and southern extremities, and from very wet in the west to dry in the east.

The land lies along a zone of earthquakes and volcanoes where two of the earth's crustal plates collide, and has a vibrant geological history. From a connection with the former great southern continental land-mass, it drifted away, eroded to virtually nothing, rapidly rebuilt, and found itself alternately in the grip of ice ages and times of tropical lushness. What exists now is a convoluted array of mountain ranges, low hills, valleys, plains, rivers, lakes, enclosed seaways, wild open coasts and numerous offshore islands.

It must have been an amazing place for the Maori discoverers, around one thousand years ago. They would have found a land almost entirely clothed in forests, but very few of the plants would have been familiar. No coconuts, no pandanus, no breadfruit, taro or paper mulberry. But trees bearing edible fruits, flowers having nectar, ferns with nutritious fronds, and roots, and the marvellous harakeke (*Phormium tenax*, New Zealand flax), full of strong silky fibre, growing in abundance. The seas and waterways were full of fish and shellfish, and the forests and grasslands were alive with a bounteous array of birds.

The Maori settlers explored the land from end to end, and experimented with the plants, finding uses for almost everything. They progressively cleared much of the forests by burning, gardened extensively, and hunted several bird species to extinction. But this process of modification really stepped up with European arrival two centuries ago, and now only about a quarter of the total area of former forests still remains. Even in remotest corners, introduced animals browse on the native plants or kill and eat the native birds and invertebrates. Reminders of the original cover now only occur as small remnants - about one half protected by law, the others in private hands and only a few of those being nurtured by their owners.

So, as in many other countries, Aotearoa stands to lose touch with its distinctive and special plants and animals. Domination of Maori by European (Pakeha) culture has also meant a huge loss of centuries of traditional knowledge. But it is not too late to retrieve and safeguard much that is valuable, and that has been the aim of my work over the last 3-4 years.

THE STUDY

Work was begun in early 1986. The scope of the study originally encompassed the tropical Pacific too, and some work was done there, but since resources were limited and local experts clearly exist in each Pacific Island nation, work was mainly confined to Aotearoa. Energies were directed towards the following general objectives:

(a) Cataloguing the information that exists regarding plant uses.
(b) Identifying prime needs for conservation of traditional knowledge and valuable plants.
(c) Facilitating current and future beneficial plant uses in environmentally acceptable ways.

I was provided with sufficient funding by DSIR to recruit one full-time coworker. It was apparent to me though, that better value could be obtained by employing two people half-time, enabling more flexibility and a wider

coverage. So our little team was born: me, simultaneously working as regional ecological botanist for the eastern central North Island; Sue Scheele, researching the archives and current literature, and compiling the database; Atareta Paul, a skilled Maori traditional craft weaver, surveying current practices based on traditional plant use, and identifying modern needs and concerns of those users.

We began work quietly, avoiding fanfare, feeling our way. From the outset, in our approaches to knowledgeable people, we encountered such enthusiasm and such a welcome for our efforts that we were encouraged. There was widespread relief that at last someone was doing something systematic to help protect traditional knowledge and native plants of value. Perhaps our quiet consultation was the right approach, because subsequent events have demonstrated that in the public arena racial and cultural issues become so polarised that progress and cooperation are made difficult.

Efforts were made to span all native plants and their uses, but with limited resources and time a selection of the most important was necessary, and we concentrated on the following:

* New Zealand flaxes (*Phormium* spp., harakeke and whaririki), Agavaceae. The most useful multipurpose plants in the country, for traditional Maori fibre arts and crafts, cordage, industrial fibre production, medicine, food (nectar), fodder, dyes and flotation. A boon to Maori settlers in a land where pandanus and coconut did not grow.

* *Cordyline* spp. (cabbage trees and relatives), Agavaceae. Like the tropical ti (*C. terminalis*) valuable for food, fibre, symbolism.

* Pingao (*Desmoschoenus spiralis*), Cyperaceae. A robust sand sedge, prized in Maori arts and crafts for its rich golden colour.

* other fibre plants used in traditional Maori arts and crafts.

* dye-producing plants.

* food plants as a group (including trees with edible fruits, ferns with starchy rhizomes, fungi and seaweeds).

* medicinal plants as a group.

* plants providing fragrances and essential oils.

ACHIEVEMENTS AND FINDINGS

1. A thriving contact network of people and organisations has been established throughout the country and the wider region. People include: traditional artists and craftspeople, traditional healers, tribal representatives, ethnobotanists, ethnologists and anthropologists, research chemists, librarians and archivists, plant propagators and gardeners, conservation ecologists, environmental managers, educators and media representatives. Organisations and institutions include: arts/crafts organisations and cooperatives, universities, libraries, museums, science research centres, environment and social agencies and groups, government departments and tribal authorities.

2. Through the review of already-recorded information, the scope of the subject has been identified. Excellent reviews of many aspects covered by this study have already been done by others, and produced in written form. However, this study has provided an interactive focus for all

such information. A computerised storage and retrieval system has been established whereby information for any plant or use can be readily added or extracted. This enables numerous requests to be rapidly serviced, and makes the production of educational material straightforward.

3. The travelling work of surveying current Maori use of plants based on traditional practices has yielded the following results:

   (a) Use of fibre plants in arts and crafts is widespread and thriving, and is a significant and growing economic pursuit.

   (b) The medicinal use of plants is also widespread, but practitioners are less willing to divulge their secrets.

   (c) Native plants make only a very minor contribution to diet these days.

   (d) Needs and concerns mainly revolve around establishing or maintaining sources of supply of the required plants. Access to plant material from Crown-controlled land (usually having protected status), protection of wild remnants and establishment of artificial plantations are all considered necessary.

   (e) Comparison with the database has shown that very little information has come from the survey that was not already recorded by European scholars, settlers and researchers. This probably reflects both a loss of this kind of knowledge among Maori people, and a reticence by some to divulge what they know.

4. Perhaps the most tangible achievement has been the assembly of the nucleus of a national collection, in cultivation, of New Zealand flax (*Phormium*) varieties. These are forms that have been selected over centuries by Maori users for their distinctive qualities, and the aim of the collection is to safeguard them for use and research.

5. Many thousands of people from islands in the tropical Pacific now reside in Aotearoa. Cultural practices are retained, but few of the plants central to those practices in the island homelands are available. The study has found a strong demand for the following: pandanus (*Pandanus* spp.), coconut (*Cocos nucifera*), aute or paper mulberry (*Broussonetia papyrifera*), kava (*Piper methysticum*), ti (*Cordyline terminalis*), taro (*Colocasia esculenta*) and breadfruit (*Artocarpus altilis*). Efforts are already being made to establish aute and taro commercially. It is possible that others may also be able to grow in Aotearoa, if selected from cold-tolerant sources. Preliminary investigations for pandanus are encouraging.

6. Though the study officially finished in 1988, it brought sufficient recognition of the whole subject for various aspects of it to continue in different ways. The database, contact network, and flax collection continue to expand, and the most pressing of the conservation needs are being addressed. Publicity has taken facets of the subject to the wider community, and land managers now have a heightened awareness of the issues. Besides, ethnobotany has been established as a discipline within DSIR and the scientific community of Aotearoa, to be taken seriously and funded for research in future. These are important steps.

7. Our study took something of a lead in the CSC BDGR Project. It drew up proposals, organised funding and began work earlier than other countries, and its programme was received with interest and taken as a general model for other countries' activities. It must be stressed here

> though that each region, each country, each locality, has its own unique characteristics: the plants, people, customs, politics, economy, landscape and climate all dictate the needs. Interaction with plants occurs at a local level, and that is where greatest help can be rendered. It is my experience that once national and international overlays are applied, little of real meaning takes place. The aims of the CSC BDGR Project are laudable, but without translation of those aims into on-the-ground action that is appropriate to the particular needs of Aotearoa, or to each Pacific island group, and commitment of adequate resources to the work, the project is of little real value.

Many other fascinating issues have been raised during the study. These include widely varying attitudes to conservation, conflicts created by Pakeha laws relating to land-use, profound cultural differences in the ways plants are expressed in language (names, values and stories), the ownership of knowledge, rights over plants, piratisation and commercialisation of traditional knowledge, and the intricacies and etiquettes of cultural interactions. There is neither time nor space to elaborate here. However, they are pivotal to the value and success of future pursuits in ethnobotany in Aotearoa. They reflect the multiple cultures now present in the country, and these times of cultural tension and polarisation. There is a current renaissance of Maori cultural practices, with the regaining of a sense of identity, but not yet accompanied by sufficient self-determination to feel secure.

These plants, these traditions, are a means by which cultural interactions and learning exchanges can happen. They could be critical to us in the future.

That this work has already created a heightened awareness of and respect for the distinctive natural flora of Aotearoa, and translated into local conservation efforts, is a source of real delight. Should it contribute to a more tolerantly multicultural Aotearoa, it will have been doubly worthwhile.

Part 7

The Economic and Social Dimension of Nature Conservation

Theme Paper: HOW MUCH IS A PARK WORTH:
ECONOMIC AND SOCIAL BENEFIT OF NATURE CONSERVATION

Peter Valentine
Research Fellow
East-West Center
HONOLULU
Hawaii

and

James Cook University
TOWNSVILLE
Australia

INTRODUCTION

At the World Conservation Strategy Conference in Ottawa in 1986 it was proposed that WCS sponsors should encourage governments to start putting price tags on their existing natural resources. It was also suggested that governments should assess the economic and social costs to their countries should these natural resources be depleted. Since then the World Commission on Environment and Development produced the Tokyo Declaration which emphasized long term sustainability, in turn followed on December 11, 1987 by the General Assembly adoption of the Environmental Perspective (Resolution 42/186) in which member countries should progress towards environmentally sound and sustainable development. While these ideas about sustainable development were widely supported, it has subsequently been noted, at the Nairobi meeting of UNEP, that "environmental action and economic planning still remain insufficiently related to each other in most countries".

In this paper economic and social benefits of environmental protection will be explored, and an attempt made to explain some of the problems and prospects for bridging the gap identified above. A particular focus is the nexus between tourism and the environment with a discussion of the nature of tourism and the tourism of nature.

This theme can be seen in two parts - the values we place on protected areas and the potential of protected areas to generate benefits, especially those benefits which can be counted in economic terms.

PERCEIVED ECONOMIC AND SOCIAL BENEFITS OF PROTECTED AREAS

The problem in defining values of national parks is compounded by their non-market collective good nature. Almost all the attempts to place values on national parks ignore some elements, and frequently underestimate others. I want to present a few examples to illustrate the kinds of problems and possibilities involved, and to encourage support for further development of appropriate techniques. It might be a useful project to produce and test a checklist of economic evaluation which could be applied to any National Park.

One might also pause a moment, and consider why we need to know about economic benefits of protected areas. Your own specific answer will undoubtedly influence the relevance of the many aspects.

There have been numerous statements on the "benefits" of conservation and some recent discussions have deliberately adopted an economic viewpoint (Entwistle 1987, Reynolds and Ulph 1979, Western and Henry 1979, Tisdell 1988). Given the reawakened belief in economic rationalism which seems to pervade governments throughout the world in this decade attempts to describe the benefits of protected areas in "hard" terms are inevitable. Some simple examples include relating the attractive power of organisms and/or parks to bring tourists to a region. For instance, a single penguin colony in Victoria attracted over 160,000 visitors per year. A single United States birdwatcher spent over $40,000 in 10 days chasing birds around the national parks of the world. The most popular national parks achieve visitor rates of many millions each year, which in turn translates into hundreds of millions of dollars in national income. An example might be useful. Each of the three major national parks in the Northern Territory (population 150 000) has over 200 000 visitors per annum. Tourists to the NT come primarily to visit these parks and almost all the favorable impressions of their visits are protected-area-related. The average length of stay in the NT is 8 days,and mean expenditure is $75 per day. This gives an expenditure from non-business visitors of around $360 million. Add to this an even greater amount to cover travel costs to get to the NT, and the 600 000 non-business visitors to the territory contribute a very large amount to the economy. The national parks' share of this is minute!

Another very interesting way of placing value on protected natural areas is to estimate the cost of restoring degraded land to its prior condition. Allen (1988) gives a good example of such a project in Costa Rica where an investment of $11.8 million is preparing the way for the recovery of 75,000 hectares of former forest. The area is expected to require 100 years to become free of grass, and a further 200 years to revert to intact forest. Such figures warn us to be very careful with our remaining undamaged ecosystems - the costs of repair will be very great. To save remaining tropical forests the World Bank has estimated it would need $8 billion to cover the first five years; to restore existing endangered area might cost $150 billion.

Valuing the products of protected areas might give another insight into economic benefits. Thus, in the USA and Canada the hunting industry is huge and derives its harvest as products of protected areas. What studies have been conducted demonstrate that the hunters are typically willing to pay very much more than they are currently charged for fees. This consumer surplus should be included in any calculations rather than the simple licence fees collected (see especially Bishop and Heberlein, 1980). In general, visitors to national parks also have considerable consumer surplus, and the entry fees or user fees charged undervalue the benefits received.

On a slightly different tack there has been an interesting attempt in the social sciences to quantify some of the traditional intangible benefits which flow from protected areas. In the more affluent nations this is manifest by the work of Driver et al (1987) who are examining some of the personal psychological benefits of recreation and relaxation in natural settings. Included amongst these benefits are personal development, therapeutic and health aspects, social identity, spiritual, aesthetic/creativity benefits, educational and symbolic values. An additional set of social benefits are also recognized, and these include the usual set of preservation-related benefits of primary concern to biological conservation. Another example of research relevant to this topic in affluent countries is the work of Kellert on the link between wildlife and human quality of life (cf 1987). Using carefully controlled attitude scales and combining this with secondary data back to the beginning of this century, Kellert has shown a general reduction in the frequency of what he calls "utilitarian" and "negativistic" attitudes towards wildlife. Americans (his target group) today value wildlife in broader, less competitive and less negative terms than in the past (Kellert 1987:223). Unfor-

tunately, Kellert's work indicates that "most philosophical, educational, economic and ecological wildlife values were little recognized or understood by the general public" (ibid). It is of additional interest that more positive and appreciative wildlife attitudes were largely restricted to particular vertebrate species, a conclusion supported by some research in Australia (Valentine, 1984).

Of particular interest to developing countries has been an attempt to place market values on some of the many traditional forest products. Most appraisals of tropical forests focus exclusively on timber resources, and ignore the market benefits of non-wood products. A recent study by Peters et al (1989) has shown both the remarkable diversity of such products from a Peruvian rainforest and the vastly greater economic return compared with logging. The actual calculations produce a dramatic contrast - for the non-timber products of one hectare of forest the net present value is $6330, for timber the net present value is only $490. Peters et al also compare their calculations with an assumed sustainable yield from both plantation forestry and from grazing on forest land converted to grass. In neither case does the return get even close to the non-wood products. Of additional significance is the distribution of the benefits. The non-wood products contribute to the incomes of a very large number of relatively poor people. This dispersion of benefits, while socially desirable, means that they are easily overlooked by national accounting programs. The large-scale timber projects are on the other hand highly visible.

One aspect of social benefit often emphasized is the role of protected areas in maintaining tradition and culture. For example, at both Uluru and Kakadu National Parks in Australia the traditional owners retain rights of customary use, and this opportunity is used by the people on a regular basis. The strong interest by visitors in traditional crafts has also promoted a demonstration and sales facility which has contributed to the maintenance of traditional skills. On the other hand tourism inevitably produces change in the host community although this change can be managed by influencing the style of tourism (see below).

Of increasing interest around the world is the prospect of an ever-growing tourism economy. Allied to this is a recognition, often belated, that natural environments in general and protected areas in particular are the primary magnets for tourist travel. In this context, then, it is very commonplace to have recognized as a benefit of protected areas the sustained flow of tourist dollars. This topic is of such great importance it will be considered separately.

THE POLITICS OF BENEFIT-COST ANALYSIS

Given the kind of evidence gradually emerging on the huge array of benefits which accrue from national parks it must be somewhat puzzling that expansion of the protected area systems in virtually every country occurs in the face of considerable opposition and government reluctance. This despite clear political support for conservation amongst many affluent nations. One explanation for this situation may be found in the very nature of the most widely used tool of economic evaluation - benefit-cost analysis. This central tool of economics is generally applied to favour the present over the future and the national interest over the local. Protected area managers ought to make themselves aware of the nature of this tool, and develop strategies to overcome some of its worst features. Some examples might suffice to illustrate the problem. Typically protected area benefits accrue indefinitely into the future, and these are frequently compared with alternatives which have immediate returns and a somewhat uncertain repeat cycle (e.g. logging natural tropical forests). In converting the "infinite" series of benefits flowing from a

protected area B-C analysis employs a discount rate to reduce future benefits to a 'net present value' equivalent. The size of this discount rate has a dramatic effect on the final value. In setting such a rate one might employ either an individual time-preference or a social time preference. It is typical of human societies that when we think or behave as individuals we prefer to have things sooner rather than later. However when we think and behave as groups (societies) we place a much greater emphasis on the future. It is for this reason that one might argue that benefits in the future which accrue to society as a whole should not be discounted. Or at the very least should not be treated in the same way as money in a personal bank account.

It is worth pointing out that the use of high discount rates can have a disastrous effect on the way we deal with costs as well. For example, if a development produces a large flow of cash in the short term, it might be approved even if it were to produce a much greater cost at a distant future point in time. The nuclear energy industry might fit this description somewhat. If a discount rate of, say, 10 per cent were employed, even extremely large values some 40 or 50 years down the track end up with net present values of almost nothing. The point to bear in mind is that the choice of a discount rate is subject to considerable debate, and the judgements involved are liable to be challenged. The very notion that it is acceptable to discount the future life on earth might raise hackles amongst most groups were they to be asked. It would be interesting to know just who makes these decisions in each country.

Another aspect of the politics of benefits and costs is the question of their spatial distribution. This is nearly always a crucial aspect when considering both the way communities value protected areas and the flow of economic benefits which might follow declaration and management of protected areas. Just as benefit-cost analysis tends to be used to prefer the present over the future it is also used in a way which prefers the national interest over the local. The creation of employment as usually measured by benefit-cost analysis, measures net increases regardless of where they occur. A good way of understanding this is to consider the benefits which arise from employment in, say, a large enclave resort versus a series of small enterprises scattered through the rural community. People in the rural communities will undoubtedly prefer the latter but from a national economic perspective there may be no preference, and if the large enclave resort produces more jobs then it may seem better. One of the most powerful arguments for integrating some kind of associated economic use with protected areas is that it provides employment where it is most needed - in the rural areas. Almost without exception the developing countries (and the developed) are experiencing strong rural unemployment and a consequent breakdown in social structures and migration of young people to the cities. What is clearly desirable are types of developments which provide the benefits where they are most needed. This is another way of building in some compensation for people most affected by the declaration of a protected area.

A related problem is the poaching of wildlife. In a recent UNEP News report it was revealed that 50 tigers were poached in Bangladesh during 1987. The (dead) value of these tiger to the poachers is $2000 each, and the report points out that a single international tourist will spend much more than this. Unfortunately the people collecting the tourist dollars are not the same people poaching tigers, and until some flow-on occurs from tourism income to potential poachers, the problem is unlikely to go away.

In thinking about the values of protected areas it is as well to recognize the great variety of such areas. For example, a World Heritage Area, such as the magnificent Kakadu National Park in the Northern Territory of Australia, has very high international values, and draws visitors from all over Australia as

well as internationally. State parks are typically more visited by local people, and are often subject to a greater variety of user types. Local parks have high local use and may in fact be valued more directly by the local community. This might suggest that the beneficiaries of protected areas are inversely rewarded according to their distance from the park. Such an effect, if it really does exist might offset the claims for local compensation. Thaman (1986) has outlined many distinctive benefits and values for small local protected areas (microparks), and the concepts he presents are particularly relevant to this theme.

The very high visitor rate, especially in parks near urban centres, usually leads to a breakdown in management ability to cope, and in turn to much conflict over inappropriate use, conflicting user types and environmental degradation. Frequently there are few mechanisms available to translate community values into dollars for management - a problem much in need of addressing. Given the previously mentioned untapped consumer surplus, it is not surprising that the user-pay concept has been vigorously pursued by park managers and politicians around the world. One might observe however that entry fees only capture a small proportion of the beneficiaries of parks, as it is quite clear that for many parks in absentia benefits are extremely high.

LINKING TOURISM WITH PROTECTION - THE NATURE OF TOURISM

There is a vast amount of writing on the nature of tourism and it is worth exploring briefly some of the central concepts, especially where they relate to the link between tourism and the environment. There is no simple or single answer to Budowski's question about tourism and conservation (1977), but there are numerous subsequent accounts of both positive and negative interaction. Thorsell and McNeely (1988) present some useful suggestions on how to integrate tourism development with protected area management; Richter and Richter (1985) and Cater (1987) discuss options for tourism in developing countries pointing out that there are many different styles of tourism, each with benefits and costs. Amongst the most useful models of the tourist industry are those which attempt to identify the evolving nature of tourism at any given site, surely a crucial element if tourism is to be a major arm of conservation efforts. The so-called "product-life theory" predicts a progression through stages each becoming more intensive than its predecessor (often four stages coinciding with different tourist types: thus inception, growth, maturity and decline with, respectively, explorer, followers, budget packages and charter/mass tourism). Some models are based on the interaction levels between tourism and the environment and tourism and local cultures. Typically, they predict increasing levels of impact as the tourist type changes. One of the most successful tourism developments has been termed "enclave" tourism where visitors are more or less contained within an appropriate social and biophysical bubble, not mixing with the local community, and, apart from the construction impacts, not having much affect on the environment. Some governments prefer such styles of tourism as it gives less opportunity for local people to be polluted by tourists (e.g. the Maldives uses this approach). Given that most models indicate the potential for serious social and environmental impacts of tourism on host communities it is not surprising to find evidence of resentment (Mathieson and Wall 1982). Doxey's index of tourist irritation provides a descriptive account of successional change - from the level of euphoria, to apathy, to irritation, to antagonism and perhaps finally to irreversible breakdown (sometimes violent).

A good example of an apparently harmonious relationship between local people and tourism is the Mana Island resort off the western coast of Viti Levu (Fiji). Here the customary land owners have arranged an agreement (part of the lease) whereby locals have first preference for all jobs at the resort. The

resort, built in 1972, has 133 bures and employs 166 people. Although 85 per cent Japanese owned (10 per cent Australian) the local people have a 5 per cent shareholding. In this example the arrangements do favour the local community but this is clearly related to the distinctive land tenure system in Fiji.

TOURISM AND THE ENVIRONMENT

Members of the tourism industry have frequently claimed that tourism is a positive force for environmental protection (e.g. Shackleford 1985, Romevil 1985). Much is often made of the Manila Declaration on World Tourism in 1980 however in that document the environment ranks 18 out of 25 clauses. Jeffreys (1987) reported that an analysis of the past 10 years of annual reports of the Queensland Travel and Tourism Corporation, a state government body, revealed that not once was the word environment mentioned even though many of the reports include pictures of unspoilt mountain streams, coral reefs and coastal scenery. Likewise the two-volume Australian Government Inquiry into Tourism released in 1987 failed to address tourism's relationship with and impact upon the environment. But things are very definitely changing. The current Australian Industries Assistance Commission enquiry into tourism released its first discussion paper earlier this year entitled The Environmental Impacts of Travel and Tourism (Burns et al 1989). In April this year, partly in response to conservation groups action on the matter, the Australian Travel Industry Association organized a seminar to formulate a policy on the environment. This is due to be finalized as national policy in November this year. There is, therefore, a dramatic increase in interest in the interaction between tourism and the environment. The commercial value of the environment is now widely recognized in the tourism industry. For example, the January 1989 Northern Territory Tourism Development Plan (Peat Marwick Hungerfords) points out, "The range and variety of park and recreation areas in the Northern Territory form the underlying base of its tourism future." It is not surprising that the NT government's promotional material refers to itself as "Nature Territory". With 1988 tourism expenditure figures of $400 million, this accounting firm appears to value the parks very highly indeed. Likewise the Tourism Council of the South Pacific in its most recent series of promotional brochures has clearly emphasized nature as the major drawcard in the region. In the Coopers and Lybrand Fiji Tourism Master Plan (February 1989) the prospect for expansion of the tourist industry is predicted on the protection of natural environments, and strong support is given to the establishment of a park system.

There is no doubt that a very large proportion of total world tourism income depends on the protection of natural environments and this factor is universally acknowledged in principle if not always central to management of the industry.

Ingram and Durst (1987) made a study of USA operators of nature-based tourism to developing nations, and their results are highly informative. The activities include trekking/hiking, bird watching, nature photography, wildlife safaris and even botanical study and butterfly watching. Thirty different countries are included and the companies interviewed believed overwhelmingly that this form of tourism was going to increase. The companies do employ host-country nationals, most frequently as guides/interpreters. The greatest concerns of the visitors were about the qualifications of the tour operator and health and sanitation. It is interesting to note that for this group of tourism operators 40 per cent used rural village accommodation. In a study of visitors to Lakefield National Park in remote northern Queensland (Valentine, 1984) incomes, higher education levels and were spending more on their visit than others.

Nature-based tourism, or eco-tourism, comes in a very large variety of forms, and unfortunately there appear to be few careful case studies which have assessed the benefits and costs of this industry to either local communities or the environment. Most of the information available seems largely anecdotal, and there is definitely a need for some detailed studies. Proposals for nature-based tourism are much more common. A current project at the EAPI (East-West Center) seeks to prepare a more detailed review of this topic, and contributions from South Pacific nations will be warmly welcomed.

The general philosophy which seems to offer developing countries considerable potential involves the use of dispersed special-interest tourism. The style might resemble a guest- house approach (Ranck, 1987) but perhaps with more emphasis on nature-based activities. The work of the Ecumenical Coalition on Third World Tourism includes the identification of a large number of alternative forms of tourism (Gonsalves and Holden, 1985) and some of these would fit nicely with a nature-based tourism program. An example would be setting up a protected area in conjunction with a village; relying on the local community skills to identify appropriate areas in conjunction with marketing advice, developing special skills amongst the community in interpreting nature and establishing an agreement for protection. The village would then need to consider its own ability to feed and shelter prospective visitors and identify the style and duration of visits preferred.

It might be wise at this point to suggest a degree of caution in making claims about the prospects for this form of tourism. While I am personally confident that small scale programs can and do work well, it would be most unwise to build up the hopes of villagers to an unrealistic level. Given the human resources of most Pacific Island nations it is unlikely that adequate government support could be provided to properly establish nature-based tourism except on an experimental basis. Unfulfilled expectations of a protected area/tourism bonanza will surely do vast harm to future protected area programs. In addition all forms of tourism produce trauma in host societies, and this prospect should be made clear at the beginning. Discussions of small scale village-based nature tourism should not deny a role for the large enclave tourism developments as such resorts have potential to provide a base for short term visits to a network of low-key nature-based destinations. Indeed it is frequently the volume of tourists who travel to a destination which enables the reduction in fares required to produce a sustained flow. The geography of the Pacific Island nations makes this a very important factor.

One other aspect needs emphasizing. Nature-based tourists are discriminating. It will be essential to have high-quality interpretation. An example which illustrates the need for improvement is the Navua River ethnic and wilderness tour in Fiji. While the environmental setting is superb and the cultural contact has great potential, there is little interpretation of either cultural activities or of nature. Consequently, the trip lacks the appropriate level of intellectual content for these specialized tourists. It seems likely that such tourists would be more than happy to pay extra for this service.

In a useful review paper Marsh (1987) identifies a range of styles of tourism and associated conflicts with environment and people. He concludes that the 'economic and development benefit of national park tourism will depend upon the volume of tourism, the level of visitor expenditure, the cost of park and tourism facility operations, the financial leakage, multiplier effect and import propensity.' Assuming a successful development of tourism associated with parks, this raises a very major issue. Tourism in the parks is by no means all beer and bikkies! In an international survey of threats to National Parks (Machlis and Tichnel 1985) it was found that 65 per cent of all threats perceived by managers were indicated to be caused by humans. A total of 23 per cent of all parks surveyed (n=98) reported too many visitors as a major threat

to management, while even more identified degraded scenic viewpoints, litter and trampling of vegetation as threats to the parks. It seems unlikely that success in attracting tourism to a park will be rewarded by an increase in management funds from governments already stretched for funds. One clear option is to develop an agreement for tourism developments to supply the necessary extra management funds.

CONCLUSIONS

The Nairobi UNEP meeting mentioned above (1988) concluded that 'the further development and application of economic analysis techniques so that decision-making may reflect environmental values more appropriately is a high priority', and this paper has discussed some of the problems facing those who wish to present the benefits of protected areas in more complete economic terms. That such benefits exist is undeniable and evidence points to a consistent underestimate in the value of those benefits. New and careful accounting procedures will help provide a better insight into such values. However, these will not overcome the judgement components in economic analysis and the many other issues raised above. Of particular value in understanding these problems will be some careful case studies which look at specific developments in the context of particular local conditions. The prospects for small-scale nature-based tourism in association with protected areas seem good but such developments are not without potential conflicts. It would be of particular value if member countries could help document the variety of types and the relative merits of eco-tourism through specific case studies and monitoring.

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CASE STUDY: ENVIRONMENTAL PLANNING FOR TOURISM IN WESTERN SAMOA

N. W. Firth
Director
KRTA Limited
NEW ZEALAND

and

d'E. C. Darby
Director
Conservation Development Services
NEW ZEALAND

INTRODUCTION

Most Pacific nations are interested in a level of tourism that is appropriate to their cultures and resources as the basis of sustainable development programmes. Western Samoa is no exception, as shown in its Tourism Master Plan. Similarly, most nations are interested in maximising local ownership and outer-island participation in tourism, and in minimising infrastructure costs and leakage overseas of profits.

This requires utilisation of each nation's unusual or unique natural and cultural resources, rather than constructing extensive man-made attractions which, because of their very high capital requirements, are almost always foreign-controlled with attendant dilution of advantage of the host country. However, in tourism as in any other industry, both cultural and natural resources must be utilised very carefully if they are not to be degraded or debased in the process. Only one of those resources is addressed here, the natural environment.

This paper is based on a study carried out in 1987 by KRTA Limited for the South Pacific Commission and the Government of Western Samoa. It discusses firstly the value of maintaining primary natural environment as the basis of a tourism industry. Then follows a brief account of the situation in Western Samoa, and the institutional mechanisms which were proposed to assist in meeting this objective in that country.

TOURISM AND NATURAL RESOURCE MANAGEMENT

A significant advantage of tourism based on natural assets is that there is no lead time waiting for the marketable resources to develop. The greatest constraint is their fragility. The economic returns from "nature tourism" are exceptionally high in relation to the development funding it requires, much to the surprise of the conventional tourist industry in places such as the North Queensland rainforest region. Further, nature tourism tends to be more appropriate for Pacific Island nations than does high-density package tourism, and thus easier to control and more rewarding for local people. Even more important, nature tourism requires conservation (wise use) of ecologically viable areas of the distinctive terrestrial and marine ecosystems upon which much of the future prosperity of Pacific nations inevitably depends.

Tourism development requires attractions, access and accommodation. The first is clearly the most important, hence a resource assessment is needed at an early stage. This requires an inventory of "attractions" and evaluation of the options for and constraints upon utilising them. A principal objective is

to identify attractions which are unique to, or best shown in the country of interest. Unique attractions have no competitors, and the tourism business is fearsomely competitive!

It is then necessary to ensure that suitable mechanisms exist to protect the resources that are needed for the tourism industry. If they are not protected then the investment in upgraded airfields, accommodation, roads, infrastructure, support services and marketing will be at risk, and the development may fail. Tourists will not continue to visit a degraded environment and will simply go elsewhere. There is plenty of choice!

In the Pacific, a high proportion of the best tourism attractions depend for their sustainability upon the maintenance of undamaged primary rainforest with all its characteristic vegetation and wildlife and the functions it serves as regards water management and erosion control. These functions include protection of coral reef and lagoon ecosystems which for purposes of high-quality tourism, as well for their fishery, lifestyle and "development bank" values, would be destroyed by logging or other major land-clearing activity.

Most Pacific nations have natural features which are unique, and which could through nature tourism both be conserved for future generations, and provide income for the present generation. It is regrettable that so few of the people of the Pacific Islands recognise the economic value of conserving such resources, and instead sell them for "dollars now" or succumb to that bugbear of the recent Pacific Forum, "chequebook diplomacy".

Thus a key requirement in natural resource management is to consider conservation at the forefront of the planning process, not last, as is usually the case where colonialist interests survive or conventional "big business" prevails. The reason is obvious: if consumptive uses are given priority without considering alternatives, then valuable resources may be lost forever, perhaps without even knowing that they once existed.

TOURISM DEVELOPMENT IN WESTERN SAMOA

In 1987 the tourism industry in Western Samoa appeared to be making some progress, notwithstanding certain features of the country which tend to constrain tourism. The volcanic topography of Upolu and Savaii, two of the biggest volcanic islands in Polynesia, is such that they have few sheltered harbours or "white sand beaches", there are few man-made attractions of wide interest except for those related to Robert Louis Stevenson and of course to the Samoan culture itself, and the rainforest with its unique plants and bird life is regarded more as a timber mine than as a sustainable development resource. The villages and the culture of the country are promoted very cautiously, with good reason. Lifestyle, fa'a Samoa, is a matter of great importance and pride which Samoans do not wish to compromise, and their culture is open to tourism only on tightly controlled terms. By 1987 this had left the tourist industry with an apparently limited base upon which to promote investment, and equally little to encourage visitors to see and appreciate more of the country, stay longer, or make return visits.

THE NATURAL RESOURCE SITUATION IN WESTERN SAMOA

Both the National Development Plan and the Tourism Master Plan emphasise the importance of the natural environment and set out policies for its protection, but few of these have been implemented. We found a nation at a critical stage of natural resource destruction, where timescales measured in months would see

decisions made, or not made, as to the survival or extinction of life forms and ecosystems found only in Western Samoa, and within which has developed fa'a Samoa.

We found that a proposal for an excellent national parks and reserves system had been prepared by Holloway and Floyd in 1975. Implementation of this plan started off well with establishment of the O Le Pupu Pu'e National Park in Upolu, its boundaries even greater than those recommended. This demonstrated that the people of Samoa can act quickly and decisively in such matters. Follow-up assistance from New Zealand and aid from the United Nations supported a scientific survey, management plan, and training and interpretation programmes in the new park. In 1977, however, responsibility for parks and reserves had been transferred to a department which included indigenous forest logging among its primary responsibilities, and the momentum of the parks programme was lost.

Funding fell by 93 per cent in real terms from 1979 to 1987, and staff levels by 42 per cent. A sawmill/logging project started operations at Asau and was followed by other logging operations, and within a few years most of the remaining lowland and foothill forest in Savaii as well as in Upolu had been destroyed. The last remaining lowland forest in Savaii, the proposed Tafua National Park adjacent to two tourism development areas, was also under threat of logging. As at 1987 there had been no apparent action in implementing the parks plan, no reserves had been established, and even the proposed Cape Puava National Park was being logged.

We visited 22 of the 30 areas proposed as national parks or reserves. We concluded that there was still time to ensure that enough of the natural environment of "old Samoa" survived to provide the basic attractions for a tourism industry, but only just! Samoa will have to rely principally upon its few remaining primary forest relics to provide the basic tourism "attractions", at least until such time as the matter of access to fa'a Samoa is clarified. The coastal zone, for various reasons, would play the major supporting role but could not compete with most other countries in Oceania in providing the primary attraction. Similarly, as spectacular as they are, the volcanic features cannot alone compete with those of Hawaii, partly because of the great activity of the latter. That leaves the primary rainforests to underpin the tourism industry.

Comparatively little is known of the rainforests of Samoa. The richest forests are, or were, in the foothills of Western Savaii and once covered almost 20% of the island. Those forests had the greatest species diversity and density, as well as the largest and best-formed trees, and numerous species of plants known only from Savaii.

Similarly with birds, where 31 species or subspecies are endemic to the Samoas, of which 16 occur only in Western Samoa. Many of these endemic birds are now under serious threat from habitat destruction including the manumea or tooth-billed pigeon. This large bird, believed to be the closest living relative of the dodo, cannot survive in logged forest remnants or in forestry plantations.

We concluded that the proposed national parks are Western Samoa's priority tourism resources. These areas could, if they are secured in viable reserves, form the basis not only of a sustainable tourism industry, but would also represent Samoa's biological development bank within which seed stocks of organisms may be found as the basis of future industries.

The relationship of the proposed parks and reserves to the Tourism Development Areas defined in the Master Plan is clear from Figures 1 - 4. Again with the exception of any cultural attractions that local people may wish to make avail-

able, there are few attractions in those areas which the discerning international traveller could not find better exemplified elsewhere in the Pacific. Thus, the preservation of Western Samoa's unique forest environment becomes of even greater importance.

CURRENT LEGISLATIVE SITUATION IN WESTERN SAMOA

The principal legislative means by which conservation and appropriate use of the natural environment could take place are contained in the National Parks and Reserves Act 1974, and the Forests Act 1967. Both of these Acts are administered within the Department of Agriculture, Forests & Fisheries, and more specifically within the Forestry Division.

The National Parks & Reserves Act provides for the establishment, preservation and administration of national parks, nature reserves, recreation and historic reserves. It is constrained in scope to gazetting of parks and reserves only on government-owned land, and requires amendment to permit establishment of parks on customary land.

The Forests Act establishes the Forestry Division and sets out the law related to forest development, licensing and protection. Conservation measures are stated in general terms, but the primary objective of the Act is to provide guidelines for the development and utilisation of forests for timber.

It was apparent at the outset of our study that there was a clear incompatibility of purpose in having a Parks Service, orientated towards natural resource conservation, preservation and public use, administered and funded by an office charged with the task of utilising those same resources for timber production, with no mandate to promote alternative profitable uses (such as tourism in this case). The decline in funding and staffing directed towards supporting the single established National Park was a clear effect of this situation.

Thus, we sought to find ways in which the necessary independence of management of natural resources could be achieved.

PROPOSALS FOR NEW ORGANISATIONS

It was proposed that the Government of Western Samoa establish two new organisations:

- A National Parks and Reserves Agency (NPRA) - an independent agency to advocate the preservation and/or conservation of natural resources;

- An Environmental Management and Planning Agency (EMPA) - an impartial agency to ensure that environmental and planning issues are taken into account before development decisions are made.

The primary function of the NPRA would be to expand, strengthen and administer the system of existing and proposed National Parks and Reserves, and to be responsible for providing conservation strategies and functions necessary to protect the natural environment.

The primary function of the EMPA would be to provide the means for control and monitoring of development projects, including tourism, projects in order to ensure compliance with national environmental and planning goals. More detailed levels of planning and associated functions are illustrated in Figure 5.

PLANNING AND MANAGEMENT PROCESS

As far as responding to the prospects for tourism in Western Samoa were concerned, the Tourism Master Plan advocated the preparation and use of management plans specifically related to the tourist development areas identified in the Master Plan. Such plans have the objective of providing necessary guidelines and controls so that utilisation and protection of an area can be balanced.

We concurred with this approach, and sought to develop a process whereby the preparation of such management plans could be undertaken in a manner which was as far as possible in accord with the Samoan way of doing things and reaching consensus. Within this process the Council of local village matai was perceived as being of prime importance. A process was derived which endeavoured to ensure a direct contact between the matai and the proposed agencies over any proposal within their area, and left the Council of matai as the final arbiters before any necessary formal endorsement and approval by Parliament took place.

The process is illustrated in Figure 6. The study report also presented details related to the objectives and tasks of the proposed agencies, together with suggested staffing and training requirements.

CONSERVATION INCENTIVES AND EDUCATION

Two further aspects were promoted in the interests of ensuring that the natural environment and particularly the primary forest, received adequate protection:

- Means of providing incentives so that conservation produced a clear benefit. Some approaches in the case of providing land for park purposes suggested, were:

  . purchase by government of timber from customary owners, for the purpose of leaving it intact;

  . payments equivalent to royalties foregone for primary forest placed in the national park system;

  . assistance with other projects of interest to customary owners in exchange for land placed in the park system;

  . priority assistance with agriculture, or provision of infrastructure;

  . assistance with development of local tourism opportunities.

- Environmental education, in order to make people aware of the capacity for development to bring about environmental change, and to promote the benefits of conservation as a means of stewardship and as a protection for their livelihood. The importance of identifying and targeting the appropriate "user groups" was stressed (children, village leaders, middle-managers and senior government officials, tour operators), together with the usefulness of "demonstration areas" as an educative tool. These could be conceived as school, village or commercial projects.

MAIN RECOMMENDATIONS FROM THE STUDY

- Set up an independent National Parks and Reserves Agency to establish and manage a National Parks System, and act as the advocate for preservation of Western Samoa's natural resources.

- Set up an independent Environmental Management and Planning Agency to assess the environmental implications of development projects, and to provide guidelines and monitor progress of such projects.

- Establish the Silisili National Park as proposed by Firth and Darby 1988 (i.e. as originally proposed by Holloway and Floyd but extended to include the Matavanu and Maunga Afi lava flows, and the eastern Savaii crater lakes).

- Establish the proposed Tafua National Park (Savaii's last remaining lowland forest).

- Establish other proposed reserves, especially Nu'utele Islands, Lake Olomaga, Fusi/Tafitoala and Lake Lanoto'o.

- Prepare a National Conservation Strategy. Prepare management plans for the proposed tourist development areas. Promote these areas in order to open income and employment opportunities.

- Seek funding from like-minded bi-lateral assistance partners such as New Zealand or from multilateral agencies such as the World Bank to implement these programmes.

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CASE STUDY: NATURE TOURISM IN VANUATU - A TOUR OPERATOR'S VIEW

Frank King
Founder and Proprietor
Frank King Tours
VANUATU

There is no argument between conservationists and serious tour operators in Vanuatu. Vanuatu's current and long- term tourism resource rests in the twin bases of culture and relatively undamaged flora and marine fauna.

If the objective of nature-tour operators is to convert this static resource into financial gain for tour operators, land owners and citizens, then the operative word is "stasis". To damage the environment, to lose credibility with land owners and villages is to destroy the very resource the tour operator is negotiating into financial gain.

Vanuatu's tourist industry is small by most standards and is largely disorganised and undirected due to a lack of understanding of the mechanics of this sometimes mysterious industry. Independent and private innovators and developers remain the mainstay of tourism in Vanuatu today. It could be argued that any tour or activity that ventures beyond the borders of Vila town becomes a nature tour because there are almost no man-made tourist attractions in Vanuatu.

Virtually all tour operation in Vanuatu comes under the control or administration of the two main tour operating companies. Tour Vanuatu, a 51 per cent government-owned inbound agency and tour operator and Frank King Tours, an expatriate-owned ground operator with the longest trading history of any tour operator in Vanuatu. Some of the more popular activities for tourists organised by these operators, beyond the Port Vila town limits are:

- Cruises to appreciate the coral reefs surrounding the Vila area.
- Bus tours around the island of Efate with an accent on the villages, flora and physical features of the island.
- Walks up a nearby cascade.
- Snorkelling trips to nearby reefs.
- Nature walks through the nearby bushlands.
- Day and overnight trips to visit Yasur volcano on Tanna.

Within all these activities harmony has been maintained with land owners and the environment, and in many cases tourism activities have resulted in an improvement in local attitudes towards culture and environmental issues. A contributing factor to the maintenance of harmony with land owners and the environment is the total lack of public land in Vanuatu. Tour operators must always work in consultation and co-operation with land owners who are rewarded financially for the use of their land. A natural consequence is a more responsible attitude towards the use of the land and its subsequent well-being by tour operators and land owners alike.

SCUBA dive operators form another element of tour operation which largely falls outside the influence of Tour Vanuatu and Frank King Tours and is under the direct influence of two dive operators in Port Vila, Nautilus Dive Shop and Scuba Holidays. Both of these dive operators maintain a healthy regard for the reefs and fish of Vanuatu and no dive operator by mutual consent employs anchors on reefs. A long time ago a protocol between dive operators agreed to install fixed moorings at all dive sites where any operator could use the mooring irrespective of who installed it - the only proviso being whom-

soever breaks or damages the mooring is obliged to quickly and efficiently repair it. This initiative has preserved Vanuatu's reefs from devastation by anchors that has occurred in Queensland. The few reef areas convenient to dive operators and within easy striking distance of Vila is probably why a responsible action like the introduction of fixed moorings is in place.

No tour operators or dive operators in Vanuatu countenance the "souveniring" of any living creature or the disturbance of any living creature's habitat.

The sluggish pace of tourism development in Vanuatu since independence has resulted in a false sense of security for Vanuatu's environment. Proposals abound for the development of resorts and tourist facilities, and a demand for new sources of income for villagers in the light of falling commodity prices will see a change in attitudes on the short term.

Frank King Tours is currently negotiating with the government of Vanuatu to institute broad-based public awareness of the tourism industry to ensure that decisions taken concerning tourism development are sound, responsible, commercial propositions, and represent sustainable sources of income on the longer term. A principal thought underpinning this initiative is that greater tourism awareness amongst the citizens of Vanuatu will promote a greater participation from these citizens for their own greater financial gain and to cement the traditional bonds between land owners and their land.

It is naive to believe that foreign investors take the preservation of culture and the environment seriously. From a businessman's point of view, the only reason you invest in a foreign country is to earn a greater return than you can in your own. A lack of controls and public awareness of the damage commercial development can cause in the developing countries of the world indicates an imperative for local businesspeople to become the principal investors in their own country to avoid the legacy of destruction and sorrow that is so much a feature of the developing world.

CASE STUDY: VARIRATA NATIONAL PARK - VISITOR USE AND INCOME GENERATION

Vincent Nyama
Assistant Secretary (National Parks)
Department of Environment and Conservation
BOROKO
Papua New Guinea

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1. INTRODUCTION

The establishment of a system of nature conservation areas brings many benefits to a nation both directly and indirectly by providing for:

- the growing recreation needs of increasingly urbanised populations.
- attractive natural settings within which overseas tourists can appreciate local scenery, vegetation, wildlife, history and culture.
- gene-pools - the widest possible range of types of plants, animals well-being not only for local population but of all people on earth through their genetic potentials.
- scientific reference areas in which monitoring of changes due to forestry and agriculture monocultures, industrial development and other scale environmental disturbances can be based.
- they provide a bridge with the cultural past so that people undergoing very rapid changes to their life styles have areas where they can restore themselves in an accustomed stable environment.

Papua New Guinea has established its system of conservation areas which are regulated by the following pieces of legislations - the National Parks Act, the Conservation Areas Act and Fauna (Protection and Control) Act. The areas conserved or protected under these three pieces of legislations are classified as - National Park Historic Site, Provincial Park, Nature Reserve, Sanctuary, Wildlife Management Areas and National Walking track.

We are pleased with the opportunity given to us by SPREP to present a case study of the Papua New Guinea's first national park, the Varirata National Park, as Papua New Guinea's contribution to this Fourth South Pacific Conference on Nature Conservation and Protected Areas for theme paper "Economic and Social Benefits of Nature Conservation and Protected Areas".

2. BACKGROUND

The Vatirata National Park has an area of 1063 hectares, and was originally dedicated on February 17, 1963 under a trust. Members were the District Commissioner, the Director of Forest and a representative from the local business community.

On 18th December, 1969 it was committed to the care, control and management of the then Papua New Guinea National Parks Board. The Varirata National Park became Papua New Guinea's first national park in 1973,

when it was officially opened on 18th of October. The access to the park is by a 48 km sealed road, and is about an hour's drive from the city of Port Moresby.

PURPOSE

There are three main purposes, and they are

a) to preserve natural communities of plants, animals and Koiari culture.

b) to protect the outstanding scenic view, and landscape.

c) to provide for people to enjoy outdoor recreation in natural surroundings and

d) for research and education of the public about concept of national parks.

VEGETATION AND WILDLIFE

Vegetation of the park consists of rainforest, savanna grassland, gallery forest and secondary regrowth.

Wildlife in the park is rich in birdlife. This includes the Raggiana Bird of Paradise, different species of doves, pigeons, kites, cockatoos, kingfishers and swallows. The Bird of Paradise can be observed from the marked display between the months of mid-March to end of August - which is the mating season.

The animal life in the park consists of migrant deer, wallabies, spiny ant-eater, cuscus, bandicoots, rats, wild pigs and different species of pythons.

RECREATIONAL FACILITIES

For day visitors, there are picnic areas which have been established at six (6) different sites around the park. Each site has picnic shelters with tables and fireplaces with barbecue plates outside. Pit toilets are provided in each picnic site.

Overnight facilities provided include a lodge containing six (6) bedrooms and a camping area which has basic facilities such as rain-water tank, toilet and fire places. The site holds a minimum number of about ten one-man tents.

For bushwalkers or hikers, there are five (5) walking tracks. One is self-guided, and those wishing to walk this track are asked to obtain an information leaflet at the welcome house. All tracks vary from 5 minutes to an hour's walking.

SCENIC VIEWING

This is one of the major attractions of the park. There are three lookout points located at different points. The main Varirata lookout is accessible by road while the other two are accessible by foot tracks.

7. CULTURAL DISPLAYS

The highlight of the cultural displays is the famous Koiari Tree House. In olden days, during intertribal fights, the Koiaris kept their women and children inside the tree house while men stood on the platforms and threw spears at their enemies. The ladder to the tree house was mobile, and was pulled up to avoid the enemy climbing after them. It is about 10 to 15 metres above the ground. This is one of the major attractions of the park, particularly to overseas visitors.

8. MANAGEMENT

The Papua New Guinea National Parks Service is responsible for the development and management of the land committed to the care, control and management of the Director of National Parks in accordance with the purpose for which it has been reserved.

For administration and management of resources of the Varirata National Park, the Park Service provides the services of a resident Ranger-in-Charge, an Artisan and five general park workers.

The other organisations involved in providing services, are the Department of Works which maintains major roads and administrative buildings in the Park, the Papua New Guinea Electricity Commission, the Post and Telecommunication Commission and St. John's Ambulance.

9. REGULATIONS

To control visitor activities, use of the facilities, and public respect for the park resources, the following regulations apply:

- Domestic animals are not permitted in the park.
- Kindly take all rubbish home.
- Light fires in approved places only.
- Avoid damage to plants, animals, insects or other protected items.

10. SOCIAL BENEFITS

Varirata National Park with its cool and fresh air and magnificent lookouts, challenging walking tracks, unique species of flora and fauna and excellent barbecue facilities provides a demanding environment for the population of Port Moresby city and overseas tourists, enabling picnicking, hiking, viewing from different lookout points, environmental education, bird watching, church services, camping and lodging and traditional dancing and feasting by local Koiara people on certain occasions. St. John's Ambulance also runs an aid post, and provides first aid services. On one occasion that I would like to mention, an expatriate couple got married in the park in 1983.

Table 1, in Appendix A at the back, shows the number of visitors who passed through the gate per year from 1974 to 1988. Despite decreases in 1974 and 1981 there has been an always increasing number of visitors during the period. Fewer people visited the park in 1975 because gate

fees were introduced that year, and many people were reluctant to pay. The 1981 decrease was contributed to by a bushfire which destroyed half the picnic facilities.

Revenue Generation

Varirata National Park earns 50 per cent of National Parks Service total internal revenue of thirty thousand kina (K30,000). The rest is collected from the other parks. Revenue is generated from entry fees collected at the gate, lodging and camping fees and sale of souvenirs.

The fees charged are as follows:

(a)	Entrance fee	- K1.00 per person
(b)	Taxis	- K5.00 per person
(c)	Tourists Bus & PMVs	- K12.00 for vehicles carrying eleven or more passengers;
(d)	Overnight lodge	- K8.00 per night for single room; - K12.00 per night for duplex with two bedrooms;
(e)	Overnight camping	- K5.00 per night for less than 5 persons; - K10.00 per night for more than 5 persons

These are the fees charged since 1986. Section 4 of the National Parks Regulation empowers the Director of National Parks to fix and revise park fees whenever he feels the need to do so.

Table 2 in Appendix A shows that from figures collected from visitor survey sheets for 1985 to 1988, 70 to 73 per cent of visitors pay fees, while 27 to 30 per cent have free entry. Those who enter the park free of charge include children under the age of twelve, members of educational institutions and people issued with free-entry permits.

11. OTHER ECONOMIC BENEFITS

11.1. Direct Benefits

Other economic benefits derived from the park include:

- provision of employment for five of the local people from Koiari.
- group involvement in construction work when required, e.g. construction of Koiari Tree House.

11.2. Indirect Benefits

Other benefits include:

- sale of artifacts to tourists;
- tourists hiring transport from car-rental firms to go up to the park.

These are only a few to mention, as no proper survey has yet been done.

12. MANAGEMENT PROBLEMS

There are no settlements on other land-use activities in the park area conflicting with management of the park's resource.

The only problems are regular annual man-made bushfires and de-barking of trees by migrant deers, particularly in picnic areas.

Preventive measures taken to minimise these problems are construction of permanent fire breaks in places where fires usually come into the park land. This has lessened the dangers of continuous burning of savanna grassland in the park. The worst bushfire experienced was in 1981, when half of the park, including picnic shelters, was destroyed.

The deer population is controlled by permitted hunting. Hunting permits are issued by the Director of National Parks, and only the local Koiari people and Ranger-in-Charge are allowed to shoot - only when necessary.

13. ANNUAL OPERATIONAL COST

In terms of management of the infrastructure the annual operational cost is given below:

(a)	Labour & related cost	-	K27,000
(b)	Transport	-	K12,000
(c)	Utility		K 600
(d)	Material & Supply	-	K 2,000
	Total Cost		K41,600

CONCLUSION

Nature conservation areas can contribute towards promoting a nation's tourist industries if they are planned and managed properly. Papua New Guinea's conservation areas system has a lot to contribute to its tourist industry. The Varirata National Park has proved this, and other areas have developed following a similar concept.

APPENDIX A.

Table 1.

Year	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
No. of Visitors	13045	9050	14000	14506	15000	15621	15950	11900	15700	17900	18254	18499	18744	20629

Table 2.

Year	Total No. Visitors	Paying Visitors	Non Paying Visitors	Fees Collected
1985	18499	12392 (70%)	5567 (30%)	K11,551.00
1986	18744	13674 (73%)	5071 (27%)	K15,402.00
1987	20629	15490 (73%)	5739 (27%)	K17,225.00
1988	22758	15908 (70%)	6850 (30%)	K17,319.00

Part 8

Achieving Nature Conservation Goals in Oceania

Theme Paper: ACHIEVING NATURE CONSERVATION GOALS IN THE SOUTH PACIFIC

Peter Thomas
Protected Areas Management Officer
South Pacific Regional Environment Programme (SPREP)
South Pacific Commission (SPC)
P.O. D5
NOUMEA CEDEX
New Caledonia

INTRODUCTION

The popular image of the island countries of the South Pacific is one of a tropical paradise of stunningly beautiful coral reefs, aquamarine lagoons, white sand beaches, waving palms and lush green mountains rising from the clear lagoon waters, where the people live simply and in harmony with their environment. There are still many places in the South Pacific where this ideal persists, and where life and the environment are far removed from the pressures and demands of the modern western consumer society.

However, the situation is changing rapidly. Throughout the region there are now many examples where the detrimental environmental impact of rapidly increasing development demands on the often limited resources of the island countries is all too evident. Governments are hard pressed to respond to the problems of high population growth which, when coupled with outer island migration to urban centres, overtax infrastructures, and increase environmental pressures and resource over-exploitation. The people of the South Pacific are also keen to share the benefits of western-style consumerism, and desire higher standards of living. They are therefore, pressuring their governments to provide them with a larger share of the consumer 'cake'. The response of the governments to this need for improved social services and stronger economies has been to attempt to accelerate their 'development' with the aid of the international development assistance community. This has led to a strong emphasis on rapid exploitation of the natural resource 'banks' of the countries with little thought being given to the long-term consequences of such action.

History suggests that all the 'developed' nations of the world have based their development on natural-resource exploitation and the investment of the income generated has provided the physical, social and economic infrastructure which make more sophisticated, industrialized forms of development possible.

It is this early resource exploitation stage that many countries in the South Pacific are now experiencing. In some countries the exploitation of the limited natural resource base is proceeding at a very fast rate, aided by large capital inputs and modern technology and machinery. Logging, agricultural development, fishing, mining for construction materials, etc all enact a heavy toll on the natural ecosystems, diversity, habitats and species of a developing country. While this exploitation phase of development is the legitimate right of every nation and government acting in the best interests of its people, the governments also have a responsibility to balance resource exploitation against the need to conserve the nation's natural heritage for present and future generations. Indeed, in the South Pacific countries where cultural heritage is intricately linked to the environment through generations of dependence on its resources environment for subsistence, heritage conservation is also vital for the survival of cultural tradition and custom.

Sadly, there is widespread evidence throughout the region that the conservation side of the development equation has been and is still, being neglected. Excessive logging of native forests and the clearance of natural habitat for agriculture has all too often resulted in accelerated soil erosion, pollution and siltation of waterways and downstream impacts on coastal ecosystems, particularly the nearshore shallow reefs and lagoons. Sand mining and coral dredging for construction materials, the destruction and infilling of mangroves and the excessive harvesting of reef resources, particularly in the vicinity of urban areas, are problems facing most countries. Thus, on many islands the dimishing area of natural undisturbed environments has become critical and relatively large numbers of native plant and animal species are endangered or threatened. The conservation of these remaining species and the sustainable development of natural resources is a direct responsibility of the region's governments. It is a responsibility which must be addressed quickly, with determination and commitment, if the countries are to avoid the enviromental problems stemming from resource over-exploitation which are plaguing many of the other less developed regions of the world.

THE PROBLEM OF PRIORITY

Inevitably, the emphasis of the governments is on the generation of income and the improvement of social and economic conditions. Conservation is mistakenly seen as having no tangible economic benefits, and has historically been accorded a low priority on the political and resource allocation agendas of most governments.

Nowhere is this better illustrated than in national development plans, which are the most common expression of government priorities in this region. While concern for the environment usually receives mention in the 'motherhood' statements of national policy, details of how this concern will be addressed are often lacking, or receive such scant attention that they are submerged and lost in the volume of 'development' prescriptions.

If we are to achieve conservation goals in the South Pacific, much greater priority and commitment must be given to supporting conservation as an integral component of development than has been the case in the past. Changed perceptions and greater understanding by the politicians, and the administrators and economic planners who advise them, of the importance of resource-conservation issues and needs in small island countries, will be necessary. This could be greatly assisted by the involvement of specialists with natural resource management and planning skills in the national-development-planning process.

INSTITUTIONAL ARRANGEMENTS FOR CONSERVATION

Without the elevation in priority referred to above, nature conservation in the region will always be stumbling along, without the financial resources or staff to achieve goals or effectively to advocate conservation needs within the policy- and decision-making processes. Although the situation is changing, it is still common to find responsibility for conservation matters tacked on as a function of a large ministry or department with natural resource 'development' responsibilities. Within those agencies perhaps one or two persons are working in comparative isolation with limited resources and weak legislation to discharge their national conservation functions and to make progress with conservation and protected areas.

There are advantages to such an arrangement in that conservation can 'piggy-back' financially and logistically on the generally well-endowed resource ministries. However, there is a danger that the growth of the conservation agency will be inhibited in the longer term. Such agencies are usually looked on as appendages rather than as a key functional area of the department and although the basic resources to keep it functioning will be available, additional resources for growth and the expansion of activities generally will not. Any increases in budget allocation will normally go to the expansion of the ministry's principal 'development' functions. Similarly, the staff of the service will have to work to, and through, superiors whose priority is resource development, and who are less inclined to lobby and fight for conservation at the highest level. Other problems can arise where there is a direct conflict of interest between the conservation and development functions of the parent ministry. In these cases the tendency is to 'internalise' these conflicts to the disadvantage of conservation.

To overcome these problems, governments must pay particular attention to the structure and location of the agency responsible for conservation. Desirably, conservation agencies will have the patronage of a strong political figure committed to conservation. If the agency is to be located in an existing department, this should be one without direct resource-development functions. Desirably, the agency should enjoy a fair degree of independence, and be in a position where it is well connected with a wide range of other government agencies and can influence policy and decision-making across the wide spectrum of government activity. Departments which meet these criteria include the national planning offices and prime minister's departments. Another option which has proved successful in some countries is the establishment of an independent ad hoc agency controlled by an authority widely representative of the government and private sector.

STAFF AND TRAINING

To ensure the effective advocacy of conservation and its integration into the national planning and decision-making processes, it is essential that conservation agencies have staff of a sufficiently high grading to participate as equals on committees and in important decision making forums. For this reason, conservation agencies must be given the status of a highly graded head, and desirably should have a structure which allows promotion to that position for other staff in the agency.

Equally important is the need to ensure that well-qualified staff are employed, and that recognized tertiary and other training opportunities are available. In some government administrations educational qualifications strongly influence the grading and status of employees and in building the strength of the conservation agency, it is advantageous to seek and retain staff either with these qualifications or the ability to get them.

The metropolitan governments of the region can do much to assist in this respect by providing special scholarships in the natural sciences and natural-resource management for conservation personnel. These may need to be distinct from the opportunities offered under normal bilateral aid education programmes where preference is usually given to students studying in the fields such as finance, economics, law or medicine. Other opportunities in the fields of technical and practical training in protected area and wildlife management are important, and can be best assisted through special-purpose training courses sponsored by regional and international assistance agencies. Agreements with metropolitan organisations specialising in nature conservation such as that between SPREP and the NSW National Parks and Wildlife Service also provide important training opportunities.

THE NEED FOR DATA

One of the problems facing government conservation agencies in the region is a lack of information on which to base conservation priorities and the effective allocation of their meagre resources. Conservation agencies must also be in a position to argue the case for resource conservation with conviction and integrity, and this requires access to objective, scientifically valid data.

Important factors which have inhibited the collection of this type of information include the often high logistical and consultancy costs involved, and the historical tendency of development assistance agencies to support and undertake resource surveys and research only where this is required for development programmes such as for agriculture and forestry. Although the results of such work are useful and contribute to the geographical information base of a country, it is often too specific for the purposes of nature conservation where integrated ecological and/or specific species population and distribution data is required. Development and other assistance agencies committed to assisting countries to achieve conservation goals and sustainable development can greatly assist by accepting conservation-orientated surveys and research as a legitimate priority for development-funding assistance.

CUSTOM, TRADITION AND CONSERVATION

In most Pacific societies land is owned by tribes, clans or other forms of traditional groups as are the rights to many of the resources of the forests, reefs and lagoons. These rights are very jealously guarded as they were and in some cases still are, the essence of survival. Resource conservation measures such as the establishment of a protected area or the imposition of some form of harvesting regulation, inevitably affect these rights. Special consideration must be given to the influence of custom and tradition and obtaining the sanction and agreement of the affected custom owners and all the local communities in the region. Thus attempts to regulate or curtail traditional rights without the full agreement and support of all the custom owners involved will almost certainly fail.

Those involved in negotiations with local communities and custom owners must be prepared to be flexible in the interests of achieving their objectives. Innovative ways of integrating traditional resource use and conservation objectives must be sought. It is worth noting that the traditional western model of a protected area, e.g. the national park or nature reserve, which is based on alienation of land and strict protection of resources, is of very limited utility in the region. Instead, there are now examples of the sort of innovation and flexible approach mentioned above being applied with success in the region, for example, in Papua New Guinea Wildlife Management Areas where the objectives and rules are set by the local community are being widely established. In Vanuatu a lease for the Erromango Kauri Reserve which guarantees continued resource-user rights to the owners but protection from logging is under negotiation, and in Fiji the Crested Iguana Reserve has been established under special arrangement with the custom owners of the land. At the practical level, it is virtually impossible for central governments with limited resources to enforce rules and regulations in remote rural areas or on outer islands. So, unless local communities understand and support the conservation measures, and are prepared to exert social pressures to see them achieved, it is unlikely they will be successful.

It must also be recognised that achieving conservation goals on customary lands and waters will often require funds for the compensation of lost rights. In most countries the low priority accorded conservation means it is highly unlikely that governments will provide these funds. In such cases the international conservation community and development assistance organisations can assist conservation by providing the initial finance to secure a lease or other such agreement, particularly where this is urgently required to protect immediately threatened habitats. In this regard the apparently successful 'debt for nature' agreements which have been negotiated in other developing countries of the world should be investigated for their relevance and applicability in this region. It is also important that where such action is taken, it be tied to some form of government commitment to ultimately take up responsibility for the area. Without such a commitment the long-term integrity of conservation areas cannot be ensured. At the very least, the areas concerned must be legally secured by lease, covenant, or other forms of agreement.

Finally on this subject, we should not forget that it is the individual and groups with stewardships, responsibilities for family, clan and tribally owned lands and resources, who have a particularly heavy conservation burden to carry. These are the people who must make the decision whether or not at this particular point in the history of their clan, it is right to 'develop' the custom resources which may represent the only assets of any value they control. Faced on the one hand with the promised benefits of those intent on exploiting the resources and social pressures from within the group for access to those benefits, and on the other with the responsibility for their stewardship for future generations, the dilemna of decision must be difficult. It can, however, be eased through access to responsible and objective information on the short- and long-term consequences of such decisions and responsible governments can provide such an advisory service. NGOs and regional institutions such as SPREP and Universities of the South Pacific and Papua New Guinea can also help in this regard.

INDIVIDUAL COMMITMENT

Conservation has always been a field noted for the dedication of individuals to the achievement of goals and this maxim certainly holds in the South Pacific. Many of the conservation achievements in the region can be traced to the persistence and tenacity of individuals both within and without the government system. This will obviously continue to be individual commitment to conservation particularly while the profile and priority of conservation plays second fiddle to unsustainable resource exploitation. It is important therefore, that encouragement and support is made available to individuals and groups working in national agencies or in conservation related areas. The international conservation community and regional organisations such as SPREP should play an important role in supporting the efforts of these individuals.

THE IMPORTANCE OF NGO'S

While it is important that effective government conservation agencies are established to ensure that national conservation policies, legislation and programmes are developed and implemented, it is a fact that such agencies are inevitably tied to government policy, and hindered by bureaucratic restraints. This can inhibit their ability to shape and challenge policy. It is important, therefore, that there be an independent conservation voice, free, if necessary, to speak out and challenge the government on its policies and on the conservation issues of the day. Because of their grassroots linkages with local communities, non-government organisations can be a strong political force in the advocacy of conservation needs and their growth and development must be encouraged.

At present, conservation oriented NGOs are only established in about one-third of the region's countries although there are many church, youth, village and women's groups interested in and with the potential to actively campaign on conservation issues. The growth and influence of these and the few organisations specifically focusing on conservation can be encouraged and supported by ensuring they have access to the resources, information and expertise necessary for them to function effectively as conservation advocates. There is also a need to ensure opportunities are provided for their involvement in local and regional workshops, seminars and at conferences such as this one. Materials for community education must also be developed and made available. The development of a regional non-government-organisation network will also do much to assist the development of the NGO conservation voice in the region, and is an issue SPREP is keen to see addressed in this conference.

The potential for regional and international conservation NGOs to assist their South Pacific colleagues is also very high through the provision of practical support and access to their often considerable expertise and information resources. The direct involvement of such organisations in important conservation projects which would not normally be undertaken by the country concerned is another practical form of assistance. However, in such cases care must be taken to ensure there is liaison and where possible, co-ordination, with government and other interested organisations, both national and regional/international. Where they are undertaken, these initiatives should also involve both local NGOs and government personnel to provide an element of training and to ensure that there are local people motivated to carry the project on and see its results implemented. Finally, regional and international NGOs can greatly assist conservation in the region through their scrutiny of the aid and development assistance policies of their own governments and the international development assistance organisations.

CONCLUSION

This paper has emphasised the need for governments of the South Pacific to make a stronger commitment to the conservation of nature by according this important aspect of national development a much higher priority in terms of policy, planning and resource allocation. Without such a commitment the present alarming trend towards over-exploitation of resources and loss of natural diversity will continue, leading in the long term to the chronic environmental problems suffered by many countries in other developing regions of the world. However, the people of the region must also share responsibility to ensure their natural heritage is not lost forever. They must be encouraged to take a more active interest, individually and collectively, in the protection of their environment and the conservation of resources. In this respect, non-government organisations which represent the independent voice of the people have an important role to play by becoming actively involved in conservation issues, and developing dialogue with government on appropriate policy, legislation and priorities.

CASE STUDY: **THE PERSPECTIVE OF THE LAND OWNERS FOREAD ECONOMIC DEVELOPMENT EFFECTIVE CONSERVATION PROGRAMME IN PAPUA NEW GUINEA**

Ben Joseph
Spokesman for Landowners
Hidden Valley Gold Mine

Since man arrived in New Guinea (Zoographically) several thousands years back, he had come to consider his forest, his rivers, the seas and the wildlife in them as his God-given wealth. In recognising this, he had over the years gradually learnt and accumulated a tremendous wealth of knowledge on how to harmoniously interact with the total environment, whether it be in the coastal areas, islands or highlands of Papua New Guinea. Even to the present day, land in Papua New Guinea is owned by the people and not the state. Only the land in towns and cities is owned by the state.

From the landowners' view, since 80 per cent of the people live in rural areas man is still and will be an integral part of his total environment despite what some foreign academics who had become expert overnight think about this undeniable truth. They say man in Papua New Guinea, or the Pacific Islands for that matter, was an exploiter, and is a potential exploiter given the time, money and the technology to do so. It is no wonder many of them had become expert advisors to the government of Papua New Guinea, and thereby represent the country on SPREP, WWF, IUCN, MAB, UNEP, CITIES and you name it. Not only that, but they are usually the consultants on the environment impact assessment and feasibility studies on the development projects. If they say that there is no need for a tailings dam, and that the river which is turbid year round with increased heavy metals from the mine is still safe for human consumption, the government will accept their advice. However, the landowners who had once used the river for drinking, fishing, bathing and enjoyed the aesthetic value of the crystal clear rivers will never return to use it again.

In Papua New Guinea, the Department of Environment & Conservation has legislative responsibilities under eight Acts of Parliament including the Environmental Planning Act 1978, Environmental Contaminations Act 1978, National Parks Act 1982, Conservation Areas Act 1982, Conservation Areas Act 1978, Fauna (Protection and Control) Act 1974, Water Resources Act 1982, Crocodile Trade Protection Act 1982 and the International Trade of Endangered Species of Fauna and Flora Act 1979.

However, to tell you the truth, many land owners are totally ignorant about these laws because there is no information available to the general public. It is often an unanswered question to us the landowners, to ask how can we get our land conserved for future use. This is because if we don't have the land conserved legally, the government under the compulsory land acquisition Act can negotiate with a developer for a logging or mining project without first establishing a clear dialogue with the owners. We are often told, we only own the land down to six feet, and anything below or above belongs to the state.

I have told you, Land is a very big thing in Papua New Guinea and perhaps the Pacific. We will defend it and fight for it like the Bouganvillians if anyone tries to take it away from us, and tries to compensate us with barely a token sum of money. If there is to be any compensation, it must be genuine, and we, the landowners, must have equal participation either in the development of the projects or in the long-term spin-off activities that can be passed on to our children.

Ladies and Gentlemen! It is the landowners' concern that you as advocate of conservation, you find ways and means to work closely with the established non-governmental organisations who are often at the disposal of the landowners to be your representative in the Pacific Island countries and not the government institutions. They may be hip shooters but certainly in Papua New Guinea the people of my area, and the Morobe Province as a whole, know what an NGO like Wau Ecology Institute can do for them.

We the landowners at the village level are now forced to choose between the so called economic development and the traditional responsibility to conserve our land and pass it on to our children and they to their children. If we are given sound advice and support towards both conservation and economic development, we would prefer to accept the kind of development that is environmentally or ecologically sound, as discussed by Dasmann 1973.

Therefore it is not true (I repeat 10 times) for the lobbies of the petroleum, mining or timber industry to say that we want money and not conservation.

If we are forced to accept developments with false promises, don't forget we will fight back when our God-given rights over our land is taken away from us and told to live with the piles of stones and deep holes stuck in the middle of our once-a-paradise. It is because of the Institutes and private citizens' determination to stick by my side and my people that I have got my landowners to organise ourselves to form a joint-venture company with the outside firm, and are ready to undertake major construction and building works as well as other spin-off activities within the Hidden Valley Gold Mine under CRA, the company that owns Bougainville Copper. This is the first time we have been able to do that in PNG. We have also, through the advice of the institute, put pressure on the mining company to set aside over 300 hectares of land in the water-catchment area, as a conservation area right next to the mining site. More work is needed to be done here. We need your help to have the money to engage surveyors and lawyers to assist us with the necessary documents to have the area legally protected. We cannot expect the Department of Environment and Conservation to help us protect the area because our pleas, together with the Ecology Institute, to have Mt. Kaindi protected since 1979 had fallen on deaf ears. The problem therefore, ladies and gentlemen, towards conservation in Papua New Guinea are as follows:

a. Landowners cannot pass a resolution to set an area aside for conservation if it is not recognised or gazetted under the Conservation Areas Act 1978. If it is not covered under the Act, the government will allow prospectors to go into the land to prospect for minerals or apply for a logging permit.

b. There is lack of co-ordination between the lead agency which is the Department of Environment and Conservation, the conservation-oriented NGOs like Wau Ecology Institute and the landowners.

c. The colonial-inherited mining or lumbering laws make it expensive and difficult for landowners to stand up for their rights when it comes to objecting to the government and the multinationals over various developmental projects.

d. Lack of direct participation with landowners and NGOs on specific conservation projects by regionally-based conservation organisations like SPREP, UNEP, WWF, MAB and whoever you are.

Finally but not the least, thank you Greenpeace for bringing a villager like me here to present my people's case to you, all the experts who have come from various parts of the Pacific and the outside world, to discuss about the conservation of our natural environment and the wise use of these resources.

I invite you, Greenpeace and others, to Papua New Guinea to base your work in the Morobe Province and to make use of resources and facilities provided for by Wau Ecology Institute and PNG National Forest Research Institute, as these institutions are more easily accessible to the people than the central government offices and the academic institutions who worry only about theory and not the practical side of issues.

Thank you.

CASE STUDY: ERROMANGO KAURI RESERVE - ENVIRONMENTAL PROTECTION ON CUSTOMARY LAND

A. J. Barrance
Forest Research Officer
Vanuatu Department of Forestry
VANUATU

Abstract

In Vanuatu, where all land is held under customary ownership, special consideration must be given when establishing protected areas to the social, cultural and economic importance of land to both its customary owners and to other members of the community. In the absence of suitable legislation, a lease is the best means of safeguarding both the endangered area and the interests of the landowners. Annual land rental may be used as a means of compensating landowners for losing the opportunity of earning income from their land. Where valuable resources are tied up by establishing a protected area, it may not be possible for the governments of small developing nations to pay compensation equal to the true opportunity cost. Protected areas legislation must be drafted as a priority, which while ensuring secure long-term protection of endangered areas, will provide for the representation of the interests of custom landowners and of the rest of the community. This legislation should give the ultimate right to the government, rather than the individual landowner, to determine whether an endangered area should be protected.

The Kauri Reserve

The Erromango Kauri Reserve is an area of approximately 3000 ha in the south of Erromango island in southern Vanuatu. It is one of the last significant areas of *Agathis macrophylla* (Kauri) in Vanuatu. Its protection is essential in order to protect the genetic diversity of this heavily-logged species.

The establishment of the reserve was first suggested in 1971 (Royal Society of London, 1975). Although the idea lapsed for several years, since 1983 the Vanuatu Department of Forestry has been investigating the area, and negotiating with its custom landowners to determine the most acceptable way of establishing the reserve (Gillison and Neil, 1987: Leaver and Spriggs, 1989). A large number of options have been explored, taking into account both the principles of genetic conservation and cultural and socio-economic factors. This paper uses the Kauri Reserve to illustrate how protected-area establishment must take into account customary land ownership.

Land Tenure in Vanuatu

The Constitution of Vanuatu recognises the strong ties of Melanesian culture to traditional land ownership. At Independence in 1980, all land in Vanuatu reverted back to its traditional customary owners. It is not possible for non-Melanesians to own land.

Land is normally inherited along family lines: transfers of ownership are rare, and when they occur are normally carried out through arrangements in custom rather than by sale for cash.

Landowners feel a strong attachment and responsibility to their particular inherited land, and derive from it prestige. It is often also the most significant thing that they or their descendants will own, and as such represents their only capital. On an island such as Erromango, where infrastructure is poor, and where there are few cash crops and few opportunities for paid employment, great importance may be attached to the income-generating potential of land.

The degree to which the customary ownership of land has been resolved varies widely from island to island. On small islands with high population pressure, where land parcels are small, ownership is normally very well recognised: the boundaries of each parcel are often marked by fruit trees.

On large under-populated islands, however, the situation is often far less clear. Parcels are larger and tend to be marked by (sometimes very minor) topographical features. The low-population density on such islands means that there is little pressure to make use of a large proportion of any custom ground, and therefore little call to reassert its boundaries and ownership. It is often only when the opportunity for development arises that it becomes necessary to define ownership precisely: it is normally at this stage that disputes emerge.

Land Tenure on the Kauri Reserve

Land parcels on Erromango tend to be very large, as severe depopulation in the past has led to amalgamation of adjacent custom grounds held by members of the same family. The bulk of the Kauri Reserve is covered by two large custom grounds owned by two cousins. Their boundaries, and the veracity of their ownership claims, are fortunately well-recognised by the rest of the community. The boundaries of the reserve largely follow the boundaries of these two custom grounds, which follow obvious topographical features.

It has emerged that one corner of the reserve in fact lies outside the boundaries of the land of these two cousins, and is disputed by three other groups. This corner is at the head of one of the rivers draining into the reserve and contains a dense population of Kauri, and so should be included in the reserve. Of the three groups disputing this area, two are in favour of it being logged by a company due shortly to commence operations on Erromango, and one is keen for it to be included in the reserve.

Options for Securing Land Tenure

There were three alternative means by which the government could have secured the legal right to protect and manage the reserve. These were outright purchase of the freehold of the land, reliance on the provisions of legislation without securing land tenure, and securing a lease on the land. In taking the decision between these three alternatives, it was necessary to take into account both social and economic factors.

The first option, purchase of the land, was considered unacceptable as it would have alienated the landowners from their traditional customary land, and so could have caused cultural disruption. Practically, it is highly unlikely anyway that the landowners would have agreed to sell their land.

The second option, relying on powers contained within existing legislation to veto logging proposals, would function as a stop-gap measure. All logging contracts are subject to approval by the Director of Forestry (under the Forestry Act No. 14 of 1982, as amended). The Director's refusal to approve a contract on the Reserve would legally prevent logging. However, this would

not guarantee long-term protection: in the event of a change of government the decision could be reversed. There is at present no satisfactory legislation to guarantee long-term status of the reserve as a protected area. In this situation the government also would have no rights of access to the reserve for, for example, scientific study.

The third option, that of leasing the land from the custom landowners, was chosen. This has the advantage of retaining the land under the legal ownership of the custom landowners, while allowing for the stipulation of restrictions on harmful activities, access rights for the government, and use rights by the landowners and other local people. Since Independence in 1980, when all land reverted back to its traditional owners under custom, leases have become a familiar concept to Ni-Vanuatu landowners. The provisions of a lease are binding under the Lands Leases Act No. 4 of 1983 (as amended), and a lease can only be terminated with the mutual consent of both the lessors (the landowners) and the lessee (in this case the government).

A lease has been negotiated only on the two custom grounds whose ownership has been determined. Fortunately, this constitutes the bulk of the Reserve. Under the Lands Leases Act, a lease can be signed on a disputed area if all parties agree: in such a case the Minister of Lands would represent the landowners, and any rent money payable would be held in trust. In the case of the disputed area, however, the agreement of all disputing parties has not yet been obtained. The dispute also means, however, that logging cannot take place as it is opposed by one of the disputing parties.

Negotiating the Lease

The importance was recognised, when drawing up the lease, of taking into consideration the aspirations of the whole population which could be affected by the reserve. Lease negotiation meetings therefore took place on Erromango, in a village adjacent to the reserve, and they were open to all members of the community. All negotiations were held in the presence of an officer of the Department of Rural Lands, the body responsible for administering and approving leases and other dealings with customary land.

A large number of the men from Happylands village were present, together with others from other villages in the area (decisions on the management of customary land are almost exclusively the domain of men in Melanesian society, even in those islands with matrilineal systems where women are the actual owners of the land). In the discussions the landowners were represented by the overall chief of the several villages in the area: they had little direct input themselves. Many subsidiary chiefs of villages in the area also participated in the discussion.

Management of customary land is a matter in which the community obviously considers that it has a right to some say. Whether the individual landowners resent this or not is not clear: the fact that one of the landowners, who lives in Vila, waited until he returned to Vila before raising objections to some points in the lease, implies that he felt restricted in the community meeting from making his views felt. On the other hand, the landowners have mentioned that they sometimes feel pressurised to make decisions between the conflicting options for the use of their land: some community assistance in making these decisions may be welcome.

Provisions of the Lease

The lease which has been negotiated has been designed to protect both the values of the Kauri Reserve and the way of life of the local population.

It was considered important to state the objectives of the reserve at the start of the lease. This should help to forestall suspicion of government motives, which may arise in remote rural areas such as south Erromango where most communication is by means of rumour.

The objectives of the reserve are stated as follows in the draft lease:

"i) To safeguard the future of the Vanuatu Kauri in its natural environment by allowing all Kauri trees within the demised area to grow and regenerate without disturbance either to them or to the other trees and plants growing upon the demised land;

ii) Subject to Objective i) above, to ensure that the indigenous Ni-Vanuatu inhabitants of Erromango and their descendants retain the opportunity to follow their chosen lifestyles without further erosion of their cultural heritage by protecting the land to which they traditionally have access, including the natural vegetation and wildlife and sites of cultural significance occurring thereon, from degradation;

iii) Subject to Objectives i) and ii) above, to provide opportunities for scientific study of the environmental, ecological and cultural values of the demised land;

iv) Subject to Objectives i), ii) and iii) above, to ensure a source of seed of Kauri of sufficient genetic diversity to allow full realisation of the plantation potential of the species, by ensuring that adequate numbers of trees of a range of ages are left upon the demised area to be able to breed together to produce a continuing supply of variable seed and seedlings from which high-quality individuals can be selected."

The lease restricts the landowners from carrying out commercial operations, lighting fires, introducing machines such as chainsaws, trucks or bulldozers onto the reserve, introducing livestock, or constructing roads or buildings (except for small bush-material houses for traditional use), unless given permission by the government. They are also restricted from granting permission to any other parties to carry out any of these activities. The government, as lessee, has the right to veto any infringements on the reserve by outsiders. The government itself is prevented by the terms of the lease from felling, or allowing to be felled, any trees. It was originally suggested in the lease-negotiation meetings that the government should be allowed to fell occasional trees for research purposes only: however the landowners mistrusted this suggestion, and insisted that it should be stated that no trees would be felled.

Care has been taken to limit the restrictions placed on the landowners to the minimum necessary to guarantee protection of the ecological values of the reserve. The second objective of the reserve, stated in the lease, is to safeguard the right of the Erromango people to pursue their "chosen lifestyle". The lease therefore gives the landowners, and any other people authorised by them who have traditionally been allowed access to the land, the right to "pursue activities on the demised land which are consistent with their normal lifestyle" These activities include hunting, fishing and gathering of tree and plant material. It is specified however that collection for sale is not allowed without the permission of the lessee: this is to prevent excessive quantities of trees or plant from being removed.

Rather than seeking to fossilise the lifestyle of the local population, the government should take into account their aspirations for the improvement of their lot. Thus "chosen lifestyle" is used in the second objective in the lease, rather than "traditional lifestyle". In the clauses restricting the

landowners' activities are therefore included openings which give the government the opportunity to give permission for the proscribed activities: it is stated that this permission "shall not unreasonably be withheld". Thus if, for instance, it were proposed to build a road along one edge of the reserve, to allow much-needed economic development in adjoining areas, and if there were no practical alternative and the road was designed in such a way that it posed no threat to the environmental values of the reserve, it would be unreasonable for the government to withhold permission. If there were disagreement about what constituted "reasonable", the case (and any other disputes concerning clauses within the lease) would be arbitrated by the Lands Referee, under the provisions of the Lands Referee Act No. 15 of 1982.

Under the Lands Leases Act the maximum allowable term for any lease is 75 years. This is therefore the negotiated term of the lease on the Kauri Reserve.

Other Means of Protection

Within existing legislation the government has limited means to protect endangered areas in the absence of a lease.

The Forestry Act gives the Minister of Agriculture, Forestry and Fisheries the right to prevent clearing or utilisation activities on any land, in order to prevent erosion, protect ecology, conserve an area of scenic, cultural, historical or national interest, or to preserve an area for recreational purposes. The Act also specifies that all logging contracts must be approved by the Director of Forestry. He therefore has the power in practice to prevent logging by refusing to approve logging contracts.

The Physical Planning Act No. 22 of 1988 gives Local Government Councils the power to declare Physical Planning Areas in consultation with custom landowners, in which all development activities would be subject to planning Control.

The Fisheries Act No. 37 of 1982 gives the Minister, in consultation with custom landowners, the power to declare marine reserves. Any protection enforced under these existing pieces of legislation could be easily reversed in the event of a change of government.

Payment for the Land

By preventing logging or other economic activities on a protected area, one is denying the landowners the opportunity to earn a return on the only significant capital which they have, their inherited custom land. How should the government compensate landowners for this opportunity cost?

It was originally proposed to base compensation for the Kauri Reserve on an arbitrarily chosen percentage of the estimated timber revenues foregone by the custom landowners when opting for the reserve. Subsequently, it was decided that due to the difficulty experienced by landowners in areas such as Erromango in managing lump sums to their full potential so that they provide them with appreciable long-term benefit, a reliable annual payment would be more appropriate. This would be offered as an annual rental payment, stipulated within the lease.

In determining how much to pay the landowners, it could be argued that the government should pay them the actual opportunity cost incurred by tying up the land as a reserve.

The theoretical economic opportunity cost, based on logging royalties foregone, would in fact over-estimate the actual opportunity cost to the landowners of establishing the reserve, for a number of reasons:

i) The landowners obviously place considerable value on their land as it exists in its present undisturbed state. It gives them the opportunity to go hunting and fishing, and is a valuable source of firewood, building materials, medicinal and food plants. The Kauri trees are also a source of pride, being some of the last and best big trees remaining following logging on the rest of the island. The landowners have expressed their wish for their children to have the opportunity to see Kauri trees as they used to be over the whole of the island. This is thus a benefit rather than a cost to the landowners.

ii) Prevention of degradation of the land, and thus the protection of its long-term value by preventing logging can also be seen as a long-term benefit although it incurs a short-term opportunity cost.

iii) Material items purchased using logging royalties, such as trucks and outboard engines, tend to have a very limited life-span in the difficult conditions of areas such as Erromango, and so are unlikely to provide the landowners with the full benefit which they may expect. The actual value of royalties is also less than their theoretical value due to the previously-mentioned difficulty for landowners in such a situation of investing royalties to their full interest-earning potential. It is not fair however to assume that landowners will not be able to manage their property properly, so this is not a justifiable reason for reducing compensation.

Even taking into account these factors, however, it is unlikely that in the case of a valuable resource, such as the Kauri on the Kauri Reserve, the government of a small developing nation could devote adequate of its scarce aid funds to be able to afford to pay the true amount of the opportunity cost, If the government cannot afford to pay it, the opportunity cost is therefore of little relevance.

In the case of the Kauri Reserve, the Department of Rural Lands' guidelines for land rental levels were used as a basis for negotiation. Most major leases are for development projects such as agricultural plantations: these guidelines are therefore based on what is considered a fair price for land for such projects, taking into account access, infrastructure and existing development. The amount which could be offered was constrained by the risk of inflating land rental levels, which could prejudice the attractiveness of the island for such projects. This could in some cases be a problem as it would limit the government's bargaining power. For the Kauri Reserve the government is already offering double the guideline rental level but the one landowner who lives in Vila is now, subsequent to the lease negotiation meetings on Erromango, expressing reluctance to accept this amount. While the government has the power, as a stop-gap measure, to prevent logging, it therefore cannot yet secure a lease which would guarantee long-term protection.

Requirements for Environmental Legislation on Customary Land

Existing environmental legislation is inadequate both in its ability to guarantee long-term protection of endangered areas and in its consideration of the representation of local community interests. It is therefore imperative that new legislation be drafted which will establish consistent procedures for the establishment of all classes of protected area, which will make it difficult to remove protection from endangered areas without good reason, and which will establish appropriate consultative procedures.

The need to take into account the way of life and aspirations of both custom landowners and the rest of the community has already been stressed. Legislation must make consultation by the government with local people obligatory. Although it would be wise to provide for the power to proclaim protected areas, with restrictions on activities, with immediate effect and without consultation (to counter, for example, an immediate logging threat), there should then be a period during which consultations should be held with local people, and representations against the proclamation can be made. A management plan should also be drafted within a limited period by a body established as the protected areas authority, and it should be obligatory for this to be submitted to a committee of local people for comment before ministerial approval and implementation.

Local people should be represented by a broad-based committee consisting of the landowners, the local Council of Chiefs, the Local Government Council, village representatives and other bodies such as women's representatives. Legislation should compel the government or the protected areas authority to take into account representations by this local advisory committee not only at the time of management plan production but in decision-making at any time in the future. Close and regular communication should be held between the Government and the committee, to reinforce the principles and justification for the reserve, and thereby to pre-empt misunderstandings and mistrust.

Should this legislation compel the government to comply with the wishes of the landowners and the local community, or should it require the government merely to take note of them? Existing legislation, such as the Physical Planning Act and the Fisheries Act, although stipulating consultation with landowners, does not state that the government must abide by their wishes. The Forestry Act does not even specify a requirement for consultation. In the absence of landowner cooperation, management and protection could be very difficult to enforce: existing environmental legislation has yet to be put to the test in the face of landowner opposition. It is the author's opinion, however, that future legislation should give the final right of decision concerning protection of endangered areas to the government. The rights of the majority of the country's population, and of future generations, to benefit from sites of outstanding environmental or cultural importance should ultimately take precedence over the rights of the individual landowner. In a country such as Vanuatu, whose culture and philosophy are so strongly based on traditional and inalienable rights of ownership to the land, this is a question which ultimately needs to be resolved at a political level.

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CASE STUDY: CONSERVATION OF THE KAKERORI

Rod Hay and Hugh Robertson
Ecology Division
Department of Scientific and Industrial Research
NEW ZEALAND

and

Gerald McCormack
Conservation Service of the Cook Islands
COOK ISLANDS

INTRODUCTION

The kakerori is one of several species of small monarch flycatcher scattered across eastern Polynesia, particularly in the Society and Marquesas Islands. Of the nine species and subspecies known, six are either rare, endangered or already extinct. Rarotonga has only four native forest bird species; the kakerori is the rarest, with a population of approximately 30. It has two colour forms, one grey and white, and the other vivid ginger on top and pale underneath.

The kakerori has been studied since 1984, when the first reliable estimate was made of the population and the first birds colour-banded. From early on in the study it has been apparent that the species is very rare, very restricted in distribution and consequently at serious risk of extinction. Previously, it had been suggested that the kakerori was suffering from the effects of predatory activity by rodents or cats, the influence of avian disease, habitat loss and deterioration, the impacts of the Indian myna or combinations of those factors. In 1987-88 it was decided that a detailed research programme was required to check whether it was, in fact, declining, and to identify which factors were responsible if it was.

The project has been carried out by Drs. Hugh Robertson and Rod Hay of DSIR in conjunction with Gerald McCormack of the Conservation Service of the Cook Islands. Support has been received from SPREP and from several volunteer workers who have given their time free of charge.

OBJECTIVES

- To assess the size and distribution of the kakerori population.
- To check the survival rate of adult kakerori.
- To study nesting, and determine the output of juveniles per year.
- To measure the impact of predators, particularly rats, on nesting.
- To determine whether rat control is a suitable management tool for boosting kakerori numbers.
- To make recommendations about other management options including the appropriate form of protection for the birds' habitat.

METHODS

The kakerori responds readily to playback of tape-recordings of its own calls. Using playback, much of Rarotonga has been surveyed in recent years. The three valleys (Totokoitu, Turoa and Avana) where birds have appeared have been surveyed repeatedly over the last three years and the territories of individual birds mapped.

Eight birds were individually colour-banded in May 1984. From 1987 on, this banding programme has been continued, and over half the population is now individually recognisable.

Through monitoring the banded birds, the status, sex and age of the different colour forms have been assessed.

All nests found have been studied, and, where possible, their success monitored. During the 1988-89 season, most kakerori nests were found. Good evidence of their breeding performance was therefore available. At the end of each season the number of juvenile kakerori present has been assessed as an overall measure of success.

During the 1988-89 season, the upper Totokoitu Valley was ringed and traversed with poison bait stations in which were placed pellets of Talon L50 (brodifacoum) rodenticide. The 56 bait stations were placed 50 metres apart within the valley and at 100-metre intervals around the perimeter. Bait placement was "pulsed" three times at monthly intervals. Each month after initial placement, the baits were replenished twice at five-day intervals. The rate of bait take was one measure of the efficacy of the operation. Meanwhile, the Turoa and Avana catchments were not poisoned.

At the same time, a "long-line" of 30 rat traps was established in the Totokoitu as well as the Turoa/Avana Valleys as an independent measure of rat density in the poisoned and unpoisoned parts of the study area.

During the same season an attempt was made to see whether wild cats observed in the study area were likely to be in sufficient numbers to affect kakerori. One cat was trapped and a radio transmitter placed on it so that its movements could be tracked.

PRELIMINARY RESULTS

At the start of the 1987-88 breeding season we found 35 kakerori in two km2 of the southeast of Rarotonga, probably the wettest part of the island. Sixteen were in the Avana catchment, five in the Turoa Valley and fourteen in the Totokoitu.

There were 20 birds with grey and white plumage, thirteen with orange plumage, while the remaining two were intermediate. It was clear that the colour forms did not indicate sex as there were pairs of each possible combination of colours. Similarly, they did not clearly denote age differences. Subsequent analysis of band recoveries leads us to conclude that fledglings are a pale tan colour; first year birds are orange with a pale yellow base to the bill; second year ones orange with a grey base to the bill; second to third year birds mixed dark orange/grey colour and three year onwards grey and white.

This sequence provides a good means of quickly checking the age-structure and hence health of the population in future years.

Nesting success was extremely low. Of 13 nests in seven territories found that season, one resulted in a single fledgeling. One pair built five nests, all of which failed. At most of the nests we were able to observe, rats ap-

peared to be responsible, though human interference may have caused the demise of one. In addition, the cat-eaten remains of one adult, banded in 1984, were found.

ADULT SURVIVAL

The estimate of a population of 24 birds made in 1984 was probably conservative since not all areas, particularly in the Avana, had been thoroughly searched. Nevertheless, the eight birds banded at that time give some indication of survival rate. At the start of the 1987-88 season, five of them remained, though one was killed by a cat during that year. In 1988-89 three of those birds were still alive, as were seven of the nine birds banded the previous season. These re-sightings enable us to estimate a mean adult life expectancy of 4.3 years.

RESULTS OF RAT CONTROL PROGRAMME

Three methods are available for estimating the success of the 1988-89 rat control programme. Rate of bait-take provides an immediate assessment of the effectiveness of the poison:

	COMPLETE	PART	TOTAL
OCTOBER	40.5	23.5	64.0
NOVEMBER	27.0	5.0	32.0
DECEMBER	95.0	5.0	100.0

Percentage bait take during each laying of Talon poison rat-baits in Totokoitu Valley, Rarotonga

The November results suggest that the initial poisoning in October had an effect on the population. However, the rate of bait-take in December suggests that the population had built up again by then.

Trapping in both the poisoned and unpoisoned areas enabled us to better measure the effectiveness of the operation:

	TRAP NIGHTS	RATS/100 TRAP NIGHTS		
		Total	exulans	rattus
POISONED				
September	142.0	6.34	5.63	0.71
October	137.5	8.00	0.00	8.00
UNPOISONED				
September	141.0	5.67	0.00	5.67
October	126.5	13.44	7.12	6.32

Rat captures on long-lines in poisoned and control areas, Rarotonga 1988.

Despite our efforts, there was a small (26 per cent) increase in the index of rat numbers in the poisoned area after the first month's operation. There was, nevertheless, a much greater increase in rat numbers in the unpoisoned area. The difference was due mainly to the number of Pacific rats (*Rattus ex-*

ulans) caught however. If we assume that the main predation pressure is from the more aggressive ship rats (*Rattus rattus*), then we have failed to have a marked impact. Indeed, trapping results from November suggest a further build-up in both areas.

BREEDING SUCCESS

As already noted, breeding success has previously been low. In 1988-89, during the poisoning campaign, we also instituted a policy of protecting some nest trees from predators by placing rat-proof aluminium collars around the trunks. A similar number of trees was protected in each area.

The crucial test of the poisoning programme is the effect it has on the ability of the kakerori to raise offspring. In contrast to the previous season, we had no direct evidence that rats had destroyed any eggs or chicks in the Totokoitu Valley. Chicks were known to have fledged from at least three nests and at least two juveniles were still present in February, at a time when kakerori are quiet and relatively difficult to locate and observe.

In the other catchments we know that rats destroyed eggs in at least four nests, and may have been responsible for the disappearance of young chicks in a fifth. Chicks hatched in at least three nests, two of which were protected, and at least one fledgling was present in January.

	Totokoitu	Turoa/Avana
Nests known hatched	5	3
Known fledgelings	3	2
Nests known preyed-on	0	5

Summary of breeding success in poisoned (Totokoitu) and unpoisoned (Turoa) catchments, Rarotonga 1988-89.

Overall, the breeding success in the poisoned catchment appears to have been higher. Indications are that this may have been the result of a lower rate of predatory activity there early in the season. Later in the season rat numbers were higher in both catchments.

THE FUTURE

We are prepared to claim that the pilot poisoning programme has been partly successful. It was carried out with relatively low effort, and appeared to result, at least early in the season, in a reduction in rat numbers and some increase in kakerori breeding success.

We have therefore resolved to continue the poisoning and tree-banding programme this year at a greater level of intensity, and using a new, moisture-resistant bait formulation.

Equipped with the results of this season's work we will draw up a comprehensive management plan to be applied by the Conservation Service of the Cook Islands. This plan will complement current proposals for and management of a national reserve for Rarotonga.

ACKNOWLEDGEMENTS

We are grateful to SPREP, DSIR and the Conservation Service of the Cook Islands for support and encouragement so far. Particular thanks go to Teariki Rongo, Peter Gaze, Nigel Langham, Vitoti Tupa, Sue Mitchell, Mike Bryan, Tony Utanga, Kiriau Turepu, Tony Pritchard and many others who have helped.

CASE STUDY: **NEW CALEDONIA:**
CONSERVATION OF THE KAGU *(Rhynochetos jubatus)*

Yves Ltocart
Service des forts et du patrimoine naturel
NOUMEA
New Caledonia

Presentation of the kagu:

A crested slate-grey bird belonging to the Order of Gruiformes, the kagu is the sole representative of the *Rhynochetidae* family. It is endemic to New Caledonia, about the size of a heron, weighs between 800 and 1000 grammes and, being practically incapable of flying, lives on the ground in the thick rain-forest of the New Caledonian mainland.

It feeds on earthworms, insects, myriapods (julids), spiders, snails and small reptiles (geckos and lizards).

Kagus form permanent pairs. Every pair has its own territory of about 30 ha (in the Rivire Bleue territorial park), and two pairs cannot bear to share the same territory. Once formed and established, the pairs are sedentary.

The kagu lays only one egg at a time but it may lay twice a year, once in winter (June-July) and once in summer (December). If the winter egg has not hatched out, the female may lay again in November. Sometimes a laying season is skipped altogether, and there are years when a pair will only nest once.

The kagu sings in the morning at daybreak. Its call may be very occasionally heard just before nightfall and more rarely still in the daytime. For the time being, males and females can only be distinguished by the structure of their call.

Status:

New Caledonia's kagu population has declined markedly since the beginning of the century and even in comparison with what it was only thirty years ago. The proposed kagu survey that will be described further on will give us a better idea of the overall population density and distribution.

The 1989 population in the Rivire Bleue territorial park is estimated at about 200 individuals.

Causes of decline in kagu numbers.

Introduced mammals such as dogs, cats, wild boars and rats are mainly to blame for the decline in kagus' numbers.

Dogs are obviously the most dangerous, even for adult kagus - not only stray dogs that have run wild, but also dogs taken on boar or deer hunts by their masters. Occasionally, dogs also get lost during a hunting trip, and roam the woods for days on end or even weeks before being recovered.

Personal observation and numerous testimonies confirm the kagu's vulnerability when confronted by a dog, and the very destructive impact of this carnivorous animal on the kagu population.

Cats are mainly predators of young kagus, up to one year of age, and of kagu chicks, but do not seem to attack adults. Evidence of the presence of feral cats can be found throughout New Caledonia in all types of vegetation and at all altitudes.

Wild boars are not agile enough to be dangerous for an adult kagu or even a young one past the age of four months. They are mainly a threat to chicks and eggs, since the kagu nests on the ground. The wild boar has spread all over New Caledonia, and large populations can be found in every type of vegetation and at all altitudes. The wild boar also competes with the kagu for food, especially during the dry season (September - December). In the forests of the Rivire Bleue territorial park we have noticed that in this period wild boars and kagus both tend to congregate at the bottom of damp valleys, where they feed on earth worms, among other things, which are easier to get to in moist ground than in dry ground. In these areas and at these times of year, the ground is completely "ploughed up" by boars.

Rats are predators of chicks, from the time of hatching out to about one month of age. Mortality is highest during this period. Three rat species have been introduced into New Caledonia, as well as one mouse species.

Rattus norvegicus lives in towns and villages. *Rattus exulans* is found mainly in savanna woodland and, generally speaking, in all open environments. *Rattus rattus* is almost exclusively found in thick forests. This last species is carnivorous and a formidable predator for kagu chicks.

Mining and forestry activities have also played an important part in the decline in kagu numbers over the last few decades, especially during the nickel boom (1960-1970) when new roads and tracks were cut all over New Caledonia, allowing hunters and their dogs to reach areas that had previously been inaccessible.

Chronology of kagu conservation measures:

The kagu is totally protected by Territorial Assembly Resolution No. 387 of 26 April 1972, brought into effect by Government Council Order No. 1017 of 4 May 1972. It is formally forbidden to hunt, capture and hold kagus, except by special authorisation which may be granted for purposes such as scientific research.

The Department of Forests selected the Rivire Bleue territorial park, 50 km south of Noumea, as the most suitable site for kagu conservation activities. This park, established in 1980, is located within the special wildlife reserve established in the Haut Yat area in 1960, which covers 16,000 ha. The park itself covers 9,000 ha, 6,000 of which are covered with thick rainforest, the kagu's natural habitat. The fact that its boundaries are formed by high mountains (averaging 1,000 m in altitude), and that there are no villages around it, reduces the risk of poaching and invasion by introduced predators. A good network of tracks (60 km of tracks suitable for motor vehicles) facilitates surveillance.

1980: Beginning of a kagu population in the Rivire Bleue territorial park.

1982: Beginning of control of introduced predators (dogs, cats, wild boars, rats) in the Rivire Bleue territorial park.

Construction of a 1 ha enclosure inside the territorial park, where young kagus born in captivity in the Noumea 'Michel Corbasson' park can adapt to the natural environment before being released.

1983: Beginning of releases of young kagus born in captivity into the Rivire Bleue territorial park (after spending several months in the adaptation enclosure).

Dr. Rod Hay, an ornithologist with the Royal Forest and Bird Protection Society of New Zealand, visited New Caledonia to prepare a conservation programme of New Caledonian birds, chiefly the kagu, in co-operation with SPREP.

1984: Yves Ltocart (from the New Caledonian Department of Forests) visited New Zealand from 3-31 March to observe management of parks and reserves and control of introduced predators, as well as radio-tracking techniques.

This visit was organised in New Zealand by Dr. Rod Hay with the support of the following bodies: Royal Forest and Bird Protection Society of New Zealand, Forest Service, Wildlife Service, Department of Lands and Survey, Department of Scientific and Industrial Research.

1986: Yves Ltocart was assigned by his Department to full-time study of kagu behaviour and biology in its natural environment (in the Rivire Bleue territorial park).

Drafting of a survey, study and conservation programme of New Caledonian birds, in particular the kagu.

Bodies involved in this programme:
- SPREP South Pacific Regional Environment Programme)
- ICPB (International Council for the Preservation of Birds)
- ASNSC (Association pour la Sauvegarde de la Nature de Nouvelle-Caldonie)
- SCO (Socit Caldonienne d'Ornithologie)
- The French Ministry for the Environment
- The New Caledonian Department of Forests - SFPN (Service des Forts et du Patrimoine Naturel).

1987: Yves Ltocart again visited New Zealand from 24 September to 3 November to learn how to use radio-tracking techniques for the kagu study.

Purchase, with SPREP funds, of radio-tracking equipment brought back from New Zealand at the end of the visit (one Merlin 12 receiver, 1 aerial and 12 transmitters).

Mr. Peter Thomas from the South Pacific Commission was the main organiser of this visit, and three New Zealand bodies assisted with local arrangements: the Department of Conservation, the Environment Division of the DSIR in Wellington, Nelson and Havelock North, and the Royal Forest and Bird Protection Society.

At the end of November the first kagus were fitted with transmitters in the Rivire Bleue territorial park.

1988: Continuation of the kagu study by radio-tracking techniques in the Rivire Bleue territorial park.

Two sorts of kagus were fitted with transmitters: wild kagus in the territorial park and young kagus born in captivity and released in the park after a stay in the adaptation enclosure.

1989: Publication of the first two chapters of the kagu study in Rivire Bleue territorial park:

Chapter I : Feeding behaviour and diet
Chapter II : Vocal activity

A complete kagu population survey is to begin in September, both in the Rivire Bleue territorial park and in other places throughout New Caledonia.

Status of the kagu population in the territorial park in 1989:

30 kagus were released in the Rivire Bleue territorial park between 1983 and 1989, after spending some time in the adaptation enclosure.

22 of them were born in captivity in the Noumea Forestry Park and 8 came from various parts of New Caledonia; they had usually been captured by dogs, were recovered by the Department of Forests and released.

Of the 22 kagus born in captivity, 2 died in the adaptation enclosure, one was killed by a cat two weeks after being released in the territorial park (this bird had been fitted with a transmitter), and two others had to be taken back to the Noumea Park because they proved incapable of feeding adequately in the adaptation enclosure.

The first kagu born in captivity and released in August 1983 after a period in the adaptation enclosure (a male) was rediscovered again in August 1986 only a few hundred metres from its place of release. It was established on its territory with a wild female. In October 1986 the female laid an egg and at the end of November a chick hatched out, which unfortunately disappeared a few days later. In 1987 the pair produced another chick which was identified as a female when it was heard to sing with its parents. In 1989 this kagu is still on the same territory.

Of the two kagus born in captivity and released after being fitted with a transmitter, one was killed by a cat 3 weeks after release. The other, released on March 15, 1988, is still alive in August 1989 and established on a territory with a wild mate.

A sample area about 1,500 ha in size was mapped out in 1980 in the Rivi Bleue territorial park for monitoring changes in kagu numbers. A population count has been conducted over the past ten years by noting the calls heard at

daybreak. Counting was facilitated by the fact that once a pair has formed it becomes sedentary. The figures do not include young birds that have not yet begun to sing.

1984	:	21 birds (8 formed pairs and 3 single males)
1988	:	45 birds (20 formed pairs and 5 single males)
August 1989	:	49 birds (22 formed pairs and 5 single males)

These figures clearly illustrate the effectiveness of the predator control operations that have been carried out continuously from 1982 to 1989 in the Rivire Bleue territorial park. New kagu releases in the park have also contributed to the population increase.

The kagu population survey to be carried out from September 1989 to January 1990 over the whole of the Rivire Bleue territorial park will give us an idea of the total size of the population.

CASE STUDY: CONSERVATION OF THE FIJIAN CRESTED IGUANA: A PROGRESS REPORT

James Juvik
Environment and Policy Institute
East-West Center, and
University of Hawaii-Hilo
HAWAII

and

Birandra Singh
Director
National Trust for Fiji
FIJI

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1. INTRODUCTION

In a paper presented at the Third South Pacific National Parks and Reserves Conference one of us (Singh, 1985) reported on the recent discovery of a new iguana lizard in Fiji. This arboreal lizard, previously unknown to science, was discovered on the tiny island of Yadua Taba (70 hectares = 175 acres) off Vanua Levu in 1979, and scientifically described as the Crested Iguana (*Brachylophus vitiensis*) by Gibbons (1981). The notoriety and public interest surrounding this discovery prompted the establishment of Fiji's first wildlife sanctuary in 1980, when the National Trust for Fiji secured a lease to uninhabited Yadua Taba, and initiated steps to protect the native ecosystem by removing domestic goats and appointing a volunteer warden.

2. IGUANA POPULATION ON YADUA TABA

The iguana population on Yadua Taba was initially estimated at "well in excess of 300 animals" (Gibbons, 1984). More recently, on the basis of two mark-release surveys in 1983 (Cogger and Sadlier, 1986) and 1985 (Laurie, Uryu and Watling, 1987), the Yaduataba iguana population has been conservatively estimated at 4000-6000 individuals. In the favoured beach forest habitat, iguana densities may reach 140 per ha. With an average body weight of approximately 250 gm, this translates to a lizard biomass of 35 kg per ha, a very high value comparable to that found in mammalian ungulates (see Case, 1982; p. 211). These figures only serve to confirm the unique character of the Yaduataba ecosystem and the international scientific value of its protection.

Although the sanctuary iguana population is quite large, it remains threatened by the possible accidental introduction of potentially devastating predators (feral cats, European rats, pigs, etc.) from adjacent, inhabited Yadua Island, which is separated from Yadua Taba by only 200 metres of shallow water (submerged coral reef).

Because of this ecosystem vulnerability and the infrequency and short duration of National Trust staff and scientists' visits to remote Yadua Taba, it was deemed appropriate to establish a simplified and standardised population sampling methodology, using permanently marked sampling stations that could be repeatedly surveyed by the local warden and other Trust staff. The objective in establishing permanent baseline transects in the prime beach forest habitat is to generate long-term data on population fluctuations within a specifically defined sample area. Two sampling transects (A and B) were established in the Island's western beach forest (Map 1) in 1988. Trees (over 5 cm trunk

diameter at 1 m above ground) intersecting the transect line were taken as sampling stations (numbered aluminium tags were nailed to the trees). Subsequent night-time spotlighting of iguanas along these transects demonstrated that lizards could easily be detected up to a distance (vertical or horizontal) of 10 m and occasionally to 15-18 m.

During transect counts, 3 minutes were spent at each station searching for iguanas (if two people were searching, this would represent 6 search minutes per station). During three different Transect A counts taken on the nights of July 13-14, 1988, iguanas were encountered at rates of 4.3, 7.1, and 10.7 lizards per search hour, with a mean of 7.4 lizards per hour search time (Juvik, 1988). This value is close to the value of 8.5 lizards per hour reported by Laurie, et al. (1987) for night-time searches in the same habitat during September 1985. A resurvey of the Transect A stations on July 8, 1989 recorded 18 iguanas in 112 search minutes, or 8.6 iguanas per search hour. These values suggest a relatively stable population density over the past few years. The reserve warden, Anare Bicilo and his son Lota, participated in transect establishment and night-time iguana counts. A powerful spotlight was left with the reserve warden, and a simple data survey form (in English and Fijian) has been prepared for field use. It is anticipated that monthly or bimonthly transect surveys will be undertaken in the future by the reserve warden and results forwarded to the National Trust Office in Suva. Although the sampling procedures here outlined are comparatively crude, the data produced should be useful in tracking long-term population trends or spotting unusual population perturbations that could trigger further Trust staff investigation.

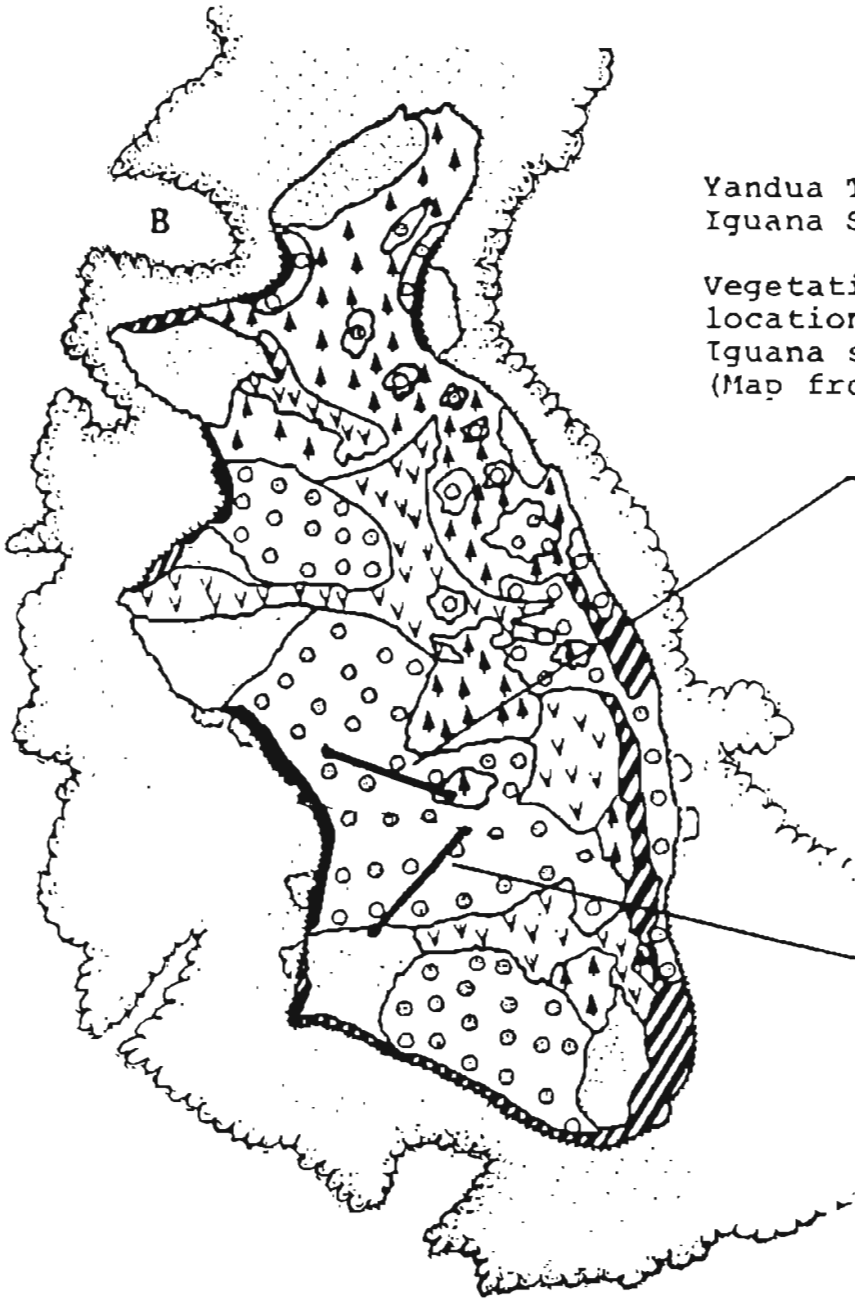
3. IGUANA POPULATIONS IN THE YASAWA-MAMANUCA ISLANDS AND IMPLICATIONS FOR PARK AND PROTECTED AREA DEVELOPMENT

Subsequent to the discovery of the Crested Iguana on Yadua Taba, Gibbons (1984) reported the presence of Crested Iguanas on at least seven additional islands in the Yasawa-Mamanuca Group off western Viti Levu (Map 2). Several of these new records require further verification as well as confirmation of the taxonomic status of these different island populations. Because the Yasawa and Mamanuca Islands are currently undergoing substantial tourist-related development, the National Trust for Fiji may be able to successfully exploit the Fijian public and international conservation interest in the Crested Iguana as a vehicle for National Park or Protected Area designation within the Yasawa-Mamanuca Group. Most of the larger islands in this group have a long history of human occupancy and environmental degradation associated with fire, alien ungulates and predators (cats and rats). The island of Yasawa is typical of this situation where native forests have been largely supplanted by anthropogenic grasslands maintained by annual burning. Some of the larger inhabited islands such as Matacawa still maintain patches of isolated forest that support at least small Crested Iguana populations. On an overflight of the Yasawa-Mamanuca chain on July 23, 1988 we identified several smaller (and at least from the air presumably uninhabited) islands throughout the group which appear to be little disturbed and supporting native forest (see: Juvik, 1988). These include Yalewa Kalou, Sawa-i-lau, Vana Levu, and Monu and Monuriki. The National Trust is now seeking support for a biological survey of these small islands that have yet to undergo human settlement or tourist development (as well as remaining forest remnants on the larger islands) with the aim of developing a National-Park or protected-area proposal for the Yasawa-Mamanuca Group. For example, the Crested Iguana has been reported present on Monuriki, which, being close to Nadi and nearby tourist-developed islands, might be an ideal location for nature tours (as opposed to the much more isolated Yadua Taba). In addition to the Crested Iguana, the Yasawa-Mamanuca Group supports an interesting dry forest flora that is rapidly disappearing from western Viti Levu. A thoughtfully developed national park proposal for selected areas in the Yasawa-Mamanuca Group may well gain govern-

MAP 1

Yandua Taba Island
Iguana Sanctuary

Vegetation types and the location of permanent Iguana sampling transects. (Map from: Gibbons, 1984)



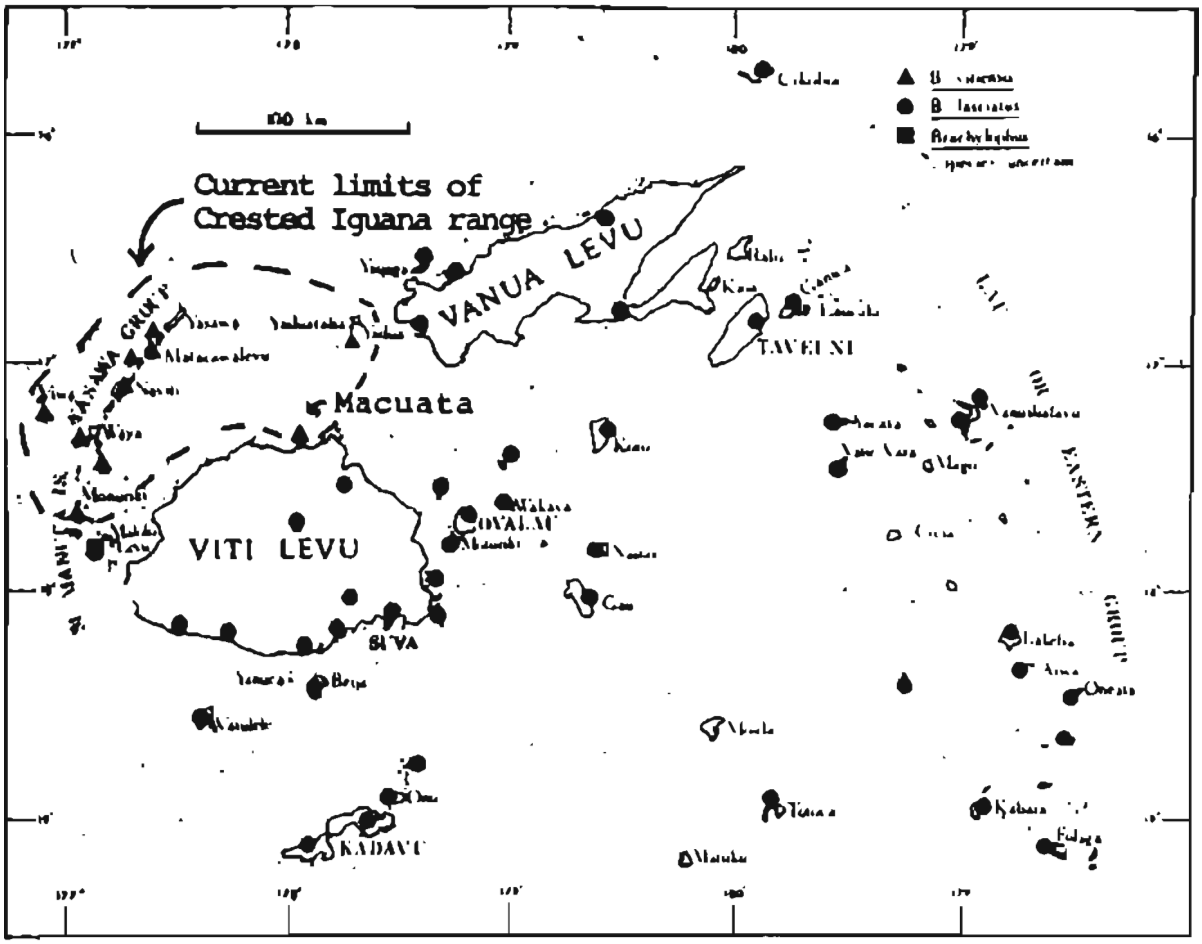
Key to Vegetation Types

- beach forest
- Casuarina
- grassland
- copra plantation
- coastal scrub
- cliffs

N

200 m.

MAP 2



Distribution of the Crested Iguana (triangles) and Banded Iguana (circles) in Fiji. Locational data from Gibbons (1984), with the recent addition of Macuata Island locality by Matling in 1988.

ment, landowner and tourist industry support since well-planned and well-maintained national parks typically act as tourist magnets, and enhance regional economic development, while promoting the primary benefit of protecting representative ecosystems.

In July 1989 we visited Monu and Monuriki Islands in the Mamanuca-I-Cake Group. The islands exhibit spectacular natural beauty including towering jagged peaks and fringing white sand beaches. More importantly, these two islands alone in the group retain a still substantially intact native dry forest canopy. With neither traditional Fijian villages nor tourist facilities, alien predators (e.g. feral cats) appear absent. The forest ecosystem on both islands is, however, threatened by domestic goats maintained by villagers from nearby Yenta Island. The forest industry has largely disappeared, and iguanas have become scarce. It would appear that the Crested Iguana may well represent the classic "indicator species" of ecosystem vitality in this region. The iguana's rapid decline or disappearance with the introduction of alien predators or vegetation-destroying herbivores is borne out by its total absence from other nearby islands such as Tavua and Yanuya where a long history of human settlement has led to near complete deforestation. Recent tourist developments on previously uninhabited islands such as Matamanoa and Galito have generally led to the introduction of cats and rats which may rapidly decimate iguana populations even where remaining forest cover is left intact.

4. EMPLOYING AN "ADOPT A PARK" CONCEPT AS A SOURCE OF INTERNATIONAL FUNDING FOR CRESTED IGUANA CONSERVATION

A problem common to sustaining or expanding park and protected area activities in developing countries is the generally low and frequently inadequate level of operational funding from national governments. Yet, by the same token, relatively small amounts of funding (by the standards of the developed nations) can go far where the costs of labour for park and protected-area rangers and guards are generally low. During a Park and Protected Area Workshop held at the East-West Center (Honolulu) in 1987, efforts were made to launch an "adopt-a-park" programme to directly link potential conservation donor organisations with individual park or reserve areas in the developing nations of the Asia-Pacific region. The project's specific objective was to involve (as donors) small local/regional conservation-oriented organisations in the developed nations who may have felt their resources were too meagre to contribute significantly to international conservation initiatives. By scaling project needs to donor resources, it was felt many new "players" might be drawn into the international conservation arena.

A first attempt at developing such a direct linkage in the Pacific has involved securing support for the Yadua Taba Iguana Sanctuary from the Honolulu Zoological Society (a volunteer support group for the Honolulu Zoo). Although not yet finalised at the time of this writing, the Honolulu Zoological Society has agreed, in principal, to provide annual operational funding for the Yadua Taba Sanctuary in the sum of US$1,500 per year for an initial five-year period. The terms of the draft agreement between the Honololulu Zoological Society and the National Trust for Fiji generally specify appropriate uses of donor funds and the annual documentation of conservation activities (see Appendix I). We feel that this approach to small-project support may be particularly appropriate for protected-area development in the Pacific Islands.

5. ACKNOWLEDGEMENTS

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APPENDIX I

AGREEMENT BETWEEN THE HONOLULU ZOO HUI AND THE NATIONAL TRUST FOR FIJI RELATING TO FINANCIAL SUPPORT OF THE YADUA TABA CRESTED IGUANA SANCTUARY

The Honolulu Zoo Hui, a non-profit organisation incorporated in the State of Hawaii, is dedicated to the global conservation of wildlife and in particular supports conservation education directed at protection of unique insular ecosystems and threatened species in Hawaii and the Pacific Region.

In accordance with this Pacific area wildlife conservation commitment the Hui is prepared to provide limited financial assistance in support of indigenous conservation efforts in the developing island nations of the Region.

The National Trust for Fiji, a government-supported agency, charged with the protection of natural biological and cultural resources of Fiji, is responsible for both the management of wildlife reserves and conservation education. As a consequence of an expanding human population and the resulting development pressures on the limited land and resource base, Fiji's native wildlife heritage requires special protective measures to insure survival.

The Fiji Crested Iguana, a unique endemic lizard, only recently became known to the world scientific community. Evidencing an extremely restricted natural distribution, the species has been afforded protection by the creation of Fiji's first official wildlife sanctuary under the management of the National Trust on Yadua Taba island.

In view of the demonstrated commitment by the National Trust to protection of this symbolically important native species, and in consideration of the very limited financial resources the Trust is able to commit to national conservation efforts overall, the Honolulu Zoo Hui is prepared to provide annual funding in support of Crested Iguana conservation for an initial five-year period. The Hui shall commit a sum of US $1,500 for each year of this agreement. The total financial commitment over the initial five years of this agreement shall be not less than US $7,500.

Terms and Conditions

1. Funds provided by the Honolulu Zoo Hui shall be used exclusively to improve species protection and reserve management for the Fiji Crested Iguana. The nature of fund expenditures shall be at the discretion of the National Trust with the exception that:

   a) Not less than $350.00 of the allotted funds be directed annually to provide an official salary for the Yadua Taba Sanctuary warden.

   b) Sufficient allotted funds be utilised to undertake at least one annual visit to the Sanctuary by a senior staff member of the National Trust for the purposes of monitoring iguana population and habitat conditions, and insuring the island remains free of goats, cats, rats and other alien species.

2. The National Trust shall provide to the Honolulu Zoo Hui an Annual Report incorporating:

   a) a financial statement describing the expenditure of Hui funds in the previous year;

b) a summary of the reserve warden's activities and observations;

c) a report of reserve iguana and habitat conditions as determined by at least one annual visit to the Sanctuary by a senior National Trust staff member;

d) a summary of general activities during the year with respect to management or conservation initiatives undertaken on the reserve, or in other areas where the Crested Iguana is known to occur.

3. The Honolulu Zoo Hui shall forward funds for each subsequent year of this agreement within sixty (60) days of receipt of a satisfactory annual report (described in Item 2 above).

4. The National Trust shall agree to acknowledge publicly the support to Crested Iguana conservation provided by the Honolulu Zoo Hui in its publications, press releases and at such local or international conservation forums where appropriate.

5. In addition to the financial commitment detailed in this agreement, the Honolulu Zoo Hui further offers to provide other technical and scientific support (within its means and in cooperation with the Honolulu Zoo Hui professional staff), as may be requested by the National Trust to further the objectives of the protection of the Crested Iguana and its essential habitat.

6. The National Trust shall immediately notify the Honolulu Zoo Hui should there be any change in the protected status of the Yadua Taba Crested Iguana Sanctuary or the management authority of the National Trust that would bear on the execution of this agreement.

7. This agreement may be dissolved by either party (without cause) upon six (6) months notice.

8. This agreement shall take effect upon signing by authorised representatives of the parties, and the first annual payment to the National Trust shall be provided within 60 days of this date.

CASE STUDY: QUESTIONNAIRE SURVEYS AND THE EVALUATION OF WILDLIFE RESOURCES IN THE SOUTH PACIFIC

M. R. Chambers, E. Bani and D. Esrom
Environment Unit
Ministry of Lands
Private Mail Box 007
PORT VILA
Vanuatu

INTRODUCTION

In many Pacific island countries detailed information about the status of wildlife species (flora and fauna) is lacking. This is an impediment to the development of management proposals designed to protect and/or conserve these species. It is especially important to have such information for species which are known or believed to be endangered or vulnerable to extinction. There are a number of such species in these categories in the region e.g. turtles, dugong, coconut crab, giant clams and the horseshoe clam, some palms and orchids etc. Such endangered species may be of scientific, popular (international), national, commercial or subsistence value or any combination of these factors.

Most Pacific island nations either do not have the trained scientific personnel to conduct detailed investigations into their wildlife or have insufficient personnel to do all the studies that would be desirable. A further impediment is that such studies could be expensive and beyond the limits of funds available in many countries. They could also be very time consuming if extended field surveys were done.

These restrictions generally apply in Vanuatu. In Vanuatu as elsewhere in the Pacific, however, the need to collect information on selected species of wildlife is well recognised. Thus in an effort to collect useful information on the status of some of its indigenous species, the Environment Unit of the Ministry of Lands, Republic of Vanuatu, undertook a number of questionnaire surveys. Such surveys were considered to be the only method available given the prevailing manpower and financial restrictions within the country. Undoubtedly, the surveys have provided much useful information about wildlife in Vanuatu. The surveys are briefly discussed here in the belief that similar surveys could easily be conducted elsewhere in the Pacific, and would be equally useful. To date, four surveys have been carried out in Vanuatu - on dugongs, flying-foxes, the estuarine crocodile and turtles.

METHODS

Although the questions varied between the different surveys, each study sought generally the same type of information. The types of information sought in all or most of the surveys included:

- Distribution - where the species occurred
- Abundance - how common the species was in these areas
- Value - the subsistence and/or commercial significance of the species
- Cultural importance - there is little recorded information on this in Vanuatu

- Custom - traditional controls on species exploitation; little recorded information

- Capture - methods of capture; little recorded information available.

In addition, further questions were included on topics such as local language names, breeding or changes in abundance as appropriate to a particular survey. The full questionnaires are given in Appendix 1 (dugong), Appendix 2 (flying foxes), Appendix 3 (estuarine crocodile) and Appendix 4 (turtles). Each questionnaire was written in Bislama (pidgin English), the *lingua franca* of Vanuatu.

Two of the surveys (dugong and turtles) involved sending out the questionnaires to people all over the country. Every effort was made to send the questionnaires to people who would either know the information required or be able and interested to find it out. Thus selected groups of recipients were targeted. These included: field workers of the Departments of Agriculture, Fisheries and Forestry; field workers of the Cultural Centre; Island Councils of Chiefs; secretaries of the village Area Councils; secretaries of Local Government Councils; individuals known by us to be interested and knowledgeable about turtles or dugong. In total, then, the survey questionnaires were sent to every major island and island group and the main regions in them. A very good coverage of the whole country was achieved. This is particularly important in Vanuatu, as it would be in other Pacific states, because there is an enormous variety of cultures within the country. Thus as many as possible of these cultures should be contacted, as their attitudes to the same species of animals may vary significantly.

With these two postal surveys, efforts were made to ensure as high a response (return of the completed form) rate as possible. Thus each questionnaire was accompanied by a supporting letter or endorsement from the employer of the recipient concerned - from the Director of Fisheries for the fishery personnel, from the Director of Local Government for Area Council officials, from the Director of the Cultural Centre for his field workers etc. In addition, a stamped and addressed envelope was included with each questionnaire. This is important in Vanuatu for in many rural localities it is impossible or difficult to buy stamps and envelopes. Finally, at the time the questionnaires were sent out, Radio Vanuatu put out programmes that explained the nature and purpose of the study and the questionnaires. Thus with the national publicity, support from the recipients' employers for the survey and simplifying the return of the questionnaire, all possible steps were taken to ensure a high response rate.

The other two surveys (flying-foxes and crocodile) were carried out differently. For the flying-fox advantage was taken of the annual meeting of the Cultural Centre field workers. This is held annually in Port Vila and is a gathering of men who are knowledgeable and interested in a great variety of subjects, particularly as they affect village and local cultures. The Environment Unit gave a talk on flying-foxes to the meeting, and requested the field workers to complete the questionnaire we had prepared. Thus the form was distributed to a small group of "captive" people, who nevertheless came from many parts of the country, and who were undoubtedly knowledgeable on the subject.

The crocodile questionnaire survey was conducted during a field trip to the one island in the country where a breeding population is known to occur. One of the objectives of the trip was to talk to the local villagers, and record their knowledge of the crocodile. In the limited time available it was not possible to talk to everyone in the area. Thus we distributed questionnaire forms, and thereby received information from more people than would otherwise

have been possible. Thus, again, the recipient audience was those people with a good local knowledge. In this case there would have been little point in a national survey as the crocodile occurs on only one island.

RESULTS AND DISCUSSION

Some of these surveys have been written up for publication, and a list of these is included below. Others are in the process of preparation. Thus it is not necessary here to analyse the results in detail, but the value of the methodology is discussed, and summaries of some of the results presented.

Dugong survey

Out of 331 questionnaire forms distributed, 102 replies (31 per cent) were returned. These replies contained good information on the distribution, abundance, methods of capture, rates of capture, subsistence importance and cultural significance (traditional beliefs, practices and stories, custom controls on exploitation) of the dugong. Virtually all of this information was unknown before the survey. This study highlighted the importance of a wide coverage, for a nationally distributed species as the dugong was found to have a significantly different importance amongst various local cultures. In most local societies the dugong is apparently not important, not hunted and has little cultural or traditional value. In a minority of local societies, however, it was hunted and of great cultural importance. The study also discovered areas in which the dugong is comparatively abundant, and thus which may in the future be considered as potential protected areas.

The postal survey was also complemented by an aerial survey of Vanuatu's coastline. This latter study was expensive. It provided no significant information that was not discovered in the postal survey. Thus more expense does not necessarily provide more or better results.

Flying-foxes

Out of 35 forms distributed to the Cultural Centre field workers, 28 (80 per cent) were returned by the end of their meeting. The results were fairly uniform for all the islands and local cultures represented in the replies. Thus one of the four species occurring in Vanuatu (*Pteropus tonganus*) is the commonest everywhere, just about everyone eats it, and it is an important animal in local diets. Despite this, numbers did not appear to be declining. The study revealed a number of interesting beliefs and stories about flying-foxes, and they are clearly animals of significant cultural importance, quite apart from their food value.

Crocodile

The estuarine crocodile (*Crocodylus porosus*) is an animal of international interest, and Vanuatu's population is the most easterly in the world. Earlier studies about 10 years ago had indicated that the one population in Vanuatu (on Vanua Lava island in the Banks Islands) had suffered a major decline in numbers following a severe cyclone in that area. Thus this present study was undertaken to assess the current status of the crocodile.

Out of 30 forms distributed to local villagers, 20 (67 per cent) were returned. These results complemented those obtained from discussions with villagers. It was clear that crocodile numbers had not increased since the earlier study, and in all probability had declined further. In fact, breeding ap-

pears to have stopped. The survey revealed interesting beliefs about how the crocodiles came to be on the island. Also discovered was the fact that hardly anybody wants the crocodiles on the island. The survey has thrown up a dilemma - the question of whether a species, unpopular on the island but of international interest and concern about its long-term survival, should have attempts made to conserve it. Our recommendations are that no such efforts be made.

Turtles

At least four species of turtle are known to occur in Vanuatu - the green turtle (*Chelonia mydas*), the loggerhead (*Caretta caretta*), the hawksbill (*Eretmochelys imbricata*) and the leatherback (*Dermochelys coriacea*). Other than this, very little is recorded.

This survey is still in progress, 301 questionnaires having been sent out in May 1989. At the time of writing 101 (34 per cent) have been returned. A full analysis has not yet been made, but some results are clear - all species nest widely throughout the country; the green and hawksbill turtles are the commonest; eggs and turtle meat are extensively eaten; eggs, meat and shells are sold; nesting numbers are small at most localities; in some areas comparatively large numbers nest; compared to nesting numbers, large numbers are killed annually; in most areas there are no custom controls on exploitation; turtles occupy an important place in local cultures as evidenced by beliefs and stories about them.

It is clear from the survey that turtles are heavily exploited in Vanuatu, and that existing laws designed to protect them are widely disregarded. Thus the survey has highlighted the need to devise proposals to conserve turtles in Vanuatu.

CONCLUSIONS

All the surveys have provided much information on species about which little local knowledge was previously recorded. This is important in that local knowledge is built up, scientific knowledge is increased and information is available for devising, where necessary, management policies to conserve these species. The alternative methods of providing comparable information (extended field surveys) are just not possible in Vanuatu or in many other Pacific countries either. It is unlikely that such surveys would in any case produce significantly more or better information, since just about all the information can best be collected by tapping local knowledge. Whether this is done by postal questionnaire or personal interview is probably immaterial.

Surveys of this nature can highlight areas of outstanding interest for follow-up surveys, perhaps by field visits. Thus areas in which, say, turtles or dugongs are particularly common, or conversely are in danger of extinction, can be more accurately assessed by a visit at an appropriate time. On the turtle form for example, some replies stated that "more than 100" turtles nest at a particular site. It would be valuable, certainly for national knowledge and perhaps for international too, to know if this was 110 turtles or 1000. It would also be useful to know which species nested in large numbers. It is possible that nesting beaches of international significance occur in Vanuatu, or elsewhere in the Pacific, that at the moment are unknown.

Questionnaire surveys are extremely cheap to carry out. The only direct costs involved are photocopying paper, envelopes and postage. In Vanuatu, the latter is free for official government mail, thus costing nothing in the surveys reported here. The cost per 100 postings (100 sheets of photocopy paper and

200 envelopes) was about US$ 12. Thus such surveys could easily be incorporated into normal office budgets. The enormous investment of money and time involved in conducting extensive field surveys would not justify the small (if any) improvement in the data collected.

Questionnaire surveys are also quick to carry out. The preparation and distribution of the questionnaires need only take a few days. In the dugong survey, virtually all replies were received within three months. Analysis and report writing can also be done quickly if other commitments allow. Thus within six months the whole project can be conceived, executed and analysed. Other types of survey, particularly if they are expensive and require overseas funding, may take years to complete.

There is no doubt that in Vanuatu the questionnaire surveys have been very effective, and have in fact exceeded our expectations. There is no reason why they cannot be equally effective elsewhere in the Pacific. However, by no means all species of fauna (or flora) are suitable for such a survey. Species so surveyed must be well known to the people asked to supply information. Little-known species could not be assessed in this way.

PUBLICATIONS ARISING FROM QUESTIONNAIRE SURVEYS IN VANUATU

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Chambers, M.R. and Bani, E. 1988. Custom, tradition and the dugong (Dugong dugon) in Vanuatu. Naika 19, 17-25.

Chambers, M.R. and Bani, E. In Press. The distribution and abundance of the dugong (Dugong dugon) in Vanuatu. Naika

Chambers, M.R., Bani, E. and Barker-Hudson, B.E.T. In Press. The status of the dugong (Dugong dugon) in Vanuatu. SPREP Topic Review No. 37. South Pacific Commission, Noumea, New Caledonia. 62 pp.

Chambers, M.R. and Bani, E. Submitted. Vanuatu - a safe haven for the dugong. The Pilot. (IUCN/UNEP Newsletter of the Marine Mammal Action Programme).

FLYING-FOXES

Chambers, M.R. and Esrom, D. 1989. The flying-foxes of Vanuatu, with notes on their social and cultural importance. Naika 30, 6-13.

Chambers, M.R. and Esrom, D. Submitted. The fruit bats of Vanuatu. Bat News.

CROCODILE

Chambers, M.R. and Esrom, D. In Press. A survey of the estuarine crocodiles (*Crocodylus porosus*) of Vanua Lava. Naika.

Chambers, M.R. and Esrom, D. Submitted. The status of the estuarine crocodile (Crocodylus porosus Schneider 1801) in Vanuatu. South Pacific Regional Environment Programme.

TURTLES

Several papers in preparation.

APPENDIX 1.

DUGONG SURVEY QUESTIONNAIRE FORM

The dugong is one of Vanuatu's most important and interesting animals but very little is known about it here. We would like your help in finding out about Vanuatu's dugongs. Can you please answer as many of these questions as possible? If you don't know the answer, a village elder or chief may be able to help.

1. Your name: 2. Your occupation:

3. Your address:

4. Name of island for which you are giving dugong information:

5. Village or part of island for which you are giving information:

6. When walking or boating in this area, do you see dugongs?
Nearly every time: Often: Sometimes: Never: (Please tick)

If dugongs are never seen in this area, this is useful information. Please return the form to let us know.
If you do see dugongs, please answer as many as possible of the following questions.

7. Are there now more dugongs, few dugongs or the same number as before?
More: Less: Same: (Please tick)

8. How many dugongs are there in the groups you see?
1: 2: 3 - 10: More than 10: (Please tick)

9. Do dugongs feed in this area? Yes: No: (Please tick)

10. Do dugongs live here all the year? Yes: No: (Please tick)

11. If only in some months, which ones? (Please tick)
Jan. Feb. Mar. Apr. May. June July Aug. Sep.
Oct. Nov. Dec.

12. Are dugongs hunted in this area? Yes: No: (Please tick)

13. Are dugongs hunted for other reasons besides food?
(Please give details)

14. Are there special occasions when a dugong is needed for a celebration?

15. How are dugongs killed?

16. About how many dugongs are killed in one year?

17. Have dugongs disappeared from any places that you know of?

18. Are you worried about dugongs in your area?

19. Are there any custom laws concerning hunting of dugongs? e.g. dugongs can only be hunted at special times or in certain places or by special people. Please give details if possible.

APPENDIX 2.

FLYING-FOX QUESTIONNAIRE FORM

Flying-foxes are common animals in Vanuatu. The Environment Unit wants your help to find out more about them. Please try to answer all questions on the form.

1. Your name: 2. Your village:

3. Your island:

4. Do flying-foxes live close to your village? Yes: No: (Please tick)

5. Do people kill flying-foxes in your area? Yes: No: (Please tick)

6. Are flying-foxes an important food item in your area? Yes: No: (Please tick)

7. How often do people eat flying-foxes in one month in your area?

8. How do people catch flying-foxes in your area?

9. Are the flying-foxes in your area more common, less common or the same as before: (Please tick)

   More common: Less common: Same:

10. Do the flying-foxes in your area: (Please tick)
    - live in large groups in caves?
    - live in large groups in trees?
    - live in small groups in trees?

11. In your area, which people eat flying-foxes? (Please tick)
    - Everybody:
    - Men only:
    - Women only:
    - Other (describe):

12. Do people in your area kill flying-foxes for food only or for other reasons? (describe):

13. Do people in your area eat flying-foxes: (Please tick)
    - at any time?
    - special occasions only? (describe)

14. Please give the local language names for the different types of flying-foxes in your area:

15. Can everyone in your area kill flying-foxes? If some people only, describe which:

16. Are there people in your area who lay down laws or rules about who may kill or eat flying-foxes? If yes, please give details:

17. Please give a traditional story about flying-foxes from your area:

APPENDIX 3.

CROCODILE SURVEY QUESTIONNAIRE FORM

The Environment Unit of the Ministry of Lands is making a study of the crocodile in Vanua Lava. There is not much known about the crocodile here so we are asking for your help. Please answer as many questions as you can - it does not matter if you can't answer all of them. Thank you.

1. Your name:

2. How did crocodiles first get to Vanua Lava?

3. Do the crocodiles attack people on Vanua Lava? (Please tick)
   Yes: No:

   If yes, give details:

4. Do the crocodiles here attack: (Please tick)
   Pigs? Cattle? Horses? Dogs? Goats? Other? (say which)

5. Do people on Vanua Lava attack crocodiles? Yes: No:
   If yes: How?
   Why?

6. Where have you seen crocodiles on Vanua Lava? Please mark on the map provided those places on land or sea where you have seen them.

7. Please mark on the map provided those places where you have seen crocodile nests.

8. How many crocodiles do you think there are on Vanua Lava? (Please tick)
   1 - 10:
   11 - 20:
   21 - 40:
   41 - 60:
   More than 60:

9. Compared to previous years, do you think crocodile numbers have now: (Please tick)
   increased?
   decreased?
   stayed the same?

10. Have you seen young crocodiles? (Please tick)
    Recently:
    Never:
    Not for a long time:

11. Do you like having crocodiles on Vanua Lava: (Please tick)
    Yes:
    No:
    Don't care:

12. Please say anything else that you want to about crocodiles on Vanua Lava:

APPENDIX 4.

TURTLE SURVEY QUESTIONNAIRE FORM

Turtles are common animals in Vanuatu. They are a food resource for some and therefore an important animal. It is useful to learn more about turtles, such as where they are found in the country. The Environment Unit is asking for your help in finding out more about turtles. Please try to answer all questions on the form.

1. Your name:

2. Your village:

3. Your island:

4. Name of the village closest to the beach where turtles lay eggs:

5. Which of the four (4) types of turtle do you have in your area? (Look at the pictures below): (Please tick)
   a) Green turtle: Plenty: Some: None:
   b) Hawksbill: Plenty: Some: None:
   c) Loggerhead: Plenty: Some: None:
   d) Leatherback: Plenty: Some: None:

6. Do people kill and eat turtles in your area? Yes: No: (Please tick)

7. Are turtles an important food source in your area? Yes: No: (Please tick)

8. Please say how turtles are captured in your area:

9. How do people use turtles in your area? (Please tick)
   Eat the meat: Sell the shell:
   Eat the eggs: Sell the eggs:
   Sell the meat: Other reasons (please describe):

10. Who is allowed to eat turtles in your area? (Please tick)
    Everybody: Women only:
    Men only: Other groups (please describe):

11. Is there a special time of the year when people kill turtles in your area? (Please tick)
    Any time:
    Special time (please describe)

12. During which months are there plenty of turtles in your area?

13. During which months do turtles come ashore to lay eggs?

14. How many turtles lay eggs in your area? (Please tick)
    1 - 20:
    21 - 100:
    More than 100:

15. How many turtles are killed in your area in one year: (Please tick)
    1 - 5
    6 - 10
    11 - 20
    More than 20:

APPENDIX 4. (continued)

16. Do you have any custom taboos to prevent men, women or children from killing turtles in your area. If yes, please describe:

17. Please tell a custom story about turtles in your area:

18. Please give your local language name for the following turtles:

Local name:	Local name:	Local name:	Local name:
			
	Hawksbill (English)	Green turtle (English)	Loggerhead (English)
Leatherback (English)	La tortue cailles (French)	La tortue verte (French)	Grosse Tte (French)
La tortue luth (French) Ridges down the back. Black.	Has a beak like the marsh harrier, owl or parrot.	Head smaller than logger-head.	Head larger than green turtle. Agressive.

Part 9

Marine Protected Areas and Resource Conservation

THEME PAPER: MARINE PROTECTED AREAS AND CONSERVATION OF MARINE RESOURCES: THE SOUTH PACIFIC SITUATION - STATUS AND STRATEGIES

Paul F. Holthus
Project Officer (Scientist)
South Pacific Regional Environment Programme (SPREP)
South Pacific Commission (SPC)
P.O. Box D5
NOUMEA CEDEX
New Caledonia

INTRODUCTION

In the Regional Ecosystems Survey of the South Pacific, Dahl (1980) lists 24 shallow coastal marine biomes/habitats and a further 12 deep offshore biomes/habitats (Table 1). Marine protected areas (MPAs) - either wholly marine areas or coastal areas which include adjacent waters and their habitats - have been established by about 12 SPREP Pacific Island member governments (UNEP/IUCN, 1986; UNEP/IUCN, 1988). Most of these were declared either during colonial or trusteeship periods or during the late 1970s and early 1980s. Until very recently there has been little continued progress towards increasing the amount of marine habitat protected. A general review of the MPAs in the South Pacific allows them to be organised into a number of loose categories, which provides a basis for analysing the current MPA situation and formulating options and strategies increased conservation of marine areas, habitats and resources.

MARINE PROTECTED AREAS IN THE PACIFIC REGION

1. Tourism/recreation oriented MPAs

(e.g. Palolo Deep, Western Samoa; Million Dollar Point Reserve, Vanuatu; War in the Pacific National Historic Park, Guam; Ha'atafu Beach Reserve, Tonga)

Characteristics: These are generally fairly small discrete areas, selected for a single major purpose - usually visitor recreation.

Pros: These areas are generally small and accessible,and therefore in theory easy to manage. They usually have a high profile and good public support, due to their heavy recreational use. Some are income-generating - either directly though user fees or through employment generated by associated visitor service industries.

Cons: The areas may have been selected solely on visitor-use criteria. Boundaries thus may be completely artificial, enclosing only small parts of ecosystems. They may be primarily managed for visitor purposes, and heavy use may result in degradation of the natural resources in the area.

2. General marine resource/habitat conservation areas near major population centres

(e.g. Matre and Amde Islets Nature Reserves, New Caledonia; Manuafe Island Park and Reef Reserve, Tonga; Pangaimotu Reef Reserve, Tonga)

Characteristics: These usually include entire reef areas surrounding islands which are subject to visitor use from nearby urban areas. Marine resources are theorically protected from harvest activities, although management may be lacking.

Pros: The marine areas are distinct, easily defined geographic entities (i.e. the whole reef surrounding an islet). Visitor groups generally support these MPAs due to their popularity. Their accessibility and discrete geographic limits should make management easier.

Cons: The heavy visitor use, especially boating, can result in significant damage to reefs, as can coral and shell collecting. Fishermen may not support or respect restrictions on the harvest of marine resources from reefs near urban areas where there is a lot of fishing pressure.

3. Outlying or uninhabited atolls or islands

(e.g. Suwarrow Atoll National Park, Cook Islands; Ngerukewid Islands Wildlife Preserve, Palau; Rose Atoll National Wildlife Refuge, American Samoa; Manuae (Scilly) Reserve, French Polynesia; W.A. Robinson Integral Reserve and Biosphere Reserve (Taiaro Atoll), French Polynesia.)

Characteristics: These encompass whole atolls, or island clusters, usually including the land area, lagoon and shallow reefs and sometimes the outer reef slope. They may be designed as comprehensive national parks (e.g. Suwarrow) or more specifically as wildlife refuges/reserves for all organisms (e.g. Ngerukewid, Taiaro, Manuae) or primarily for seabirds and turtles (e.g. Rose). A fairly high level of protection usually exists, on paper, for these areas.

Pros: These MPAs cover whole ecosystems in a discrete geographical unit which is well removed from potential habitat disturbance or degradation and resource depletion. Their isolation and uninhabited nature makes it less difficult to declare protected status over these areas.

Cons: Where there is no live-in management, these areas are subject to resource depletion or habitat degradation by those who can get there, while enforcement units generally cannot. They are often protected areas which are easily declared, but which have little relevance to the general population, and can be opposed by traditional marine resource users from neighbouring islands.

4. MPAs to protect harvested species

(e.g. Maza Wildlife Management Area, Papua New Guinea; Ranka (Long Island) Wildlife Management Area, Papua New Guinea; Ngerumekaol Channel, Palau; Trochus sanctuaries - Palau, Federated States of Micronesia, Cook Islands; Giant clam grow-out/spawning areas - Tonga, American Samoa; Great Reef Rotating Reserve, New Caledonia.)

Characteristics: These areas may be fairly small, discrete reef areas (e.g. Ngerumekaol Channel grouper spawning area, Tonga giant clam circle) or a series of moderate-size reef areas where a single species is protected (e.g. Trochus sanctuaries in Federated States of Micronesia and Palau). Clam grow-out areas may merely involve local community agreement to guard over brood stock which is provided and placed on reef areas controlled by local community user rights. In Papua New Guinea MPAs protect dugong (Maza WMA) and turtle

(Ranba WMA) for traditional harvest. To protect harvested reef organisms, particularly fish, New Caledonia established a rotating reserve of 3 large reef sections, with one section protected during each 3-year period.

Pros: Public support may be more readily obtained for MPAs to protect species of commercial or subsistence importance and species which are harvested outside the areas and/or seasons in which they are protected. This 'single-sector' type of protection is usually less complicated to legislate for and manage, as there less likely to be restrictions on other users, and consequently fewer conflicts in resource use.

Cons: The protection of preferred species may lead to poaching activities within the MPA. Enforcement may be difficult as access to harvest other species is not controlled. The extremely limited scope of protection (i.e. a single species) ignores the need to protect from degradation the habitat which supports that species.

5. Fully developed MPA's

(e.g. Fagatele Bay National Marine Sanctuary, American Samoa)

Characteristics: A fully developed MPA, such as Fagatele Bay NMS, has a high level of legal protection, and has as its goals the protection and preservation of marine resources and habitats and the development of public awareness and understanding and scientific knowledge of marine ecosystems. Uses compatible with these goals are allowed under a fully developed management plan which is backed by adequate financial and personnel resources.

Pros: The areas may be selected for their appropriateness as a fully developed MPA, i.e. as representative or unique marine habitats with consequent value for educational and or scientific purposes. A fully developed MPA may serve as a 'flag ship', and help generate the interest and enthusiasm to establish other MPAs of various sorts.

Cons: The establishment of a fully developed MPA is a very long process which may tie up time and energy in establishing a single well-protected site, while other marine areas go without less thorough forms of conservation.

STRATEGIES FOR MPA DEVELOPMENT IN THE SOUTH PACIFIC

In general, MPAs are established and managed to safeguard:

"The continued welfare of local people and communities dependent on the sustainable use of productive marine ecosystems, and the economic and social benefits of the coastal and marine environment to the surrounding region;

Representative examples of coastal and marine systems and habitats of a region, to ensure their long-term viability and to maintain genetic diversity;

Areas having special importance by reason of their economic, scientific, aesthetic, recreational, cultural, archaeological, or educational values or purposes; and

Endangered and threatened species and populations of flora and fauna including habitats considered critical to the survival of such species and populations" (Foster and Lemay, 1989).

Based on the above analysis of Pacific Region MPAs and related developments regarding international environmental management and conservation (e.g. biodiversity programmes, global climatic change), a variety of strategies are proposed for actively pursuing marine conservation through MPA development in the Pacific.

1. Strengthen existing MPAs

It is important to make the best use of MPAs that have already been declared or designated, and to consolidate their position. This may initially mean pursuing a stronger, more sure legislative mandate. Many existing MPAs lack effective management. However, before management plans can be developed, resource and resource-use surveys, designed to more precisely establish the flora and fauna, other natural features, cultural, historic or archaeological resources, and traditional and modern resource uses occurring in the area, may be required. In addition to dealing with natural-resource conservation, management plans should also give adequate attention to educational and enforcement programmes. A simple strategy for the Pacific Region would thus be to ensure that all existing MPAs have adequate legal status and effective management.

2. Build on concepts and areas established to protect harvested species

The establishment of marine areas as sanctuaries for trochus, dugongs, turtles, clam brood stock or fish spawning, to enable those species to be harvested outside the areas and/or time periods they are protected, can serve both marine-resource development and marine resource conservation goals. Where these sanctuaries already exist, the public, particularly resource-user groups, have accepted the concept that for a specific area it is off-limits to harvest the specified resource that is otherwise common property. It may be possible to build on the public acceptance of this form of resource control and on the single-species nature of the sanctuary as it becomes clear that other important stocks are threatened. For example, the concept of trochus sanctuaries may be able to be expanded to also protect giant clams and lobster from harvest. Later, overfished species of reef fish and then all marine species might be able to be added to the organisms under protection, thus establishing more complete marine-life conservation in an area that originally only protected one species.

In a similar fashion, seasonal closures of reef areas for fish-spawning aggregations may be able to be extended to control all fishing for the entire year in the limited area that is already protected. More recently, giant-clam brood stock have been placed on reefs, and given a high level of surveillance and enforcement support to protect the clams. Where feasible, site selection should involve considerations of conservation potential beyond mere suitability for clams and convenience for surveillance. Existing MPAs should be considered as possible sites for installing giant-clam brood stock, as the clams will increase the MPA's potential for active management by marine resources departments or local villages with a vested interest in protecting the clams in situ.

3. MPA's as fisheries management and fisheries management as marine resource conservation

Personnel responsible for protected-area development in the South Pacific need to work closely with those responsible for marine resource development. In particular, MPAs should be promoted as a fisheries-management tool which could provide 'seed areas' allowing larvae and juveniles to be exported to adjacent

areas where the species can be harvested in greater quantity than if no protected area existed. Scientific evidence supporting this function of MPAs, such as the results from Sumilon Island in the Philippines and the current SPREP project with ICLARM in the Solomon Islands, must be brought to the attention of fisheries-development officials.

On the other hand, conservation personnel should work with marine resource management officials in developing and supporting fisheries management techniques, such as minimum size limits, catch quotas, seasonal closures, gear restrictions, limited-entry systems and market-control systems, which are designed to conserve marine resources. Conservation and fisheries officials should collaborate closely on management activities, especially in enforcing existing regulations against destructive fishing practices (dynamite, poison), and protecting endangered species (dugongs, marine turtles) both within and outside MPAs.

4. Exploit tourist industry interest in MPAs

MPA development is often expounded as important for tourist development, although the direct links between MPA establishment and tourist use have rarely been pursued in the Pacific. However, with increasing frequency visitor industries (hotels, and diving and glass-bottom boat tour operators) are approaching local or national governments with requests to protect specific sites for their tourist value. This economic interest in establishing MPAs should be exploited as a means not only of increasing pressure for the establishment of protected areas, but also as a source of income for MPA management and/or to compensate for lost resource use by local inhabitants. Income generation from user fees, whether via the tour operator, direct entrance fees or other means, should be a part of the 'deal' when governments work with tourist operators to establish MPAs to protect assets which serve the latter.

5. Promote development of MPAs to protect rare and endangered species

International assistance in surveying, establishing and managing MPAs may be more forthcoming if the protected areas are important for the conservation of globally rare and endangered species. In the Pacific areas that are important as dugong, marine turtle or cetacean habitat are often supported by international conservation organisations, as well as serving national and local conservation interests and needs.

6. Develop MPAs within coastal management plans

If coastal management planning is being pursued in a particular country, MPAs should be stressed as an integral part of such planning. Indeed, MPAs are often the aspect of a coastal management plan which is best understood and accepted by the public, though in fact, they are merely one type of coastal marine 'zone' in a coastal management plan. Within that broad context, the natural functions and processes of MPAs can be promoted beyond their strict conservation value as being critical to other aspects of the plan. For example, a protected mangrove area serves to buffer marine systems from land-use changes which generate increased sediment discharges; a protected coral reef can also be promoted for its value as a natural breakwater protecting coastal villages from erosion. Coastal- management planning is also critical, in order to ensure that MPAs are developed in a context that protects them from degradation originating off- site.

7. MPAs as a response to the Greenhouse Effect

Global warming, due to increased amounts of greenhouse gases in the atmosphere, is causing elevated ocean temperatures and a rise in the sea level. Although there will continue to be debate over the timing and rate of change, it appears that tropical coastal ecosystems, particularly coral reef and mangrove systems, may be able to adapt to the changes predicted in low-to moderate-change scenarios. It is thus critical to maintain optimum natural conditions for coral reef and mangrove systems to allow them to adapt to human-induced changes as best they are able. In other words, vigorous development of MPAs to protect coastal ecosystems and natural processes should be a high priority and key element in Pacific Island programmes, to respond to climatic change and sea-level rise. There is increasing concensus that industrialised nations will have to support small island nations in dealing with this global environmental problem to which they did not contribute, but from which they are destined to suffer severely. The development of MPAs could, and should, receive a substantial boost from this situation.

8. Coastal marine resource ownership and MPA development

Coastal marine resources are 'owned' under a variety of systems, which might crudely be lumped into either traditional or public ownership systems. Both systems have advantages which can be used to increase protection of marine resources and habitats.

Traditional ownership (i.e. reef tenure, fishery-user rights) are becoming better documented in a number of Pacific Island areas, although there is much work to be done. Where feasible, traditional systems should be adapted to address and support modern resource-conservation needs and practices. This can be a complicated, drawn-out process, as it is on land, but is potentially very rewarding. Lessons learned from the successes and failures in adapting customary ownership on land should be used, whenever appropriate, for analagous marine situations.

Western modes of public ownership (i.e. government control) of 'submerged' or 'subtidal' lands are firmly established in many Pacific Island countries. These may have replaced effective traditional resource-management practices, and opened up shallow marine resources to exploitation as commonly owned property. However, if the public and government support the development of an MPA, or other marine resource conservation measures, public ownership can facilitate and simplify their establishment through governmental mechanisms.

9. Biodiversity and MPAs

The interest in biodiversity in the Pacific has been almost wholly directed towards terrestrial organisms due to the high degree of endemism occurring in the Pacific. In contrast, most coastal marine communities exhibit decreasing diversity from west to east across the Pacific as subsets of the centre of Indo-Pacific diversity in South-East Asia. Nonetheless, the degradation of coastal habitats and depletion of certain species make loss of biological diversity an issue of importance even at the level of individual islands or countries. Thus, efforts should be made to expand the international interest in preserving biological diversity so as to include the protection of native communities - without taking away from the important terrestrial task in the Pacific.

CONCLUSIONS

A variety of options exist for pursuing the development of marine conservation through MPAs. The best case for establishing any particular marine-conservation initiative is most likely that which can combine the greatest number of strategies. We should thus be seeking to integrate the interests, abilities and needs of international conservation efforts and agencies, fishermen, local resource owners and users, fisheries development officers, the tourist industry and others under the umbrella of coastal-management planning and in a context of global change designed to actively conserve marine resources and habitats.

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Table 1. Coastal and Offshore Marine Habitats/Biomes of the South Pacific Region (adapted from Dahl, 1980)

Shallow Coastal Marine Habitats/Biomes	Deep Offshore Marine Habitats/Biomes
Mangrove forest	Offshore terrace
Tidal saltmarsh	Offshore slope
Algal bed	Continental shelf
Sea grass bed	Submarine canyon
Animals in sediments	Continental slope
Algal reef	Abyssal plain
Windward atoll reef	Submarine trench
Leeward atoll reef	Submarine ridge
Barrier reef	Seamount
Fringing reef	Inshore circulation cell
Lagoon reef	Larger circulation cell
Non-growing reef	Upwelling system
Submerged reef	
Rocky coast	
Beach	
Saline lagoon	
Open lagoon	
Closed lagoon	
Dilute lagoon	
Brackish lagoon	
Freshwater lagoon	
Estuary	
Marine lake	
Marine cave	

CASE STUDY: CONSERVATION AND DEVELOPMENT THROUGH COASTAL MANAGEMENT AND PLANNING IN THE PACIFIC

Paul F. Holthus
Project Officer (Scientist)
South Pacific Regional Environment Programme (SPREP)
South Pacific Commission (CPS)
P.O. Box D5
NOUMEA CEDEX
New Caledonia

INTRODUCTION

Most islands of the Pacific can be considered entirely coastal in character. That is, the entire island influences, or is influenced by, processes and activities occurring on its coastal lands and in its nearshore waters. Economic development increasingly results in land-use changes and projects which have severe adverse effects on the ecosystems of coastal lands and nearshore waters important for their subsistence and commercial resources, natural values and species assemblages. Much of the destruction, degradation or depletion of these resources can be avoided or mitigated through coastal management and planning (also known as coastal zone management, coastal resources management, or coastal area management).

Coastal management and planning involves a comprehensive, multi-sectoral, integrated approach to the use of coastal resources. A complete coastal-management programme can take many years of development before it is in place and effective. In working towards this goal, a strategy for resource conservation and sustainable develoment on small islands in the Pacific could focus on three areas:

A. Addressing Immediate Coastal Management and Planning Priorities - developing discrete components of a coastal programme to address immediate achievable concerns.
B. Developing Integrated Coastal Management and Planning - instituting mechanisms for multi-sectoral integration of development planning and resource management on a scale appropriate to existing needs.
C. Developing Coastal Management and Planning Foundations - creating the policy, legislation, administrative/institutional arrangements, information base and education/awareness/training programmes required as an underlying fabric for coastal management and planning.

A. IMMEDIATE COASTAL MANAGEMENT AND PLANNING PRIORITIES

1. Development and implementation of coastal-water-quality monitoring programmes, analysis capabilities and control measures

Waters surrounding most Pacific island urban centres and industrial areas are often moderately to highly polluted by organic pollutants, pesticides and/or heavy metals. Although these waters are used for recreation by residents and tourists, and may support subsistence and local commercial harvesting of fish and shellfish and contain valuable habitat and species, few islands have sampling programmes and analytical capabilities allowing them to consistently monitor water quality and inform users or resource managers of unhealthy or degraded conditions. A top priority for Pacific island coastal management is the establishment

of water-quality monitoring programmes in known problem areas and the expansion of such programmes to all major coastal-water-use areas. However, it is not enough to identify polluted areas, and monitor trends. Pollution sources must be identified, and control measures implemented at the source and monitored to ensure compliance and effectiveness.

2. Development and implementation of EIA legislation, policy and capabilities

Environmental impact assessment (EIA) evaluates the potential impact of a development activity, and considers alternative approaches and sites. If properly implemented, EIA alone can go a long way towards avoiding and mitigating ecosystem and resource degradation. Development of EIA legislation, policy and capabilities should thus be a high priority for island states. However, conducting a superficial or after-the-fact EIA only serves to falsely legitimise development activities whose environmental effects have not been considered. But when included as a part of overall coastal management and planning, EIA can be used to evaluate individual development projects within a context of comprehensive, integrated planning which has already indicated appropriate areas and control measures for various types of development.

3. Development of contingency plans for marine pollution emergencies

Most Pacific island states are not on major oil or chemical tanker routes. However, traffic in hydrocarbon fuels and packaged chemicals within the Pacific, not to mention the bunker fuels carried by all ships for their own operation, pose a significant threat of marine pollution. Following training for oil-spill response and contingency planning conducted through SPREP by the International Maritime Organisation (IMO) and the Australia Department of Transport, more countries are developing contingency plans for marine pollution emergencies. However, all Pacific countries and territories should develop, adopt and periodically test and update thorough marine-pollution-emergency response plans covering both oil and chemical pollution emergencies and including oil sensitivity maps. Pacific Island States should participate fully in the finalisation, adoption and periodic testing of the Pacific Regional Pollution Emergency Response Plan which has been developed by IMO and SPREP.

4. Establishment of marine protected areas

Marine habitats on many Pacific islands are being seriously degraded and/or their resources depleted. Wherever possible, marine protected area should be established to protect: species important for commercial or subsistence harvest; habitats of critical value for these, or endangered, species; habitats important for natural functions (e.g. sediment-trapping mangroves, fish-spawning grounds in reefs); areas of commercial value for tourism use, etc. In other words, any initiative or incentive to establish some level of protection over marine areas should be pursued. The types of locations and levels of protection can later be integrated into the broad coastal management and planning context.

B. DEVELOPMENT OF INTEGRATED COASTAL MANAGEMENT AND PLANNING

5. Multi-sectoral planning for priority coastal areas or topics

Coastal areas where major development activities are occurring or are proposed often already need coastal management to avoid or reduce environmental degradation and conflicts in resource use. Inter-agency task teams or review processes should be set up to develop integrated management plans for these areas, (e.g. industry/port complexes, heavy tourist-use areas, urban shorelines), and to consider the needs and constraints of all involved, including commercial and public interest groups. Similarly, certain types of coastal activities may require management planning before cumulative effects become too great. For example, a long-term reef-dredging management plan for a particular island could cover extraction of reef materials, maximising the use of existing sites and regulating the uncontrolled opening of new sites. Other such activities include resort development and road construction. Specific examples of multi-sectoral management and planning could serve as pilot projects, showing the usefulness and methods of integrated coastal management and planning.

6. Large scale planning

With an adequate information base, it is possible to broadly indicate appropriate use categories for coastal lands and nearshore waters. The categories can include: 1) areas dedicated to predominately single-sector, development-oriented use; 2) multiple-use areas for sustainable-resource uses which are compatible, but which often need some controls; 3) areas for the conservation of natural resources, which can include subsistence-resource use; and 4) core areas for the preservation of natural systems and processes. On land, the basic principles and methods of land-use planning can be used to accomplish large-scale planning. However, this assumes that the government can stipulate to some degree the conditions of non-government land use, an ability which usually does not exist where most land is held by customary land-owner groups. Shoreline areas and nearshore waters, usually including subtidal or 'submerged' land such as mangrove forests and coral reefs, are more often officially controlled by governments. Large-scale zoning may be more feasible in these areas, although some islands have traditional reef or mangrove tenure and fishing rights which must be incorporated into any modern management scenario.

C. DEVELOPMENT OF COASTAL MANAGEMENT AND PLANNING FOUNDATIONS

7. Assembling an information base

In many areas there is little information available which provides a systematic overview of: 1) the species, habitats, ecosystems and resources occurring on coastal lands and in nearshore waters, 2) the existing and potential uses of the resources and 3) the causes of resource degradation to the resources. Ideally, information should be available for the whole country. However, it is costly and difficult to undertake major field surveys. Information-gathering activities should thus target areas where resource depletion, degradation or conflicts in resource use already exist.

The first requirement is an understanding of the distribution and abundance of resources in the coastal environment. This would include major coastal ecosystems and habitats, including physical features and biological communities, as well as cultural and social resources such as archeological sites and recreational areas. Much of this can be accomplished by broad-brush, semi-quantitative field surveys, the results of which can be extrapolated through air photo interpretation or satellite-image analysis. In-depth biological inventories are usually not necessary at this stage, but may be required later to provide details on the distribution and abundance of rare or endangered species or habitats. Survey methods should also include interview surveys with resource users, e.g. older fishermen, who can provide information on long-term trends, seasonal variations, local natural processes and special aspects which are missed by surveys.

Second, information gathering by interview can enable identification of existing and potential coastal resource uses. Older, expert resource users are a valuable source of data on location, timing, methods and trends of resource harvest or other use activities in coastal areas. Government agencies with a mandate for developing, promoting, managing or conserving resources found in coastal areas should also be contacted to determine their current and planned activities with regard to these resources. Information on the activities of commercial enterprises operating in coastal areas or utilising coastal resources (e.g. hotels, sand mining companies, dive-tour operators) should also be gathered.

The third essential element is information on the sources and types of pollutants, and on activities which are depleting or degrading the coastal species and habitats. Much of this can be determined during the interviews with resource users, and may be elaborated upon through a pollution sources survey.

To be useful, all the above information must be as geographically specific as possible. In other words, determining the location of species, habitats or resources, and their uses and threats, is critical. The information can then be portrayed on maps, air photos, overlays or in atlases, which are an essential tool for coastal management and planning.

8. Education and awareness raising programmes and materials

The long-term success of coastal management and planning depends upon the public and the decision makers being aware of the coastal ecosystems, their resources, uses, as well as of the effects of modern development activities on them. A programme to develop educational materials for schools and the public, radio announcements, curriculum development and awareness-raising seminars for public officials is essential. Governments should take advantage of materials developed by international and regional agencies such as SPREP, and should assist development of these materials by suggesting what is needed, and pursuing translation of these materials into vernacular languages. Awareness-raising seminars and the mass media should be used to inform both the public and decision-makers of the need for coastal management and planning. Seminars may be best used to primarily address specific components of a coastal management and planning programme, such as marine protected areas, but they should also stress the comprehensive, integrated aspect of coastal management and planning.

9. **Development of legislation, policy and administrative/institutional arrangements for coastal management and planning**

A variety of mechanisms exist for establishing coastal management and planning programmes. Some components of a coastal programme can be developed separately through specific legislation and programme development, (e.g. EIA). Other aspects can be instituted through specific actions (e.g. establishment of multi-sector management planning task teams for problem areas). However, the overall concept and structure of a coastal management and planning programme needs to be promulgated through high level policy and national legislation if it is to be comprehensive and effective. This may be accomplished by amending or revising existing legislation.

Administrative arrangements and institutional responsibilities must be clearly spelt out. In particular, an appropriate lead agency needs to be designated. The process whereby various agencies interact, proposed development projects and management activities are reviewed and the private and public sector are involved needs to be thoroughly considered. Public participation in the process is critical. However, the cultural and political context of many Pacific island countries may require creative adaptation of the participation process to ensure that it is effective.

10. **Formal education and in-service training**

Training in various aspects of coastal planning and management should be made available for appropriate government agency officials, planners, resource managers and scientists. In the Pacific, SPREP provides a two-week, in-country training course for mid-level officials upon request by countries as well as training in EIA and, with IMO and Australia, training in oil spill response and contingency planning. There are few long-term, formal education opportunities in coastal management and planning. However, individual study programmes at universities in and around the Pacific Basin can be adapted to provide a multi-disciplinary resource management outlook.

CONCLUSION

There is among the Pacific island states tremendous variation in cultural, political and economic development and in environmental awareness. Effective promotion of resource conservation and sustainable development will require a coastal management and planning programme that is in each case adapted to the local context. In addition such a programme must now take into account the changing conditions resulting from global warming and sea-level rise.

INFORMATION PAPER: MARINE PARKS IN QUEENSLAND AND THE GREAT BARRIER REEF

Peter Hunnam
Department of Environment
and Conservation
CAIRNS
Queensland, Australia

The Great Barrier Reef Marine Park management model

Over the past decade an extensive scheme has been developed to improve the conservation of the marine resources of the Great Barrier Reef and Queensland. A large proportion of the state's coastal zone and the whole of the Great Barrier Reef are now managed as marine parks.

Management of these parks recognises the inter-connected and fluid nature of marine environments, and the inter-relationships between Man's many marine activities. The management approach is holistic, emphasising integrated management and planning.

- An expanse of sea is designated in its entirety; influences from areas adjacent to the marine park are considered.
- A framework of management which can draw together all interests is superimposed as an umbrella or a network upon existing mechanisms.
- Extensive consultation takes place with all sectors of the relevant communities to identify issues and determine objectives and standards.
- A system of complementary zones is used to control partially the extent of extractive uses, and to accommodate, in very broad categories, the wide range of potentially-conflicting uses.
- Management decisions are made after considering current and likely future demands made by all users upon the whole resource.

These marine parks are multiple-use, marine resource management schemes. Their underlying purpose is to protect the natural ecology, but this goal is pursued by controlling human influences.

Control mechanisms derive from the legislation of the Australian and Queensland Governments - Acts of Parliament and their regulations, zoning plans, and management plans for specific sites, resources or activities.

In these parks, all sorts of different uses are accommodated, as indicated in Table 1. Particular activities may be allowed, either throughout most of the park, or only in certain areas; many require individual permits, which have specific conditions attached.

The multiple-use approach requires management to be broadly-focussed, enquiring and innovative. The manager has to decide the types and extent of uses which are appropriate in an area, and precisely what restrictions should be applied. Each use's potential impact on elements of the area's ecology and on other users needs to be taken into consideration. Information is needed at all levels to guide management.

The fundamental criterion is to allow only <u>reasonable</u> uses of the marine park's resources.

How a manager is to judge requests for access and use as reasonable or unreasonable is defined in the various tiers of legislation - very broadly in the Act and regulations, and more precisely in zoning plans and management plans.

Marine Park operations

The marine parks of Queensland and the Great Barrier Reef are grouped in major geographical sections, within which groups of staff focus upon the ways in which the resources are used by Man - for tourism, fishing, traditional use, shipping and recreation. Management is organised as a cyclical process, integrating the functions of research, planning, implementation and monitoring:

- identify issues (surveillance, analysis)
- collect relevant information (research)
- formulate recommendations (planning, design)
- implement management actions
- monitor outcomes and outstanding issues

Management actions

1. Communication between park users and managers is a crucial component of marine-park management. There is substantial emphasis upon making people aware of the constraints in force and opportunities available, and of the general marine-park philosophy.

   - Through consultative groups, direct liaison and an extension programme, user groups and individuals are involved at all levels of management decision-making.

   - Orientation and interpretation facilities provided to park users include maps, signage, brochures, videos, display centres and on-park guidance.

2. A permit system has been developed to provide a mechanism for controlling and guiding specific uses.

   - A permit deals specifically with an individual activity, while allowing managers some discretion.

   - The permit management process provides managers with the opportunity for substantial contact with some of the most significant users of the marine park.

3. While there is an emphasis upon achieving cooperation between management and use, enforcement actions deal with deliberate and persistent offenders.

4. Management addressed directly at marine sites, habitats or biota is limited to certain types of actions.

   - A major programme of installing permanent moorings is being undertaken, to reduce seabed damage from anchors and to delineate separate operations.

   - It is occasionally necessary for pollutants to be cleaned up, for wrecks to be removed, and unexploded ordnance, usually mines, to be removed or detonated.

- Major outbreaks of crown-of-thorns starfish may be tackled at individual reefs which are popular recreation sites.

The Future

Management means steering a course for the future. For the Great Barrier Reef and the coastal zone of Queensland, the future may be influenced substantially by three inter-related issues, concerned broadly with a) the risks of multiple use; b) the impact of external influences; c) the allocation of resources to users.

Multiple-risk parks

Accommodating multiple uses within a conservation area means accepting the risk of damage. An obvious example is the major shipping channel running through the Great Barrier Reef Marine Park. Activities which are otherwise acceptable often have unanticipated and unfavourable effects. Boats visiting reef sites have accidents, spill fuel, run aground.

Virtually nothing is known about possible synergistic effects of minor influences operating concurrently on reef ecosystems, for instance, the regular combination of reef fishing, fuel-oil spillage and toxic antifouling.

As mentioned above, multiple-use management schemes require good information. In tropical marine environments, where we know so little, it is wise to be cautious.

External influences

The Great Barrier Reef is a strip of sea off the Queensland coast. It is linked to the rest of the world by movements of air and water, which carry substances - dissolved and suspended, inorganic and organic, living and dead. Man's activities outside the marine parks are altering these transport processes: land is cleared and farmed, and plumes of fertiliser and silt head downriver and out to sea; towns expand, and sewage and industrial pollutants move offshore.

These are large-scale but insidious influences. It is rare for specific impacts on natural marine processes to be pinpointed until substantial damage is done. Management needs to be able to detect sub-lethal effects in an ecosystem which is complex and naturally dynamic. There is a major challenge for marine ecological monitoring to implement techniques which are sufficiently subtle to provide early warning of damage.

Resource allocation

Park management allocates resources to uses. This might be in terms of reef site access to line fishermen or tourist operations; of seagrass beds to dugong hunters or as prawn nursery grounds; or of sheltered waters to mariculture or shipping.

With a total area of around 350,000 square kilometres and a total of nearly 3000 reefs in the Great Barrier Reef, problems of resource allocation to date have been limited to a few cases of incompatible activities at single sites.

But demands for access and use are increasing. Reef tourism in particular has grown, with some areas having experienced over 20 per cent growth each year for the past 3-4 years. While there is some scope for making users more resource-efficient, for example by "time-partitioning", in these areas there is already serious competition between tourist operators for access to the best reef sites, and there is increasing conflict also between tourism and other uses such as fishing.

The question of how these finite resources should be allocated will become increasingly critical as demand increases. Given multiple uses of the same resource, how much of each demand should be met? What limits to growth should be specified for Reef tourism, mariculture or fishing? What proportion of the Reef should be set aside for preservation?

In the Great Barrier Reef Marine Park and Queensland Marine Parks, answers to these questions of resource allocation are determined partially through the preparation and periodic review of zoning plans and of site-management plans. Through the imperfect process of "public participation" in planning, it is the community, armed with knowledge and attitudes, which influences these judgements. Ultimately, it is the politicians and their management advisors, in consultation with interested sectors of the relevant communities, who define what is "reasonable", and thus determine the future of the Great Barrier Reef.

TABLE 1.

Activities in Marine Parks

YES

Access to safeguard human life, a vessel or the environment
Salvage a wreck

YES, SUBJECT TO CERTAIN CONDITIONS

In most Zones
Access for recreation
Operate a boat (<500 tonnes) or a plane above 500 feet ASL
Construct navigational aids

In some Zones
Trawl
Net fish (purse seine, beach, cast, dip)
Line fish
Trap crabs
Operate a ship (>500 tonnes)

In most Zones, with individual permission
Discharge waste or feed fish
Spear dugong and turtles
Collect aquarium fish
Collect corals, shells and other invertebrates
Culture pearls, clams, fish species
Install offshore structures (mariculture, tourism)
Install moorings
Operate an aircraft below 500 feet ASL
Operate a hovercraft
Run a tourist programme

NO

Litter
Spearfish using SCUBA or a power-head (except for self-protection)
Mine or drill for minerals
Take certain named species, or large specimens of some species

INFORMATION PAPER: THE DARU TURTLE FISHERY

Donna Kwan
James Cook University
TOWNSVILLE
Australia

The island of Daru is located at the northern end of the Great Barrier Reef (GBR) which terminates in the Warrior Reef Complex. The population of Daru is approximately 8900. The situation there is typical of other provincial capitals and major centres in PNG with rapidly increasing populations due to high birth rates and urban drift. Most of the people come from coastal areas of the mainland and are known collectively as the Kiwais. The remainder of people come from inland areas of the Western Province or other parts of PNG.

A vast majority of the population in the Daru area sustains itself from fishing activities. This includes the commercial barramundi (*Lates calcarifer*) and lobster (*Panularis ornatus*) fisheries which were established in the 1970s. Artisanal fisheries for dugongs and turtles also developed at this time and supplied local demand for fresh meat. Unfortunately, the dugong fishery only lasted some 10 years until existing legislation banning the sale of dugong meat was enforced in 1.84, as a result of mounting evidence that the population was being over-exploited. The turtle fishery continued in the absence of corresponding evidence.

Some of the largest populations of sea turtles reside and/or breed in the Australia-PNG area. Raine island on the GBR is noted as one of the largest remaining green-turtle rookeries in the world. With the exception of South-East Asia, the Daru fishery is the only turtle fishery with intensive levels of harvesting in the Indo-Pacific region. Recently, increasing national and international concern over the harvest levels in Daru of one of the largest remaining green-turtle populations intensified as it became evident that some components of the population are also widely distributed in Indonesia where the annual harvest may be in the tens of thousands. Consequently, in the late 1970s market surveys were set up (by Sylvia Spring) to monitor the turtle catches in Port Moresby and Daru. These were later terminated. Renewed concern over the harvest levels led to the establishment of the Torres Strait Turtle Project which was to monitor the turtle fishery in Daru with the long-term aim of formulating an appropriate management strategy.

The Daru turtle fishery operates seven days a week. Turtle catches are very variable due to factors such as local turtle abundance, demand for turtle meat, climatic conditions and alternative fisheries (e.g. lobster and barramundi). The sporadic nature of the Daru turtle fishery, the multiple landing points and the lack of trained technical staff limited sampling and data collection to interviews conducted by DFMR staff with fishermen when they were seen with turtles on the waterfront. Turtles were generally brought into Daru on the morning the meat was to be sold. The butchering site was specific to the village of origin of the fishermen. Catch statistics, biological and socio-economic data were collected during each interview.

Although turtles are caught throughout the year, most Daru fishermen hunt turtles only opportunistically for most of the year. Most fisherman originated from coastal villages near Daru or other inland areas but lived in Daru. Fishermen from two village groups are traditional turtle hunters: Parama-Kadawa-Katatai and Tureture-Mabaduan-Old Mawata. Increasing numbers of fishermen, most of whom originate from areas with no previous history of turtle hunting, have learnt turtle-hunting techniques from traditional turtle

fishermen and become involved in the fishery. These non-traditional turtle fishermen have become increasingly important in terms of the proportion of their catch during 1985-1987.

Generally, turtles were hunted by modified traditional methods. For example, the traditional wooden spear-tip was replaced with steel in harpoons which were used by the majority of fishermen. More significantly, increasing affluence, largely due to profits from lobster fishing, has enabled fishermen to purchase more outboard motors. The subsequent modernisation of the traditional sailing canoe has increased the fishermen's efficiency and presumably their catch of turtles.

Turtle fishing was mostly concentrated on four major reefs during 1985 - 1987. Aumaza and Wapa are traditional common fishing grounds which are part of the Warrior Reef complex. Podomaza and Bobo are traditional fishing grounds which belong to the Parama-Kadawa-Katatai village groups. The traditional reef ownership system appeared to be largely intact on Podomaza (adjacent to Parama village) but not on Bobo (more accessible to Daru). There are signs that it may continue to erode as hunting pressure and competition for increased turtle catches intensify.

Tag returns have shown that a large proportion of the Raine Island breeding population is being harvested from the Warrior Reef area. In 1980 Limpus estimated that in the order of 10 000 turtles are harvested annually from the Torres Strait region. Based on an estimate of 0.13 turtles per person per year for the Daru area and 1.0 turtle per person per year for Torres Strait Islanders, I estimate in the order of 5100 - 6700 are taken annually.

Between 953 - 1363 turtles were estimated to be landed in Daru each year in 1985-1987. It is believed that the Daru harvest is taken from at least three discrete stocks: one which is resident in the area, one which migrates from elsewhere to nest in the area, and another which migrates through the area to breed on other rookeries in the Great Barrier Reef. Large-sized female green turtles dominated the annual catches. These were mostly taken during the breeding season September - January. The selective harvesting of breeding females which occurs in some parts of Torres Straits may also be practised by some Daru fishermen. However, in general, all turtles captured were kept by fishermen from Daru. It is apparent that a large proportion of the breeding population (of major rookeries such as Raine Island) is being removed each year. How serious such a harvest rate is to the breeding population cannot be answered without much more research.

Fortunately, there have been no critical conservation problems identified in the Australian-PNG sea turtle populations. In Queensland indigenous people living on reserves are able to hunt turtles for subsistence purposes. In PNG, only the leatherback, *Dermochelys imbricata* is totally protected but all other sea-turtle species receive limited protection in Wildlife Management Areas where they can only be taken for subsistence.

There have been a number of trends apparent in the Daru turtle fishery which may have important management implications. These included: (1) the increasing number of fishermen (especially those with no traditional experience in hunting turtles), (2) the modernisation of traditional hunting methods, particularly the use of the motorised canoe, and (3) the apparent break-down of traditional conservation practices such as the reef/ownership system. Of more particular concern was (1) the dominance of large females, most of which were presumably sexually mature and (2) the fact that at least part of the catch is being taken from the Raine Island breeding population, whose international significance requires special attention. However, it was not considered appropriate to impose constraints on the turtle catch as there is no hard evidence that the catch was seriously affecting the resource.

However, given the long period required to impose any biologically sound management strategy and the special considerations for the nutritional, cultural and socio-economic needs of the community, it was recommended that the turtle catches be centralised with the establishment of a butchering facility. The slaughter house would thus facilitate more accurate data collection and catch monitoring. A concomitant community education programme on the biology of sea turtles with particular emphasis on the case against taking mature breeding females was also recommended. This programme could be modelled on similar projects undertaken by Division of Wildlife for turtles and dugongs.

The management considerations of the Daru turtle fishery have general application for the South Pacific region. There are three general areas which need immediate attention:

(1) Identification of the breeding units from which harvests (such as that from Daru) are taken. As it is apparent that each green turtle population is a genetic entity, identification of the resource from which harvests are taken is vital. This could be determined by
   (a) Genetic mapping of mitochondrial DNA as being done by Dr Craig Moritz and Jeanette Norman at University of Queensland.
   (b) Large-scale tagging programmes.

(2) Harvest rates of sea turtles need to be quantified.

(3) Identification and mapping of rookeries. Rookeries will also need to be quantified.

INFORMATION PAPER: SEA TURTLES: THE THREAT POSED BY INTERNATIONAL TRADE

Trevor Daly
Sea Turtle Campaigner
Greenpeace

Introduction

Sea turtles are marine reptiles which have inhabited the earth for over 100 million years. Worldwide, there now exist seven species with all but one occurring in the Pacific region. The most frequently seen species in the Pacific are the hawksbill (*Eretmochelys imbricata*) and green turtle (*Chelonia mydas*) although the leatherback (*Dermochelys coriacea*), loggerhead *Caretta caretta*) and olive or Pacific ridley (*Lepidochelys olivacea*) turtles also occur. Today sea turtles are threatened with extinction due to a variety of causes including commercial exploitation, habitat destruction, pollution and incidental catches in fisheries. In particular, the international trade in sea-turtle products is continuing to provide the impetus for the decline in many sea turtle populations throughout the world, and one of Greenpeace's aims is to see an end to this activity.

International Trade in Sea Turtle Products

The major sea-turtle products traded internationally are raw and worked shell, principally from the hawksbill turtle, raw skin and processed leather, from olive ridleys and greens; oil for use in cosmetics; and some meat products from the green turtle.

The hawksbill turtle faces a special problem as its beautiful shell is the source of "tortoiseshell" which is made into jewelry and other carved items. From 1976 to 1988 an average of 50,000 adult hawksbill turtles were killed each year for international trade. The most reliable figures come from Japanese customs statistics. These indicate that the current major exporting countries of tortoiseshell are Cuba, Haiti and Jamaica in the Caribbean; the Maldives and Comoros Islands in the Indian Ocean and the Solomon Islands and Fiji in the Pacific. Japan is by far the major importer providing the stimulus behind the international trade in tortoiseshell although Singapore, Taiwan, Hong Kong and China also import this shell for their carving industries. In 1988 Japan imported just under 30 tonnes of tortoiseshell which represented some 28,000 adult hawksbills.

Very little, if any, green turtle shell is traded internationally as it is very thin and does not have the physical properties of tortoiseshell, making it unsuitable for manufacturing purposes. However, Japan is importing significant numbers of stuffed green turtles. Japan is also the major user of turtle skin (primarily from Ecuador) which is used for leather products. It appears very little turtle oil and meat is traded internationally today, although turtle meat and eggs are widely consumed locally in some countries.

Trade in Turtle Shell in the Pacific

Pacific peoples have been exploiting turtles for subsistence purposes for thousands of years, and the taking of limited numbers of turtles for food and traditional local use continues today. However, as with the exploitation of some other marine resources, in recent times the hunting of turtles in some

areas has become more commercially motivated rather than traditional. This is because tortoiseshell, in particular, has become a highly-sought-after commodity in Japan.

Unfortunately, there is little information available from most Pacific nations on the extent of sea-turtle-product exports although it appears that only shell is currently traded internationally. Once again, the most reliable source for figures on the exports of tortoiseshell from the Pacific is Japanese Custom statistics. These show that in the last four years Japan has imported significant quantities from both the Solomon Islands and Fiji. This reflects an upward trend in exports as follows:

Year	Solomon Islands	Fiji
1985	1556 kgs	294 kgs
1986	1793 kgs	497 kgs
1987	4723 kgs	1859 kgs
1988	3911 kgs	817 kgs

The 1988 figures represent shell derived from approximately 4,250 adult hawksbill turtles in the Solomon Islands and 888 adult hawksbills (estimated 0.92 kg = 1 adult). Whether the populations of hawksbills existing in these areas can sustain this level of exploitation is currently unknown.

The only other recent recorded exports of tortoiseshell to Japan from the Pacific were from Vanuatu in 1980 (33 kgs), 1984 (25 kgs) and 1985 (12 kgs).

The Role of CITES

In 1975, a new international convention aimed at regulating trade in wild species came into force. This is the Convention on Fauna, also known as CITES or the Washington Convention of 1973. At present over 100 countries are signatories of CITES. There are biannual meetings of CITES (the next in October this year) which are held to update the convention's appendices which list species according to their endangered status in Appendices I, II or III.

CITES only regulates the international trade of endangered species, and does not interfere with national markets and trade. International commercial trade in all species threatened with extinction which are listed under Appendix I is strictly forbidden, and only under exceptional circumstances can these species be traded. Appendix II lists those species which, although they are not necessarily threatened with extinction, might soon become so if their utilisation is not strictly controlled. Secondly, Appendix II lists those look-a-like species whose trade might undermine the effectiveness of protection given to the species which they resemble.

The Importance of CITES for the Protection of Sea Turtles

At the first meeting of CITES Parties in 1976, six of the seven sea-turtle species were listed on Appendix I which bans all international commercial trade in their products. The seventh species (flatback turtle which is endemic to Australia) was subsequently added to Appendix I after Mexico exported sea-turtle products falsely labelled as flatbacks. Theoretically, under the CITES provisions sea-turtle products can be traded internationally provided they are from animals bred in captivity, come from approved ranching programmes (which take eggs from the wild, and rear the turtles for slaughter) or from a population which has been downgraded by CITES from Appendix I to Appendix II. However, CITES does have very strict requirements for the approval

of any ranch. These are that the species must occur within the jurisdiction of the nation concerned, the species must be deemed by CITES as to be no longer endangered, and furthermore the species must actually benefit from the ranching operations.

Over the course of the last three CITES meetings (1983, 1985 and 1987) several nations have attempted to downgrade the Appendix I protection of sea turtles by either submitting ranching proposals or arguing for some species to be downlisted to Appendix II. All these proposals have been rejected as the vast majority of CITES Parties were not convinced that ranging, farming or downgrading of sea turtles would benefit their conservation. In fact the opposite is more likely. The capital-intensive nature of ranching operations will assure that the products will be far more expensive than from turtles taken from the wild. To remain economically viable, ranches will need to expand into new markets, thereby stimulating international trade and placing further stress on sea-turtle populations. For these reasons and the fact that sea-turtle populations continue to decline, CITES has not approved any sea-turtle ranching proposals to date, and is very unlikely to.

Given the little that is known of the biology and migratory habits of most sea-turtle species, it is also highly unlikely that they will ever be successfully bred in captivity. To date, no sea turtles have ever been bred to second generation in captivity.

Nevertheless, despite the prohibition in place due to their continued listing on Appendix I of CITES, sea turtles continue to be traded internationally. As noted by one study, no other group of animals presently protected under Appendix I of CITES is traded more often or in such volume as sea turtles. There are several reasons for this. Firstly, although international trade in Appendix I species is prohibited, any CITES member nation may exempt itself from the prohibition by taking out a reservation which lasts indefinitely. At present Japan, which is the major international market for tortoiseshell, and Surinam have reservations on certain species of sea turtles. Secondly, trade in Appendix I species may continue with nations which have not joined CITES as long as they provide comparable documentation. However, in practice this is rarely done. Several important nations still involved in the export of sea turtle products have yet to join CITES, including the Solomon Islands and Fiji.

Finally, there are many problems with adequately implementing the CITES Convention itself, due to the failure of some Parties to meet their responsibilities. Inadequate enforcement, lack of resources, identification problems, forged permits, mislabelled products and corruption all contribute to undermining the effectiveness of CITES, and ultimately jeopardising the survival of sea turtles and other species.

Nevertheless, despite these flaws, CITES is the first international agreement which has potential to effectively protect sea turtles (and other species) from the threat posed by international trade provided that enough nations join it and implement it. If Japan can be convinced to drop its reservations on sea turtles, and exporting nations join CITES, then this will remove a major threat to the future survival of sea turtles.

The IUCN Resolution

In an effort to help reverse the decline of sea-turtle populations throughout the world, the International Union for the Conservation of Nature (which comprises a membership of governments and non-government organisations including Greenpeace) adopted a resolution on sea turtles at its 17th General Assembly in February, 1988 (copy attached). This resolution calls on governments worldwide to take specific actions to save sea turtles from extinction. These include preventing the killing of breeding adults (where it is culturally inappropriate to stop all killing of turtles); restricting or halting the collection of turtle eggs, ceasing all international trade in turtle products and protecting turtle habitats, particularly nesting beaches and foraging areas such as coral reefs.

It is Greenpeace's hope that the SPREP regional marine turtle programme, currently being developed at the Fourth South Pacific Conference on Nature Conservation and Protected Areas held in Vanuatu, will endorse the recommendations contained in the IUCN resolution where they apply to the Pacific Region. We further hope that all Pacific governments will begin individually implementing the IUCN resolution so as to ensure the survival of sea turtles in the Pacific for the benefit of future generations.

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17.47 **SEA TURTLES**

RECALLING that Kemp's Ridley (*Lepidochelys kempii*) Sea Turtle was included in IUCN's Species Survival Commission's list of twelve most endangered species in 1986, and that their continued decline is largely due to the numbers drowned in shrimp trawl nets;

FURTHER RECALLING the effectiveness of the turtle excluder device (TED) in the prevention of sea turtle incidental catch by shrimp trawlers;

CONSIDERING that legal action has been taken to invalidate the United States Government's promulgation of the TED Regulations;

RECOGNISING the importance of the IUCN General Assembly providing support to the United States Government for this valuable effort in what is a world-wide problem in sea turtle conservation;

CONCERNED that many sea turtle populations continue to decline as a direct result of human exploitation;

FURTHER CONCERNED that the level of international trade in sea turtle products, particularly of the shell and skin, remains very high, and that in many countries the level of national trade, particularly in meat and eggs, continues unabated;

RECOGNISING that there are many other contributing factors to population declines, such as disturbance and destruction of the nesting and foraging habitats, ingestion of ocean debris and toxic pollutants, and incidental catch in different types of fishing gear;

CONSIDERING that scientists are currently unable to predict sustainable levels of exploitation due to insufficient knowledge of vital parameters of sea turtle biology;

NOTING that the immature stages of the life cycle are the most susceptible to natural perdition, and that it is the breeding adults, rather than the young, that are most important for the survival of the population, and therefore most damaging to exploit;

RECALLING that most examples of sea turtle management have followed traditional fishery patterns and established minimum size limits to protect the juvenile age classes;

The General Assembly of IUCN, at its 17th Session in San Jose, Costa Rica, 1-10 February 1988:

1. **URGES** the United States Senate to oppose any delay in implementation of federal regulations requiring the use of TEDs needed to prevent the capture and drowning of the critically endangered Kemp's Ridley Sea Turtle or any other species of sea turtle.

2. **URGES** member governments to enact and enforce national legislation to increase the conservation of sea turtles:

a. Institute maximum size limits to ensure that no turtles of breeding age are killed, and study the possibility of establishing quotas for the capture of juveniles where it is culturally inappropriate to provide full protection for all age classes of sea turtles;

b. Restrict egg collection to minimise the negative impact on the population where it is culturally inappropriate to prevent the collection of sea turtle eggs altogether;

c. Protect the nesting beaches and foraging habitats to minimise disturbance, damage and other activities disruptive to sea turtle reproduction;

d. Where sea turtles are present, require use of TEDs by shrimp trawlers, and control all other fishing methods as needed to minimise incidental catch, particularly off the nesting beaches during the breeding season.

RECOMMENDS that IUCN members initiate research programmes in consultation with the Species Survival Commission to determine the long-term trends in the sea turtle populations wherever exploitation occurs, in particular, the impact of exploitation on the different age classes.

FURTHER RECOMMENDS that IUCN members initiate education programmes in sea turtle conservation to ensure the understanding and participation of the local people in the implementation of the above.

CALLS UPON member governments in accordance with the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) to cease all commercial international trade in sea turtles, their parts and derivatives, especially tortoiseshell derived from the Hawksbill Sea Turtle (*Eretmochelys imbricata*).