

COASTAL MANAGEMENT PROFILES

A Directory of
Pacific Island
Governments and
non Government
Agencies with
Coastal
Management
related
Responsibilities



Photo: David Wachenfeld



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SPREP's Climate Change
and Integrated Coastal
Management Programme

COASTAL MANAGEMENT PROFILES

**A DIRECTORY OF PACIFIC ISLAND GOVERNMENTS AND
NON GOVERNMENT AGENCIES WITH COASTAL MANAGEMENT
RELATED RESPONSIBILITIES**



South Pacific Regional Environment Programme

FOREWORD

These Coastal Management Profiles are a direct response to country requests for a directory containing guidance on who is doing what in coastal management within the Pacific islands region.

Until now, there has been no document available which provided comprehensive information on the agencies involved in coastal management activities in the Pacific islands region although there have been specific directories relating to Fisheries contacts. Even within many of SPREP's member countries and territories there can be uncertainty about the responsibilities and mandates for managing coastal areas and resources.

This Directory aims to identify and briefly describe all of the organisations, agencies and individuals in the Pacific islands region which have a mandate or interest in coastal management. It is hoped that this document will fill an important information gap, providing the necessary information for initiating and developing integrated coastal management plans and strategies.

It is natural for organisations to undergo change as their mandate evolves or they restructure. Therefore it is intended that this publication will be a "living" document, updated as regularly as funding permits.

Tamari'i Tutangata

Director, South Pacific Regional Environment Programme

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BACKGROUND

INTRODUCTION

Until now there has been no document which provided an overview of integrated coastal management (ICM)¹ issues and information, or the agencies involved in ICM, in the Pacific islands region. Even within many countries and territories, there continues to be uncertainty about what coastal management and planning actually entails, and the responsibilities of the various agencies that may be involved in it.

The present directory is intended to help fill this gap by providing basic information on ICM throughout the 22 island member countries and territories of the South Pacific Regional Environment Programme (SPREP). A chapter on each country presents the major ICM issues, documents relevant legislation and lists contact and descriptive information on key agencies whose mandate is in some way connected to ICM. The information was compiled by a large number of individuals from published and unpublished materials and with country, territory and agency assistance via fax, telephone, e-mail and PEACESAT. Details of the agencies listed were in most cases either provided or verified by representatives of the agency concerned.

In addition to information on individual countries and territories, a separate chapter on regional organisations is included. Regionalism is an important characteristic of the Pacific islands. There are a number of inter-governmental agencies and international non-government organisations (NGOs) helping Pacific island nations deal with ICM problems, especially those that recur in many countries, or are of such a large scale that they can only be dealt with on a multi-country basis. There are also international organisations such as the various UN agencies that have offices throughout the region. An attempt has been made to include as many of these agencies as possible. However, in order to maintain the ICM focus of the directory and to keep the compilation work within manageable limits it has been necessary to exclude generalist agencies (e.g. bilateral aid donors and embassies) as well as international organisations which do not have a base

in a Pacific island country, even though they may from time to time be involved in ICM projects in the region.

An attempt was made to develop a standard format for the presentation of information, but this was not fully achieved. Pacific island countries differ in many ways, and this includes their ICM situations. The wide variety of ICM issues and responses, the differences in political and administrative structure of the various countries and territories of the region, and the non-availability of comprehensive information in some cases, ultimately defeated the objective of a universal information format, although progress has been made towards this goal. It is anticipated that further standardisation will be possible in future issues of the directory.

ICM is only now beginning to gain attention in many Pacific island countries, and a number of agency reorganisations or restructuring exercises were underway at the time this directory was prepared. In addition, some countries were in the process of reviewing their legislation relating to aspects of ICM, and not all agencies were able to provide up-to-date information on their activities. The situation is therefore quite dynamic and as a result some information presented here may be incomplete or already outdated. This is somewhat inevitable in a publication of this nature. If funding is available, the directory will be updated periodically so that it retains its usefulness as a primary source of information and contacts relating to ICM in the region.

ACKNOWLEDGEMENTS

Production of this directory was managed by James Aston of SPREP and coordinated by Garry Preston of Gillett, Preston and Associates Inc. It is the result of the efforts of many people who have been involved in the various stages of preparation since it was first conceived in 1994. SPREP is grateful to all the contributors, who are listed overleaf. SPREP would also like to acknowledge with gratitude the numerous staff of the various organisations listed, many of whom went to

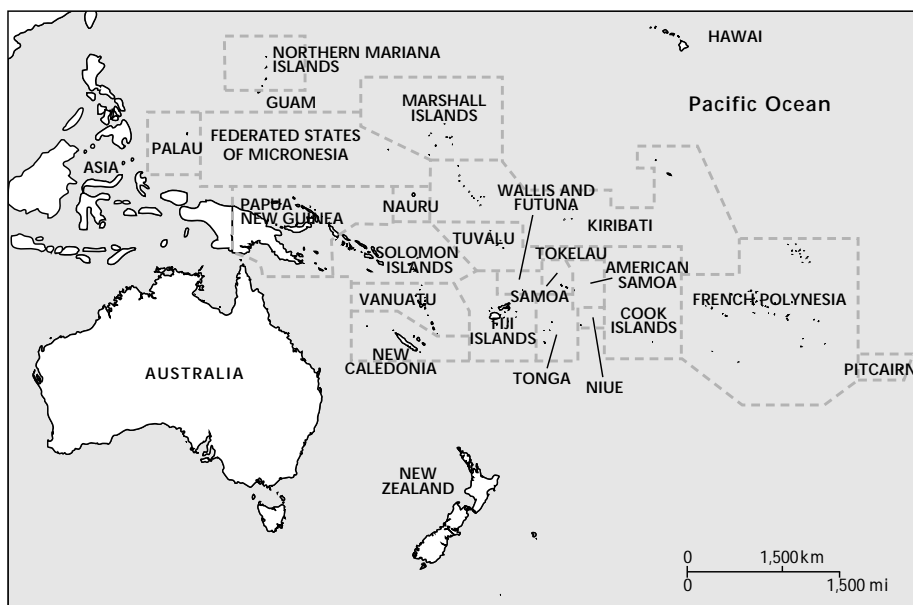
¹ Note: Previously CZM (coastal zone management) was a common acronym. Currently, ICM (integrated coastal management), ICZM (integrated coastal zone management) and ICAM (integrated coastal area management) are more common and virtually interchangeable. The "coastal zone" in many small islands, from a systems and ecological perspective, is for all intents and purposes the whole island. Layered on top of this are a range of political, cultural and legal arrangements which affect the utilisation and management of resources in the coastal zone. Therefore, defining the coastal zone or coastal areas in the small islands context should involve flexibility.

considerable efforts to ensure that information on their particular agency was as accurate and up-to-date as possible.

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THE PACIFIC ISLANDS REGION



KEY STATISTICS

The Pacific islands region comprises the 22 island states of the central and western Pacific, generally referred to as Pacific Island Countries (PICs).

Table 1: Key characteristics of Pacific Island countries.

| State/ territory | Land area (sq km.) | EEZ area (sq km.) | Est population (1995) |
|---------------------------------|--------------------|-------------------|-----------------------|
| American Samoa | 197 | 390 000 | 57 000 |
| Cook Islands | 180 | 1830 000 | 18 100 |
| Fiji | 18 376 | 1290 000 | 768 700 |
| French Polynesia | 3521 | 5030 000 | 221 300 |
| Guam | 549 | 218 000 | 150 000 |
| Kiribati | 726 | 3550 000 | 80 400 |
| Marshall Islands | 720 | 2131 000 | 56 500 |
| Micronesia, Federated States of | 702 | 2978 000 | 125 100 |
| Nauru | 21 | 320 000 | 10 400 |
| New Caledonia | 19 103 | 1740 000 | 186 800 |
| Niue | 258 | 390 000 | 2200 |
| Northern Marianas | 475 | 1823 000 | 71 800 |
| Palau | 500 | 629 000 | 16 900 |

| | | | |
|------------------|----------------|-------------------|-----------------|
| Papua New Guinea | 461 690 | 3120 000 | 4173 200 |
| Pitcairn | 5 | 800 000 | 100 |
| Samoa | 2934 | 120 000 | 163 900 |
| Solomon Islands | 29 785 | 1340 000 | 375 000 |
| Tokelau | 12 | 290 000 | 1600 |
| Tonga | 696 | 700 000 | 98 900 |
| Tuvalu | 26 | 900 000 | 9900 |
| Vanuatu | 12 189 | 680 000 | 168 300 |
| Wallis & Futuna | 124 | 300 000 | 14 700 |
| Total | 552 789 | 30 569 000 | 6770 800 |

Although the region contains only 0.55 million sq km of land, its exclusive economic zones (EEZs) cover an estimated ocean area of 30.57 million sq km, equivalent to about 29% of the world EEZ area. The disposition of land and population in the region varies greatly from country to country but in most cases the area of maritime jurisdiction is many thousands of times greater than the available land area.

PHYSICAL CHARACTERISTICS

The region contains about 200 high islands and 2500 low islands and atolls. Apart from the Pitcairn group and the southern part of French Polynesia, all of these lie in the tropical zone. The islands tend to increase in size from east to west, with Papua New Guinea comprising most of the region's land area. In general, the islands rise steeply from the deep ocean floor and have very little underwater shelf area. Coral reefs characteristically surround the islands, either close to the shore (fringing reef) or further offshore (barrier reef), in which case a coastal lagoon is enclosed. The area includes many atolls, which are the remnant barrier reefs of islands that have subsided. Some of the more recent islands in the area lack coral reefs. Mangrove forests often border the inshore waters, especially those of the larger islands, and provide habitat for the juveniles of many important food fish.

Biodiversity tends to be at a maximum in the equatorial region in the west of the Pacific Islands area, and decreases markedly towards the east. For example, the number of naturally occurring species of animals and plants is much greater in the Solomon Islands than in Tahiti. This is also true of the marine environment, where fish and invertebrate species, including corals, are far more numerous in the west of the sub-region than in the east.

Due to the relatively small size of most islands, major bodies of fresh water are not widespread in the

region, with substantial rivers and lakes only being found in some of the larger islands of Melanesia. The small land areas of most islands create limited freshwater and nutrient runoff, resulting in low enrichment of the nearby sea. The ocean waters of the area are usually clear and low in productivity. Upwellings occur in the boundaries between currents and in other localised areas, and have important implications for the abundance and harvesting of marine resources.

In general, the larger islands have more fertile soil, resulting in the greater availability of food plants. Conversely, on the small islands (and especially the atolls) the poor soil results in limited plant food production and a greater dependence on marine products for food and income. As an extreme example, in Tokelau there were only two species of edible land plants at the time of first European contact. The amount of arable land per person in the Pacific Islands area is relatively small. Estimates of this statistic, in hectares per person, are: Fiji (2.1), Solomon Islands (1.4), Tonga (1.8), Vanuatu (1.4) and Samoa (3.5) (Kofe, 1990).

Annual rainfall generally varies between 2000 and 3500 mm, although considerable variation is experienced across the area. Rain is frequently seasonal, but not consistently so across the area: Palau in the west has two periods of heavy rainfall (July/ August and December/ January) while most of the rain in French Polynesia in the east occurs in November and March. Considerable inter-annual variation in rainfall also occurs and droughts are common, especially on the smaller islands. The windward sides of the larger islands are characteristically much wetter than their leeward sides due to the existence of rain shadows.

There are also major differences in the wind patterns of the region. Those islands in the west are more strongly affected by the Asian land mass (seasonal reversals of the wind direction), while in the east the southeasterly trade winds dominate for most of the

year. Equatorial winds tend to be lighter and more variable, while those of the higher latitudes are stronger and more constant.

Tropical (cyclonic or, in the northern hemisphere, anticyclonic) storms represent the most prevalent natural disaster of the region, and occur in all but a few of the equatorial countries (notably Kiribati). On average the northwestern portion of the region (FSM, Palau, Guam) experiences about four times the number of destructive tropical storms as the areas south of the equator. Tropical storms tend to occur at the time of the year when oceanic warmth is at a maximum.

The periodic oceanographic phenomenon known as the El Niño–Southern Oscillation can produce major climatic aberrations in the Pacific Islands. At roughly 3–7 year intervals a warm south-flowing current off the west coast of South America changes course and alters the patterns of ocean water temperature across the Pacific Ocean. This can result in major changes in rainfall patterns and other aspects of the weather, including the frequency, intensity and distribution of tropical storms.

POLITICAL CHARACTERISTICS

Ethnically the region is usually broken into three sub regions: **Micronesia**, comprising the northwestern countries of Palau, Federated States of Micronesia, Guam, Northern Mariana Islands, Marshall Islands and Kiribati; **Polynesia**, which includes the southeastern countries of Cook Islands, Niue, Pitcairn, French Polynesia, the Samoas, Tokelau, Tonga, Tuvalu and Wallis and Futuna (as well as New Zealand); and **Melanesia**, which comprises Papua New Guinea, Solomon Islands,

Vanuatu, New Caledonia and Fiji (the latter being a transition point between Melanesia and Polynesia).

All but one of the countries of the region (Tonga) were colonised by European nations during the 18th century. Some have since become independent states, while others continue to be formally associated in some way with the original colonising nations, or with other nations.

The region's ethnic origins, combined with modern-day political affiliations, and the various indigenous and introduced languages now shared among some groups of states, influence the composition of the various political and economic groupings that exist in the region. Principal among these is the South Pacific Forum, a political alliance which brings together the independent countries and self-determining states (the latter being the US- and NZ-affiliated developing countries shown in table 2) of the region, including Australia and New Zealand. Outside the Forum, the various US, French and NZ-affiliated states and territories also have formal political and economic links, often with their respective 'mother' countries.

The region has a strong history of 'regionalism', which derives from several considerations: the fact that many countries share problems which justify a collaborative search for common solutions; the small size and limited human and financial resources of most countries, which constrains their ability to fully address the wide range of economic development problems they face; and the region's colonial history, during which the main metropolitan powers established mechanisms for dialogue and mutually beneficial cooperation, some of which persist today.

Historically, extensive migration has taken place throughout the region, and this continues today in the form of labour movement and economic migration.

Table 2: The political status of the region's constituent countries, their status as small island developing states, and their membership of the main regional organisations.

| State | Political status/ affiliation | SIDS | SPREP/SPC/ SOPAC | ForSec/ FFA | USP |
|------------------|---|------|---------------------|----------------|-----|
| American Samoa | US territory | | x | | |
| Cook Islands | New Zealand-affiliated developing country | x | x | x | x |
| Fiji | Independent developing country | x | x | x | x |
| French Polynesia | French territory | | x | | |
| Guam | US territory | | x | | |
| Kiribati | Independent developing country | x | x | x | x |
| Marshall Islands | US-affiliated developing country | x | x | x | x |
| Micronesia | US-affiliated developing country | x | x | x | |
| Nauru | Independent developing country | x | x | x | x |

| | | | | | | |
|-------------------|---|---|---|---|--|---|
| New Caledonia | French territory | | x | | | |
| Niue | New Zealand-affiliated developing country | x | x | x | | x |
| Northern Marianas | US territory | | x | | | |
| Palau | US-affiliated developing country | x | x | x | | |
| Papua New Guinea | Independent developing country | | x | x | | |
| Pitcairn Islands | UK territory | | x | | | |
| Samoa | Independent developing country | x | x | x | | x |
| Solomon Islands | Independent developing country | | x | x | | x |
| Tokelau | New Zealand territory | x | x | | | x |
| Tonga | Independent developing country | x | x | x | | x |
| Tuvalu | Independent developing country | x | x | x | | x |
| Vanuatu | Independent developing country | | x | x | | x |
| Wallis and Futuna | French territory | | x | | | |

Note: SIDS=Small Island Developing States; SPREP=South Pacific Regional Environment Programme; SPC=Secretariat for the Pacific Community; SOPAC=South Pacific Applied Geoscience Commission; ForSec=South Pacific Forum Secretariat; FFA=South Pacific Forum Fisheries Agency; USP=University of the South Pacific.

ECONOMIC CHARACTERISTICS

Socioeconomic conditions vary widely in PICs. In general, those people living in territories of metropolitan countries (e.g. Guam (USA), New Caledonia and French Polynesia (France)) have better access to goods and services than inhabitants of the independent states or those in free association with metropolitan powers. Throughout the region, urban residents live a more consumerist lifestyle than those in small isolated islands, remote coastal areas, and the interior of large islands, who generally live a subsistence lifestyle and have a relatively low standard of living.

The socioeconomic conditions of the independent Pacific Islands countries have recently been summarised in the Pacific Human Development Report (UNDP, 1994). With respect to relative development the report concludes that, based on the Human Development Index (HDI), the Pacific Island countries with the exception of Papua New Guinea, Solomon Islands, and Vanuatu would fall into the category of 'medium human development'. Globally, of the 173 countries listed in the report, 65 fall into this category. PNG, Solomons, and Vanuatu are placed in the 'low human development' category, amongst 55 countries in this category. Unlike Australia and New Zealand, none of the 13 Pacific Island countries covered by the report are amongst the 53 countries categorised as 'high human development'.

For the region as a whole, economic growth during the past decade was almost nil (World Bank, 1995). When this is viewed in association with population growth, the resulting outlook is gloomy. Between 1970 and 1990 the population of the region grew by 2 222 000 people which is equal to an annual growth rate of 2.3%, high relative to the world average of 1.8% (NCDS, 1994). The resulting situation of high population growth coupled with little or no economic growth is arguably the Pacific Islands' greatest long-term problem.

The economies of many PICs are largely based on agriculture (which for statistical purposes often includes fishing). Fiji, FSM, Tonga, Samoa, Kiribati, Vanuatu and the Solomon Islands all have agricultural sectors which employ more than 40% of the labour force (Booth and Muthiah, 1993). There is a tendency, however, for increasing diversification into the industry and services sectors, especially in the smaller countries. Tourism is the most important sector in some Pacific Islands economies while in others it is non-existent. SPC (1995) estimates that the Northern Mariana Islands, Fiji and French Polynesia received 536 263, 287 462 and 147 847 overseas visitors respectively in 1994. No data was available for Guam, probably the region's most important tourist destination. The Cook Islands, Kiribati, Marshall Islands, Niue and Tuvalu recorded fewer than 10 000 visitors each.

A characteristic of Pacific island countries is the large number of people who derive most of their basic

needs from non-monetary subsistence production. In 1992 the Forum Secretariat estimated the proportion of the subsistence economy in the Solomon Islands (80% of the population), Tuvalu (80%), Kiribati (80%), Samoa (60%) and FSM (at least 50%).

The term 'subsistence affluence' is sometimes used to describe the relatively high quality of life on some of the Pacific Islands. The term refers to a condition of well-being outside the cash economy. Factors contributing to this situation include low population densities, fertile soil, a benevolent climate, effective traditional resource management and social systems which provide a safety net for disadvantaged members of society. Recently, however, high birth rates, unsustainable commercial practices in regard to natural resource use, increasing dependency on the cash economy, labour migration and the deterioration of traditional authority and social systems are having a negative impact on the quality of subsistence life on many islands. Nevertheless, the fact that widespread poverty has not emerged in response to the gradually deteriorating economic conditions in most Pacific Island countries gives some indication as to the effectiveness of the traditional social support systems

Population movement from outer islands or rural areas into towns and cities is a prominent characteristic of most Pacific Island countries. The average urbanisation rate across the region was 17% in 1970 but had increased to 24% in 1990. The problems of low per capita GDP becomes much more acute as populations become more urbanised. Urban migrants are usually unable to find employment and have no access to land or fishing rights, both of which are usually governed by strict traditional systems. Urban migration generates urban poverty which contrasts starkly with the 'subsistence affluence' categorisation, and which is the source of many other social problems, including rising urban crime rates.

The high amount of development assistance received by the region, and remittance income, are two external factors which will tend to mitigate, at least in the short term, the appearance of poverty. Overall the region receives a relatively large US\$204 of aid per capita (Fairbairn 1994) which is quite unevenly distributed between the countries.

In many countries, particularly Tonga, Samoa and the Cook Islands, cash remittances by relatives living overseas are substantial, and may in fact exceed the value of all exports. Remittances from overseas employment are also very important to Kiribati and Tuvalu (a large number of whose citizens work as crew on merchant and fishing vessels, and in the Nauru phosphate mining industry), as well as to Vanuatu (fishing vessels), and to a lesser extent Fiji and American Samoa (various types of vessels).

Both aid and remittances face an uncertain future as the countries which provide aid and the countries which accept Pacific Island immigrants show signs of changing their policies. In addition, although increasing employment of Pacific Islanders aboard foreign fishing vessels is anticipated, the future prospects of employment in Nauru are poor due to the exhaustion of phosphate reserves.

Natural disasters are common in the Pacific Islands. In the period 1960 to 1989, many countries across the region experiences tropical cyclones, including the Cook Islands (15), Fiji (34), Solomon Islands (14), Tonga (15), Vanuatu (32), Samoa (10), and Papua New Guinea (2) (Chung, 1991). Other types of common disasters are coastal floods, river floods, drought, earthquake, tsunami and volcanic eruption. Although there is no evidence that the incidence of disasters is increasing, for various reasons the amount of damage from each event and the subsequent disaster relief is growing.

COASTAL ZONE MANAGEMENT

The coastal zone is regularly referred to in PIC discussions and documents relating to 'coastal planning', 'coastal management', 'coastal zone management', 'integrated coastal zone management', or 'integrated coastal management' collectively referred to here as ICM. These expressions refer to the concept of multi-disciplinary, multi-sector management arrangements that take into account the full range of often-conflicting uses of the coastal zone.

Unfortunately a definition of what exactly constitutes the coastal zone, both in the Pacific Islands region and in other regions of the world, remains elusive. Clark (1992) states that: "By virtually any set of criteria the coastal zone is a linear band of land and water that straddles the coast—a 'corridor' in planning parlance." However, he then goes on to add that:

"There is no single description of the coastal area or coastal zone: boundaries are delineated on the basis of the particular problems that ICM attempts to solve. The zone may extend inland and seaward to a variable extent—the boundaries of the coastal zone depend on political, administrative, legal, ecological and pragmatic considerations because there is a broad array of possible coastal issues and because the zone can be affected by remote activities. A narrow coastal zone could be appropriate if the purpose were to manage only the shoreline and intertidal areas. If watershed issues are of concern, then an inland extension

is necessary. Likewise, if the issues extend far seaward then the EEZ might be included. The boundaries must be adaptive to the goals and objectives.”

Sorensen and McCreary (1990) agree that “boundaries for integrated coastal zone management programmes should be tailored to capture and enable resolution of all the major coastal issues. Because there is a broad array of possible coastal issues there is also a broad array of possible management boundaries”. Some boundaries are quite narrow, and are best suited to deal with use conflicts occurring at the immediate shoreline. But if watershed-generated impacts are serious then a coastal management boundary extending far inland would be justified. The (ICM) zone of jurisdiction may be based on political and administrative considerations as well as economic and biogeographic ones.

Although the coastal zone may be drawn broadly or narrowly, it always includes the water’s edge—the boundary line between land and sea that includes the subtidal, intertidal and supratidal zones. This is where authority changes abruptly, where storms hit, where waterfront development locates, where boats make their landfalls, and where some of the richest aquatic habitat is found. It is also where typical terrestrial type planning and resource management programmes are at their weakest. The edge zone includes coastal flood plains, mangroves, marshes and tidal flats, beaches and dunes and fringing corals. It is a place of great dynamism and energy. The water’s edge is also the place where the greatest competition and conflict between users is found (Clark, 1992).

By these criteria the entire land area of many PICs can be defined as falling within the coastal zone. Even in the larger PICs the inland areas are sufficiently close to the coast, and intimately-enough connected to it through watersheds and groundwater resources, that almost all inland development activities would have direct impacts on the coastal zone. In the case of PICs and other small island states, therefore, the concept of ICM becomes modified, such that it essentially comprises the expansion and enhancement of general development planning to adequately cater for the needs and sensitivities of the coastal zone.

Uses of the coastal zone, or activities that take place within it, in PICs may be aquatic or terrestrial and typically include the following:

- fishing;
- coastal shipping;
- port and harbour development;
- water-based recreation, such as diving and other tourism-related activities;

- coastal construction—building of houses, hotels, commercial and industrial premises;
- infrastructure development—building of roads, installation of power and water supply;
- sewage treatment and disposal;
- rubbish dumping, discharge of factory effluent and other forms of waste disposal;
- coastal protection - construction of sea walls or other forms of shoreline stabilisation;
- agriculture;
- logging;
- mining of various types, including petrochemical extraction; and
- modification of watercourses (dams and so on).

These and other activities take place at variable distances from the coast, and affect the coastal zone in one way or another to varying degrees. ICM aims to ensure that development of the coastal zone takes place in a sustainable manner which allows for multiple uses of the zone, and attempts to prevent the activities of one user group having negative consequences for those of another (or for itself).

Where it exists as a formal process, ICM in the region is the responsibility of government agencies. The evidence suggests, however, that PICs have made limited progress in this type of planning and management. Only a few countries have formally established national or state-level coastal zone management plans. Various planning and ICM development exercises have taken place in other countries, some of which have put in place inter-departmental committees to coordinate or facilitate multi-disciplinary approaches to coastal zone development. In the main, however, approaches to ICM in the region remain informal and ad hoc.

In any case, incorporation of ICM issues into the national development planning cycle would only be a first step. Even in those countries that have national development plans, the actual implementation of the plan tends to be incomplete, with development activities often responding to the needs of short-term political or economic expediency rather than to long-term strategies for sustainable resource use. The reasons vary from country to country, but are generally related to the widespread difficulties encountered in all PICs in establishing mechanisms whereby government departments communicate and interact effectively with each other, with political decision-makers, and with institutions, organisations, communities and individuals outside the public sector.

PICs are far from being alone in this regard. According to UN (1992):

“Experience shows integrated marine and coastal area planning and management to be a

highly complex process, entailing the use of various policy and economic instruments, and the introduction of special institutional arrangements. Most countries have encountered difficulties in implementing this form of management and attribute these to a general failure to effectively incorporate the marine and coastal dimension into national development planning processes and thereby command adequate political and financial support. That impediment is also experienced at the sectoral level, even with respect to such valuable economic assets as fisheries”.

Despite these failures, it is becoming increasingly important that the principles of integrated coastal management be adopted in PICs, most of which are now beginning to see the deleterious effects of increased sedimentation, eutrophication, toxic pollution, habitat destruction and other negative impacts of indiscriminate coastal zone use. Truly integrated coastal management involves a representative cross section of coastal resource users

in the planning and management process. Mechanisms whereby this can occur need to be developed and implemented in PICs in order to avoid further coastal degradation, additional pressure on coastal resources which may already be stressed, economic loss and a deterioration in the quality of life.

In the absence of formal government ICM arrangements, an increasing number of non-government organisations (NGOs) and informally-constituted groups are becoming active in this area. This often takes place with the sanction and support of governments, who are increasingly seeing community-based or participatory arrangements as an appropriate and cost-effective alternative to centralised resource management systems. Although few NGOs have formal ICM responsibilities, and many are focussed only on local or specialised issues, their collective influence on development activities within the coastal zone, and on government policy in regard to the zone, is significant and growing.

REGIONAL INTER-GOVERNMENTAL ORGANISATIONS

South Pacific Regional Environment Programme (SPREP)

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|--|---|
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| Mr Tamarii Tutangata Director | E-mail: tamariit@sprep.org.ws |
| Mr James Aston Coastal Management Officer | E-mail: jaston@sprep.org.ws |
| Ms Lucille Apis-Overhoff Wetlands and Mangroves Officer | E-mail: lucille@sprep.org.ws |

SPREP is a fully independent inter-governmental agency responsible for providing professional advice, coordinating environmental activities and facilitating the implementation of the *Action Plan for Managing the Environment of the South Pacific Region 1997-2000* (Action Plan). The decision to create SPREP was taken during the 1982 Conference on the Human Environment in the South Pacific in Rarotonga.

SPREP is the implementing body for two international conventions:

- Convention for the Protection of the Natural Resources and Environment of the South Pacific Region and related protocols 1986 (the SPREP Convention); and
- Convention on Conservation of Nature in the South Pacific 1976 (the Apia Convention).

SPREP's mission is to promote cooperation in the South Pacific region and to provide assistance in order to protect and improve its environment and to ensure sustainable development for present and future generations. The 1997-2000 Action Plan sets out the objectives and strategies for SPREP and provides the framework for a regional approach to address environmental issues of the Pacific region. For the period of the Action Plan, attention will be given to building capacity in environmental and resource management through support to government agencies, non-government agencies and the private sector.

To achieve the Action Plan goal and objectives the SPREP Secretariat develops and implements a regionally coordinated and interrelated range of activities under several programme areas. The Coastal Management and Planning programme assists member countries and territories to manage and plan for the multiple use, ecologically sustainable development and conservation of coastal areas and habitats. The broad mandate of the programme covers five key areas including:

- training in Coastal Habitats Survey and Monitoring methods;
- Integrated Coastal Management to help develop unique and integrated holistic approaches for the sustainable management of Pacific Islands;
- improving the capacity of Pacific Island countries to manage changes and threats to the coastal areas and its resources;
- follow-up initiatives arising from the 1997 Pacific Year of the Coral Reef Campaign to raise public awareness about the plight of coral reefs in the countries and territories of the region; and
- identification of in-country wetlands and mangrove priorities and issues, and development of management tools and responses under the Wetlands and Mangroves Management subprogramme.

Each project within this programme is seen as a step in achieving a broader and more general goal of providing the impetus to initiate integrated coastal management appropriate to the circumstances and aspirations of Pacific Islanders.

Key publications include: state of the environment reports and national environmental management strategies for several countries of the region; reviews of environmental legislation in several countries; various technical reports on environmental issues relevant to the coastal zone (oil spill contingency planning, ship grounding, traditional use of coastal and marine resources); papers and proceedings of meetings and workshops relating to coastal zone management issues; and the SPREP newsletter. ■

South Pacific Applied Geoscience Commission (SOPAC)

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| Private Mail Bag Suva | Tel: (679) 381139/ 381377 Fax: (679) 370040 |
| Mr Alfred Simpson Director | E-mail: alf@sopac.org.fj |
| Dr Russell Howorth Program Manager | E-mail: russell@sopac.org.fj |
| Mr Robert B. Smith Marine Geophysicist | E-mail: robert@sopac.org.fj |
| Mr Xue Chunting Coastal Geologist | E-mail: chunting@sopac.org.fj |
| Dr Graham Shorten Coastal Engineering Geologist | E-mail: graham@sopac.org.fj |
| Mr Jackson Lum Marine Geologist | E-mail: jack@sopac.org.fj |

SOPAC was first established in 1972 as the UN Coordinating Committee for Offshore Prospecting in the South Pacific. The agency's original responsibilities were to assist South Pacific countries by investigating their non-living marine resources, coordinating marine geological and geophysical studies, and obtaining baseline data to determine design criteria for coastal engineering and development. SOPAC's coastal responsibilities were subsequently extended to include the provision of information on the physical environment of coastal areas in order to assist with resource and environmental management, coastal protection works and the planning and implementation of coastal development projects.

Following a review of SOPAC's future role and direction endorsed by Council in 1997, activities of the SOPAC Work Program of direct relevance to coastal management are implemented primarily by the Coastal Unit and secondarily the Mineral Resources Unit (coastal sand and gravel, aggregates studies) and Hazard Assessment Unit (coastal hazards and risk assessment studies). Support activities are also

carried out in training, information technology, publications and library.

The overall goal of the Coastal Unit and related coastal activities elsewhere in the SOPAC Work Program is improved management of the coastal zone of island member countries for sustainable development. The purpose is to assist decision-makers and planners to develop coastal zones and extract resources while protecting coastal zones from degradation.

Outputs include:

- coastal process evaluation and assessment studies;
- coastal environment and resource assessment maps;
- coastal baseline studies;
- coastal hydrodynamic models;
- sediment budget analyses; and
- trained member country individuals.

Activities include:

- collection, assessment and analysis of information on coastal, oceanic and atmospheric processes;
- planning and conducting coastal mapping, bathymetric and marine geophysical surveys;
- monitoring beach erosion;
- modelling coastal circulation and sediment transport;
- developing storm surge numerical models;
- investigating climate variations and their geological causes leading to sea-level rise;
- training member country professionals in coastal assessment and management techniques; and
- advising on best-practice coastal management procedures.

Reporting on activities to the member countries and regional agencies is primarily by way of technical reports, papers and proceedings of meetings and workshops relating to coastal zone management issues; annual reports to SOPAC Council, SOPAC Projects (biannual) and SOPAC News (biannual). ■

University of the South Pacific (USP)

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| PO Box 1168 Suva, Fiji | Tel: (679) 313900 Fax: (679) 301305 |
| Mr Esekia Solofa Vice Chancellor | Fax: (679) 302556 |
| Prof. G. Robin South Professor of Marine Studies | Tel: (679) 305272 Fax: (679) 301490 E-mail: south_r@usp.ac.fj |
| Ms Vina Ram-Bidesi Coordinator, Ocean Resources Management Programme | Tel: (679) 212584 Fax: (679) 302338 E-mail: Ram_V@usp.ac.fj |
| Ms Bale Rabuka Tamata Research Fellow, Institute of Applied Science | Tel: (679) 302403 or 212551 Fax: (679) 300373 E-mail: Tamata_B@usp.ac.fj |

USP provides higher education and training in a wide range of disciplines including several relevant to the coastal zone. The University also provides technical consulting services in these fields to various regional and national organisations. The University's priority is to serve the countries of the USP region (Cook Islands, Fiji, Kiribati, Marshall Islands, Nauru, Niue, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu and Vanuatu) but it also has links to many other countries through strategic alliances, exchange schemes, student enrollment and the provision of consultancy services.

The University Departments most relevant to the area of ICM are:

- The Marine Studies Programme, which covers aspects of marine biology, marine chemistry, oceanography, fisheries management and maritime law, and marine pollution. The main campus at Laucala Bay, Suva, has world-class facilities for all aspects of training, education and research in marine science. The Marine Studies Programme regularly hosts visiting researchers from all over the world.

The Marine Studies Programme also operates the Institute of Marine Resources in Honiara, Solomon Islands, and the Atoll Research Programme in Tarawa, Kiribati. These are described in this directory under the relevant chapters on those countries.

- PIMRIS is the Pacific Islands Marine Resources Information System and is a formal marine information network system of regional organisations and Pacific Island countries devoted to the collection, storage, retrieval and dissemination of information on fisheries and other living and non-living marine resources in the tropical Pacific.
- The Institute of Applied Science, which deals with aspects of terrestrial and marine pollution. It has an analytical service which supports industries and offers help and support in areas of effluent disposal and water quality testing. The environmental unit has conducted many significant EIAs for the region and has assisted in drafting environmental legislation for Fiji.

Key publications include courses, teaching materials, newsletters, conference proceedings and technical reports. ■

Secretariat of the Pacific Community (SPC)

BP D5
98848 Noumea Cedex, New Caledonia

Tel: (687) 262000
Fax: (687) 263818

Dr Bob Dun
Director General

Ms Lourdes T. Pangelinan
Deputy Director General

Dr Tim Adams
Director, Marine Resources Division

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SPC was established in 1947 as a multi-disciplinary technical assistance organisation providing advisory services to states of the Pacific Islands region. SPC's membership includes all 22 Pacific Island countries and territories as well as the metropolitan nations of Australia, France, New Zealand, United Kingdom and USA.

The Marine Resources Division is the largest component of the work programme and the main element relevant to ICM. The Division consists of two branches:

- **Coastal Fisheries:** includes programmes relating to inshore fisheries management, development of coastal fisheries, training, post-harvest fisheries technology, information, and the role of women in fisheries. There is currently a particular focus on the use of participatory, community-based arrangements as a means of improving the management of fisheries as well as of the coastal zone in general.
- **Oceanic fisheries:** carries out research and monitoring of the regions industrial and commercial fisheries for tuna and allied species, and makes this information available to Pacific Island governments, the South Pacific Forum Fisheries Agency (see entry in this chapter), and other organisations involved in management of these fisheries.

The Noumea headquarters houses a wide range of other social and economic development programmes relating to public health, sanitation, nutrition, education, rural technology, statistics, economics and women's development. Many activities carried out under these programmes are also relevant to management of the coastal zone. In addition, SPC maintains a centre in Fiji which has a maritime law component (see next entry).

Key publications include technical reports; Fisheries Information Bulletins; Tuna Bulletin; technical meeting papers and reports; Fisheries Newsletter; other newsletters and annual reports. SPC also has a world wide web site at <http://www.spc.org.nc/>. ■

Secretariat of the Pacific Community (SPC)—Suva Office

| | |
|--------------------------------|--|
| Private Mail Bag Suva, Fiji | Tel: (679) 370733/ 370496 Fax: (679) 370021 |
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| | |
|--|----------------------------|
| Dr Jimmie Rodgers Deputy Director General | E-mail: JimmieR@spc.org.fj |
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Dr Peter Heathcote
Maritime Law Specialist

SPC's main headquarters is in Noumea (see previous entry) but the organisation also maintains a centre in Fiji which houses programmes in agriculture, information and media, veterinary science and other areas. The main programme relevant to ICM is the maritime law programme, which provides advice and assistance to Pacific Island countries in the development and implementation of legislation relating to ports, shipping and other uses of marine spaces, and the harmonisation of such legislation with international standards. ■

South Pacific Forum Fisheries Agency (FFA)

| | |
|--|--------------------------------------|
| PO Box 629 Honiara, Solomon Islands | Tel: (677) 21124 Fax: (677) 23995 |
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| | |
|-----------------------------------|------------------------------------|
| Mr Victorio Uherbelau Director | E-mail: victorio.uherbelau@ffa.int |
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|--------------------------------------|--------------------------------|
| Mr Ian Cartwright Deputy Director | E-mail: ian.cartwright@ffa.int |
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FFA provides the Secretariat for the Forum Fisheries Committee, which serves as a means of coordinating the national fishery management efforts of South Pacific Forum member countries, particularly in regard to the region's international fisheries for tuna and allied species. FFA also provides the Secretariat to a number of sub-regional fishery management arrangements, particularly the Nauru Agreement, Federated States of Micronesia Arrangement and the Palau Arrangement, as well as administering the Treaty between The Governments of Certain Pacific Island States and the Government of the United States of America.

In addition FFA gathers and interprets economic and other fisheries data on behalf of its member countries, and provides technical services and advice in support of regional fishery management systems. These include maintenance of the Regional Register of Foreign Fishing Vessels, and the development of a regional satellite-based Vessel Monitoring System.

FFA has a total of 48 staff positions, of whom 28 are professional staff recruited predominately from member countries.

Key publications include technical reports, Fishery Resource Profiles of selected countries, FFA News Digest Newsletter, and a monthly membership-only newsletter, *From the Director's Desk*. FFA also has a world wide web site at <http://www.ffa.org/>. ■

South Pacific Forum Secretariat (ForSec)

| | |
|--------------------------|--|
| PO Box 856 Suva, Fiji | Tel: (679) 312600 Fax: (679) 301102 |
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|--------------------------------------|----------------------------|
| Mr W. Noel Levi Secretary-General | E-mail: sg@forumsec.org.fj |
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Originally established as the South Pacific Bureau for Economic Cooperation, the Forum Secretariat has recently divested itself of many of its long-term technical activities in order to function more effectively as the Secretariat to the South Pacific Forum, the region's main political grouping of independent states. Although not having a formal role in ICM, the Forum Secretariat undertakes research and provides advisory services on many issues relating to the development of the coastal zone, such as domestic and international shipping, energy policies and practices (including oil transportation and storage), and the development of coastal resources. ForSec has a staff of 71 persons, of whom 33 are professional officers. The organisation has a world wide web site at <http://www.forumsec.org.fj/>. ■

OTHER GOVERNMENTAL AND INTER-GOVERNMENTAL ORGANISATIONS BASED IN THE PI REGION

Asian Development Bank—South Pacific Regional Mission (ADB–SPRM)

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| PO Box 127 Port Vila Vanuatu | Tel: (678) 23300 Fax: (678) 23138 E-mail: adbsprm@mail.asiandevbank.org |
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|---|--|
| Mr M. E. Tusneem Regional Representative | E-mail: mtusneem@mail.asiandevbank.org |
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ADB–SPRM is a part of the Office of Pacific Operations (OPO) based at the ADB headquarters in Manila. The Bank's 12 developing member countries (DMCs) in the Pacific are: Cook Islands, Fiji, Kiribati, Marshall Islands, Federated States of Micronesia, Nauru, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu. ADB provides assistance for major development projects and programmes in the region through concessional loans and technical assistance grants in all major sectors of the economy, including natural resource management. A number of ADB-financed projects in the region have direct implications for coastal zone management. These include, among others, a programme of ICM training implemented through SPREP, management of marine resources and ecology in Cook Islands, fishery management in Papua New Guinea, Marshall Islands and Federated States of Micronesia, and commercial fishery development in Federated States of Micronesia and Tonga. SPRM has a multi-disciplinary team of eight staff (of whom four are from the Pacific region) with expertise in economics and finance, engineering, infrastructure, agriculture and natural resources management. ■

Economic and Social Commission for Asia and the Pacific— Pacific Operations Centre (ESCAP/ POC)

| | |
|--|--|
| Private Mail Bag 004 Port Vila Vanuatu | Tel: (678) 23458 Fax: (678) 23921 E-mail: escap@vanuatu.com.vu |
|--|--|

Mr Savenaca Siwatibau
Head

Dr Anthony V. Hughes
Regional Advisor, Economic Development & Planning

Mr Godfred J. Shuma
Regional Advisor, Ports and Harbours Development

Mr Serge Belloni
Regional Advisor, Development Economics and Strategic Planning

Mr Sakaru Tsuchiya
Regional Advisor, Infrastructure Planning, Design & Implementation

Dr Charles G. Kick III
Regional Advisor, Social Development & Planning

Mr Siliga Kofe
Regional Advisor, Development Policy Formulation & Implementation

ESCAP/POC is a UN body which provides policy and technical advisory services to ESCAP member and associate member states in the Pacific. Although the Centre does not have a direct ICM mandate, it has occasional involvement through policy advice and studies for governments and regional bodies which affect development management in or near the coastal zone, and through technical assistance which have coastal zone dimensions. Recent examples of the latter include a survey of markets for giant clams and support to the management of a national fishing company. ■

Food and Agriculture Organization of the United Nations—
Sub-Regional Office for the Pacific Islands (FAO-SAPA)

| | |
|---------------------------------------|--|
| FAO Private Mail Bag Apia Samoa | Tel: (685) 20710/ 22127 Fax: (685) 22126 E-mail: FAO-SAP@field.fao.org |
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| | |
|---|------------------------------------|
| Dr Vili Fuavao Sub-Regional Representative | E-mail: ViliA.Fuavao@field.fao.org |
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|--|--------------------------------------|
| Mr Masanami Izumi Fisheries Officer | E-mail: Masanami.Izumi@field.fao.org |
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|--|--------------------------------|
| Mr Lui Bell National Professional Officer | E-mail: Lui.Bell@field.fao.org |
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| Mr Gilles Hosch Associate Professional Officer | |
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The FAO office in Apia is the sub-regional office of the Rome-based FAO, a UN agency concerned with monitoring and enhancing agricultural production, living resource management and world food security.

The FAO Apia office, known by its acronym of SAPA, was upgraded to a sub-regional office in 1996 and has since expanded its activities in the area of natural resource management in the South Pacific. The establishment of SAPA is a tangible reflection of FAO's desire to decentralise and to bring its operations closer to its member countries of the Pacific. SAPA's mandate is to galvanise regional efforts towards food security. FAO also provides technical assistance to the Pacific Island countries in the fisheries sector. Recent projects have included the strengthening of fisheries management in Fiji, Solomon Islands, Papua New Guinea and Vanuatu, a fisheries sector study in Tonga and a regional initiative in the area of seafood quality control and food safety.

FAO's Sub-Regional Office consists of 18 staff including 7 technical officers (fisheries, integrated resources management, farming systems development & marketing, plant protection, forestry, nutrition and policy), 2 Associate Professional Officers (marine resources information and women in development) and a National Professional Officer, under the overall managerial and administrative leadership of the Sub-Regional Representative.

FAO headquarters in Rome has a fisheries department which compiles world fishery and aquaculture statistics and promotes international cooperation to support better utilisation and management of fishery resources, including in the Pacific Islands region. ■

FAO South Pacific Aquaculture Development Project Phase-II (SPADP)

| | |
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| c/o UNDP Private Mail Bag Suva Fiji | Tel: (679) 313750 Fax: (679) 313985 E-mail: faoqua@mailhost.sopac.org.fj |
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| Mr Hideyuki Tanaka Chief Technical Advisor | |
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SPADP-Phase II is a 5-year project which runs from 1994–1999 and which provides 15 Pacific Island project member countries with technical assistance and support in the field of aquaculture development. The project's work takes place in both the coastal zone and inland, and includes the promotion of subsistence and commercial aquaculture production (both freshwater and marine) as well as re-stocking of over-exploited fisheries resources. In addition the project has carried out resource surveys and provided management advice in regard to living marine resources. ■

United Nations Development Programme (UNDP)

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Fiji

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Mr Romulo V. Garcia
United Nations Resident Coordinator and
UNDP Resident Representative

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Mr Francois d'Artagnan
Deputy Resident Representative

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Ms Jenny Bryant-Tokalau
Sustainable Development Advisor

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The United Nations Development Programme office in Suva is responsible for UNDP country programmes in Fiji, Kiribati, Nauru, Solomon Islands, Tonga, Palau, Federated States of Micronesia, Marshall Islands, Tuvalu and Vanuatu. It also has responsibility, in collaboration with UNDP Headquarters in New York, for the preparation and monitoring of regional and sub-regional projects affecting these countries, and such regional and sub-regional activities which may be of interest to other members of the Pacific Community (such as French Polynesia, New Caledonia and Wallis and Futuna), as well as liaising with the Secretariat of the Pacific Community, Forum Secretariat and other regional institutions which affect the above countries. (UNDP also has offices in Samoa and Papua New Guinea which deal with programmes in those countries, and which are included under the relevant country chapters).

The only UNDP country programme which is relevant to ICM is the Coastal Zone Management Project in the Republic of Marshall Islands. This is described in more detail in the Marshall Islands chapter of this directory. ■

United Nations Educational, Social and Cultural Organization (UNESCO) Office for the Pacific States

PO Box 5766, Matautu uta PO
Apia, Samoa

Tel: (685) 24276
Fax: (685) 22253

Ms Edna Tait
Director

Vacant (formerly Trevor Sankey)
Science Adviser

E-mail: science.apia@unesco.org

UNESCO, *the United Nations Educational, Scientific and Cultural Organization*, is the arm of the United Nations system charged with promoting the international exchange and sharing of all forms of intellectual knowledge. The aim is to build peace in the world. UNESCO's programmes cover a very wide range of topics and include the social and human sciences, communication through the media, information and informatics as well as education, science and culture. UNESCO particularly encourages the different disciplines to find new and constructive ways of working together.

The UNESCO *Office for the Pacific States* in Apia, Samoa was opened in 1984 and serves fourteen member states through a staff team of 12, which includes five professionals. UNESCO in the Pacific has a particular interest in promoting the joint application of social and environmental sciences and in exploring the cultural aspects of the sustainable use of natural resources, including indigenous knowledge. A number of UNESCO programmes relate to coastal zone management. These are implemented in close cooperation with regional organisations such as SPREP, SOPAC and USP.

The UNESCO project on *Environment and development in coastal regions and in small islands* (CSI) is a platform for cross-sectoral action to elaborate 'wise practices' for coastal areas. In the Pacific it works with the International Hydrological Programme on the combined technical and social study of freshwater resources. It has community projects on 'Education for sustainable village living' and 'Values for sustainable village living'.

In the Pacific, the *International Hydrological Programme* (IHP) promotes combined technical and social science studies of key freshwater resource problems with a strong training element. Studies on 'Groundwater pollution in villages' and 'Atoll groundwater recharge' are nearing completion.

The *Intergovernmental Oceanographic Commission* of UNESCO coordinates international cooperative work on technical aspects of marine science and its application to coastal management. It is also the lead agency in coordinating the emerging Global Ocean Observing System (GOOS) which includes a coastal component.

The *World Heritage Convention* provides an international system for designating sites of understanding cultural or natural value. UNESCO's *World Heritage Centre* is active in promoting the system in the Pacific and works with other conservation agencies, particularly the World Conservation Union (IUCN).

The *Man and the Biosphere* programme supports basic research on biodiversity and the International Biosphere Reserve network, which can include marine protected areas. In the Pacific the focus is on preserving culturally important plants together with the scientific and cultural knowledge about them through the *UNESCO-WWF-Royal Botanic Gardens People & Plants* initiative.

The *World Solar Programme* supports education and information activities related to the application of solar and other types of renewable energy, and is providing some seed money for a projected regional renewable energy and training centre in PNG.

Key publications include office three-monthly report, technical meeting papers and reports. ■

NON-GOVERNMENTAL ORGANISATIONS

Biodiversity Conservation Network (BCN)—South Pacific Field Office

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Suva, Fiji

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Ms Diane Russell
Senior Programme Officer/ Social Scientist

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BCN is a US\$ 20 million, 6-year programme funded by the US Agency for International Development through the US-Asia Environmental Partnership. BCN is part of the Biodiversity Support Program, a consortium of the World Wildlife Fund/ US, The Nature Conservancy and the World Resources Institute. BCN provided twenty sizable grants to organisations in seven countries to set up or maintain enterprises that are highly linked to biodiversity. The bulk of the projects involve harvesting or processing non-timber forest products, and eco-tourism projects (one of them marine-based). One project funded by BCN involves deep-water fishing enterprises for communities living around a community-managed marine sanctuary. In addition, BCN's mandate includes analysis of the effectiveness and impact of enterprise-based conservation strategies.

BCN's main offices are in Washington DC, USA. The South Pacific Field Office currently comprises eight professional staff—one Director and seven programme officers located in five countries—and five administrative staff, along with interns and consultants. The programme is due to end in March 1999.

BCN has a world wide web site whose address is www.bcnet.org. ■

Greenpeace Pacific

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Suva
Fiji

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E-mail: greenpeace@is.com.fj

Ms Bunny McDiarmid
Regional Coordinator

Greenpeace Pacific is a regional campaign answerable to Greenpeace International. Greenpeace's goal is to enhance understanding of the working of the natural environment and to stop deleterious effects upon it. Like other Greenpeace branches, Greenpeace Pacific participates in or contributes to global campaigns as well as concentrating on environmental issues of concern to Pacific peoples.

Current or recent activities relating to coastal management include:

- recording outbreaks of coral bleaching (which includes many associated with the coast);
- contributing to a database of indications of climate change;
- studying the effects of upstream development on coastal land forms and ecosystems;
- community-based management of coral reefs;
- construction of mooring buoys to prevent anchor damage to reefs;
- identifying land-based sources of marine pollution and their impacts on coral reefs and assisting in the identification of possible solutions.

There are 6 professional staff in the Greenpeace office in Suva, as well as professional staff based in the Solomons, Papua New Guinea, New Zealand and the United States who work on Pacific environmental issues. Greenpeace Pacific receives its funds entirely from private donation. It employs volunteer workers in addition to its professional staff. ■

International Ocean Institute of the South Pacific (IOI-SP)

USP Marine Studies Programme
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Director

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Mr Seremaia Tuqiri
Coordinator

IOI-SP is one of four operational centres of the IOI, which was established in 1972 in the Netherlands. The organisation aims to promote peaceful uses of ocean space and its resources, their management and regulation as well as the protection and conservation of the marine environment. The Institute is based at the University of the South Pacific and serves the countries of the USP region. There are 2 professional staff, but the Institute also has access to other University staff, particularly those of the Marine Studies Programme.

IOI-SP's activities are mainly concerned with offshore areas but many impinge on the coast and have implications for coastal management. Major programmes include: ocean resources and their management; fisheries; marine environment management strategies; marine biodiversity; law of the sea; marine technology; ports and marine transportation; renewable energy; communications and networking; and marine public awareness. IOI-SP cooperates with the organisations of the UN systems, other international organisations concerned with ocean affairs, governments, foundations, industries and academic institutions.

Key publications include courses, teaching materials, Ocean Year Book, quarterly newsletters, conference proceedings and reports. ■

South Pacific Action Committee for Human Ecology and the Environment (SPACHEE)

PO Box 16737
Suva, Fiji

Tel: (679) 312371
Fax: (679) 303053

Ms Leba Halofaki Mataitini
Chairperson

Tel: (679) 300690/ 212410

Ms Cherie Whippy-Morris
Acting Coordinator

E-mail: morris_ch@usp.ac.fj

Established in 1983, SPACHEE's major objectives are to improve cooperation and communication between people and agencies involved in environmental management and protection, environmental and human ecological research, and formal and non-formal environmental education.

SPACHEE activities include:

- community-based integrated resource management projects and workshops;
- Ecowoman (network of women in the region who are involved in science, technology and environment) projects. SPACHEE identifies projects and training programmes that will help rural women in managing their resources and also in appropriate technology; and
- organising conferences and lectures on environmental issues by visiting speakers.

Key publications include SPACHEE Newsletter (issued thrice-yearly), SPACHEE Environmental News Alert and Ecowoman Newsletter. ■

The Nature Conservancy—Asia/Pacific Regional Office

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Honolulu, Hawaii 96817

Tel: (1-808) 537 4508
Fax: (1-808) 545 2019

Ms Audrey Newman
Acting Director

E-mail: anewman@tnc.org

The Nature Conservancy is a US-based international NGO founded in 1951 as a private, non-profit organisation. TNC's mission is 'to preserve plants, animals and natural communities that represent the diversity of life on Earth by protecting the lands and water they need to survive'. There are approximately 2000 staff in total, of whom approximately 75 are employed in the Asia/Pacific program. There are Pacific field offices in Palau, NZ (South Pacific programs), Federated States of Micronesia (Pohnpei), Solomon Islands and PNG.

TNC's policy is to use cooperation rather than confrontation to forge effective partnerships with business, government, individuals and organisations that share a concern about the escalating rate of extinction worldwide. Strategies to achieve this include maintenance of on-the-ground presence, encouragement of community participation, and building of in-country capacity to manage resources in a sustainable manner.

Current and recent activities relating to coastal management are wide-ranging and include:

- combating the use of sodium cyanide to capture live reef fish;
- providing policy and management assistance for the control of the live reef fish trade;
- installing mooring buoys at diving sites to protect coral reefs from dive boat anchors;
- supporting grouper spawning aggregation research and the developing management measures;
- supporting the development of catch-and-release sport fishing activities;
- development of alternative sources of income to support marine conservation areas;
- various Rapid Ecological Assessments on marine areas;
- establishing a community-managed marine conservation area in Melanesia; and
- assisting in the development of local environmental NGOs.

TNC's main Asia-Pacific Office is based in Hawaii, and the South Pacific Program Office in New Zealand (see next entry). The organisation also has representatives in Micronesia, Palau, Papua New Guinea and Solomon Islands, entries for which are contained under the relevant country chapters. ■

The Nature Conservancy—South Pacific Program Office

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The South Pacific Program is responsible for developing and managing the South Pacific country programmes in the Solomon Islands and PNG. ■

USP Climate Change Researchers' Group

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This is an informally constituted group established to acquire and disseminate information pertaining to the broad issue of climate change, and to enhance awareness of this and related issues among the people of the Pacific region. The group comprises mostly USP staff but with some outside people, mainly from the Government of the Fijian Islands.

The group has supplied people to work on SPREP-funded projects to investigate the probable implications of climate change and sea-level rise on Pacific Island nations. Many of these studies involved assessing present and future coastal management needs and problems, and making recommendations regarding legislation and policy changes.

Other activities have included:

- sponsoring a conference on the effects of climate change on Pacific Island ecosystems;
- production of public information pamphlets on the 'Greenhouse Effect in Fiji' and 'Sea-Level Rise in Fiji'; and
- organising conferences and lectures on climate change issues by visiting speakers. ■

World Wide Fund for Nature (WWF)

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Mr Peter Hunnam
Regional Representative

WWF receives its funding from WWF International and also from other funding agencies through its projects. Conservation of Marine and Coastal Ecosystems of the Western Pacific is one of six core initiatives of WWF's strategy in the Pacific. The five-year objective of this strategy is careful stewardship of inshore marine resources by coastal communities and other stakeholders in Pacific Islands. WWF is involved in initiating and promoting a series of model marine conservation areas in Melanesia as demonstrations of practical marine conservation and sustainable fisheries. At a broader level, WWF aims to support marine conservation ethics to renew attitudes of careful stewardship of inshore marine resource among Pacific Island communities and decision-makers. WWF is also promoting the Marine Stewardship Council and has recently completed analysis of biological diversity and its global distribution. This has provided a regional map for the Pacific identifying priority eco-regions. These will be the focus of WWF's efforts over the next decade.

There are six professional staff based in the regional office in Suva. There are also other professional staff based in Cook Islands and Solomon Islands (as well as a presence in Papua New Guinea, but which is not concerned with ICM issues). The immediate goal of the Fiji and Cook Islands projects is to appraise natural resource-related activities by other organisations with a view to identifying, promoting and facilitating conservation effectiveness. The target groups are communities, other NGOs and government departments. WWF works with communities in the western province of Solomon Islands to provide assistance to customary resource owners to develop sound resource management practices and viable sustainable development alternatives for their land-based and marine-based resources. (WWF also has a presence in Papua New Guinea, but which is not concerned with ICM issues).

Current or recent activities relating to coastal management include:

- reviewing natural resource management and recent conservation initiatives in Fiji;
- developing a conservation stakeholder survey directory;
- proposed activities for management of the Muri lagoon in Rarotonga, Cook Islands; and
- a proposed marine park/ reserve with Ulunikoro community, Ono, Kadavu, Fiji. ■

SELECTED DOCUMENTS ON ICM

- Aalbersberg, W. and Hay, J. 1991 *Implications of Climate Change and Sea Level Rise for Tuvalu*, SPREP, Apia, Samoa.
- Aalbersberg, W., Nunn, P. D. and Ravuvu, A. D. (eds) 1993, *Climate and Agriculture in the Pacific Islands: Future Perspectives*, Suva: Institute of Pacific Studies, University of the South Pacific, 80 pp. [10 figures, 12 plates, 4 tables].
- Bleakley, C. 1996, *Draft Review of Marine Critical Habitats and Species in the Pacific Islands Region*, unpublished document, SPREP, Apia, Samoa.
- Booth, H. and Muthiah, A. 1993, *Pacific Human Development Statistical Database*, report prepared for UNDP, Suva.
- Carpenter, R. A. and Maragos, J. E. 1989, *How to Assess Environmental Impacts on Tropical Islands and Coastal Areas*, SPREP Training Manual, East-West Center, Honolulu.
- Chung, J. 1991, 'South Pacific country study', in *Disaster Mitigation in Asia and the Pacific*, Asian Development Bank, Manila, Philippines.
- Clark, J. R. 1992, *Integrated Management of Coastal Zones*, FAO Fisheries Technical Paper No. 327, FAO, Rome, Italy.
- Commonwealth Science Council 1985, 'Environmental planning programme: coastal zone management of tropical islands—coastal zone management of the South Pacific region', *Proceedings of the Workshop/Planning Meeting*, Tahiti, 27 May–5 June 1985.
- Commonwealth Science Council 1986, *Environmental Planning Programme: Coastal Zone Management of Tropical Islands—South Pacific Coastal Zone Management Project (SOPACOAST)*, project document, CSC Technical Publication Series 204.
- Dahl, A. L. 1980, *Regional Ecosystem Survey*, SPREP, Noumea, New Caledonia.
- Douglas, N. and Douglas, N. (eds) 1994, *Pacific Islands Yearbook*, 17th edn, Fiji Times Ltd., Suva, Fiji, 767 pp.
- Fairbairn, T. 1994, 'Pacific Island economies: structure, current developments and prospects', in *Pacific Islands Yearbook*, eds N. Douglas and N. Douglas, 17th edn, Fiji Times Ltd., Suva, Fiji, 767 pp.
- Farago, A. 1993, 'Progress with the action strategy for nature conservation in the South Pacific, 1989–1993', *Fifth South Pacific Conference on Nature Conservation and Protected Areas*, 4–8 October 1993, conference papers, vol 2, pp 3–16., SPREP, Apia, Samoa.
- Hoegh-Guldberg, O. 1994, *Mass Bleaching of Coral Reefs in French Polynesia*, report for Greenpeace International. 36pp.
- Hviding, E. 1992, *Upstream Development and Coastal-Zone Conservation: Pacific Islands Perspectives on Holistic Planning*, discussion paper commissioned by Greenpeace International.
- Johannes, R. E. and Riepen, M. 1995, *Environmental, Economic, and Social Implications of the Live Reef Fish Trade in Asia and the Western Pacific*, The Nature Conservancy, Honolulu, 81pp.
- Kofe, S. 1990, *Household Food Security in Selected Pacific Island Countries*, SPC, Noumea.
- NCDS, 1994, *Pacific 2010*, National Centre for Development Studies Research School for Development Studies, Australian National University, Canberra, Australia.
- Pacific Regional Equitable and Sustainable Human Development Programme (ESHDP) 1993, *Partnership for People-Centred Development: A Directory of Non-Governmental Organisations in South Pacific Island Countries*, UNDP/ESHDP, Suva, Fiji.
- Paine, J. R. 1993, 'A review of the protected areas system in the South Pacific', *Fifth South Pacific Conference on Nature Conservation and Protected Areas*, 4–8 October 1993, conference papers, vol 2, pp. 17–26, SPREP, Apia, Samoa.
- Preston, G. 1996, *Review of Fishery Management Issues and Regimes in the Pacific Islands Region*, unpublished document, SPREP, Apia, Samoa.
- SOPAC 1994, *Coastal Protection in the Pacific Islands: Current Trends and Future Prospects*, SOPAC miscellaneous publication 177, 196 pp.
- Sorensen, J. C. and McCreary, S. T. 1990, *Institutional Arrangements for Management of Coastal Resources*, Coastal Management Publication No. 1, revised edn, US National Parks Service, United States Agency for International Development, Washington DC, USA.
- SPC 1995, *South Pacific Economies—Pocket Statistical Summary*, SPC, Noumea.
- SPREP 1992, 'Environment and development: a Pacific Island perspective', supporting technical document for *The Pacific Way: Pacific Island Developing Countries' Report to the United Nations Conference on Environment and Development*, June 1992, 334 pp.
- SPREP/ SOPAC 1994, 'Coastal protection in the Pacific Islands: current trends and future prospects'. *Proceedings of the 1st and 2nd Regional Coastal*

Protection Meetings, 21–23 February 1994, Apia, Samoa and 16–20 May 1994, Suva, Fiji. SOPAC Miscellaneous Report 177. SPREP, Apia, Samoa, 196 pp.

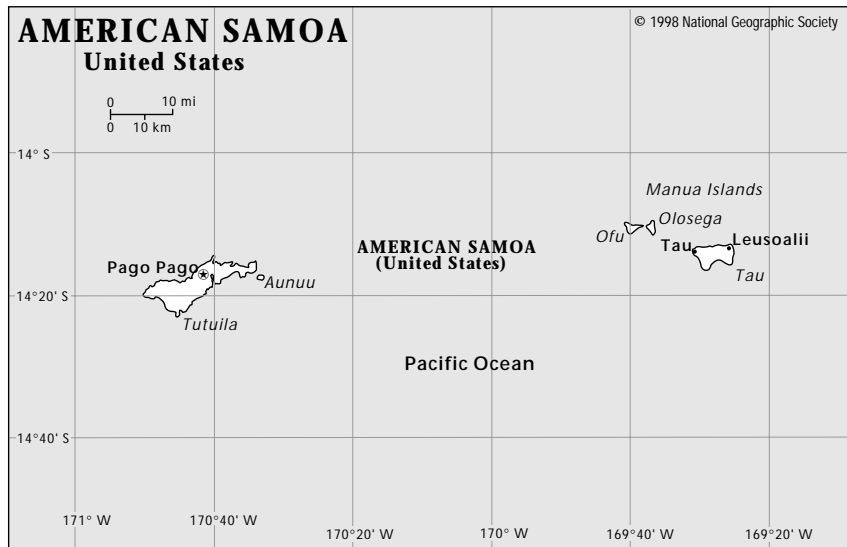
UN 1992, *Law of the Sea: Report of the Secretary-General*. United Nations General Assembly, 47th session.

UNDP 1994, *Pacific Human Development Report*, UNDP, Suva, Fiji.

Veitayaki, J. 1993, 'Addressing climate change and sea-level rise: the role of NGOs', in *Climate Change and Sea Level Rise in the South Pacific Region*, eds J. Hay and C. Kaluwin, SPREP, Apia, Samoa, pp. 212–216.

World Bank 1995, *Pacific Island Economies—Building a Resilient Economic Base for the Twenty First Century*, Country Department III, The World Bank, Washington DC, United States of America.

AMERICAN SAMOA



PHYSICAL CHARACTERISTICS

American Samoa is comprised of five volcanic islands (Tutuila, Aunu'u, Ofu, Olosega and Ta'u) and two coral atolls (Rose and Swains). It is the only United States Territory south of the equator, and is situated just east of the International Dateline (lat. 14°S; long. 170°E). The islands have a total land area of approximately 202 sq km.

All of the islands, except Swains Island, are aligned along the crest of a submarine ridge which comprise the eastern (7%) portion of the Samoan Archipelago. The complex volcanic origin of Tutuila, Aunu'u, Ofu, Olosega, and Ta'u is characterised by rugged mountainous terrain, high sea cliffs and limited, flat coastal strips. These high islands rise precipitously from the sea and are densely covered with lush tropical vegetation. Inhabitable land is limited to narrow coastal areas, which are often fringed with relatively narrow coral reefs.

Tutuila, the largest island and the population centre, is 29 km long and from 1 to 9.7 km wide with a total land area of 137 sq km. The island is the top of a composite volcano and is topographically rugged and geographically complex. The capital Pago Pago is situated on Tutuila and serves as an administrative centre. The island is nearly bisected on the southeast shore by a deep natural embayment known as Pago Pago Harbor. The numerous mountain peaks, which form the steep east-west ridge range from 300–460 m

in elevation. The physical character of the island group is dominated by two mountains on Tutuila, Mt Matafao and Mt Pioa ('Rainmaker'). Matafao Peak is the highest point with an elevation of 653 m. Almost 70% of the land on Tutuila has a slope of greater than 30%. Short perennial and intermittent streams drain the divide, while a few larger streams have wide flat deltaic valleys where villages are often located. The Tafuna-Leone Plain is the only expanse of flat land on the island.

Aunu'u is located about 1.6 km off the southeastern coast of Tutuila, and has a land area of about 2.6 sq km. The island is a volcanic cone, and the eastern and southern rim of the crater is steep and rugged, rising to an elevation of 95 m. A shallow lake with a large expanse of freshwater marsh comprises the crater floor. The village occupies the flattened outside edge of the cone.

The Manu'a Group, including the islands of Ofu, Olosega and Ta'u, lies about 111 km east of Tutuila. Ofu and Olosega are remnants of a single volcanic island, and today have a combined land area of 13 sq km. The islands are separated by the narrow (150 m wide) Asaga straight. Both islands rise abruptly from the ocean with only a narrow band of flat land along the coast.

Ta'u is the largest island in the Manu'a Group, and has a total land area of 44 sq km. Most of the northern and western coastline consists of a wide coastal plain, while sheer cliffs with spectacular cascades comprise

the southern shore. The villages on the western end are located on terraces 3–4.5 m above sea level. At 965 m, Mt Lata is the highest peak in the Territory.

Rose Atoll is located about 241 km east-southeast of Pago Pago Harbor. The atoll consists of two low sandy islands (Rose and Sand) on a coralline algae reef that encloses a 2000 m wide lagoon. The total land and reef area of the atoll is 650 ha. Rose Island is 7 ha with 1 km of shoreline. Sand Island is 0.8 ha with 0.5 km of shoreline. The atoll was designated a US National Wildlife Refuge in 1973.

Swains Island is privately owned and located approximately 370 km north of Tutuila. The island is a ring-shaped atoll that encloses a large brackish water lagoon.

It has been estimated that 70% of American Samoa's land is forest and 30% is classified as suitable for agriculture although only about 4800 ha of land is under any form of cultivation.

American Samoa has a warm, humid, tropical climate with a mean annual temperature of 26°C. Average monthly temperatures vary from the annual average by about 1.7°C. The average daily temperature range is 8.4°C. Relative humidity ranges from 72–93%, with an average of 80%.

During the dry season (May to November) moderate southeast trade winds predominate. June to August exhibit the driest and coolest conditions. Weakened variable winds occur during the wet season (December to April) causing the highest temperatures and heaviest rains from January to March. Average annual rainfall measured at Pago Pago International Airport weather station is 3175 mm. However, rainfall varies greatly with elevation and aspect. In Pago Pago Harbor, rainfall is 5080 mm per year, while at Mt. Lata on Ta'u, average annual rainfall is estimated at 7600 mm.

GOVERNMENT STRUCTURE

American Samoa was taken over by the United States of America (USA) in 1900 and is now an unincorporated US territory. It has a bicameral legislature (Fono) with an 18 member Senate and a 20 member House of Representatives. The American Samoan Government (ASG) is divided into three branches: executive, legislative and judicial. The chief executive is a Governor who is popularly elected.

The Office of Samoan Affairs (Office of Local Government) supervises operations at the district, county and village levels, including village water

systems, roads, sanitation, agriculture, schools and arbitration of land disputes.

COASTAL ZONE MANAGEMENT ISSUES

Most coastal zone management issues stem directly from the impacts of rapid population growth and a high effective population density. American Samoa's annual rate of population increase is 3.7%, one of the highest growth rates in the South Pacific. If this rate continues, the population has a doubling time of just 19 years.

Only 34% of the land on Tutuila is on a slope of less than 30%. This defines, for most practical purposes, the area available for human use; as there is a total land area of only 137 sq km on Tutuila, the island's 45 000 residents live, in effect, on just 47 sq km. If you then subtract the area used by the island's network of roads, without considering the usual needs or desires for open recreational space, the effective human population density currently approaches an average of 1042 people per sq km. Tutuila thus experiences population densities equivalent to many metropolitan areas. Unlike those areas, however, land use planning, zoning and other environmental regulatory functions in American Samoa have fallen behind any meaningful and effective control of the current pace of land conversion, development and waste output.

American Samoa's economy is heavily dependent on fish canneries and government spending. About 33% of the labour force is made up of cannery workers, 32% are government workers and 27% are with other private sector firms. It is estimated that some 25% of the total income, including both cash and non-cash, of the Samoan community is derived from the natural environment (Volk et al. 1992).

The original vegetation of American Samoa consisted mostly of tropical rainforests, coastal vegetation and wetlands. As much as 75% of the original rainforest on Tutuila has been cleared for cultivation and/or for human habitation. This land conversion has led to increased soil erosion, and will continue to be a problem with increased demands for residential and agricultural land. As a result valleys and upper watershed areas that currently harbour native vegetation or longstanding secondary vegetation will become the target for future land conversion.

Habitat conversion through landfilling is common, especially in coastal wetlands, as more land suitable for development is sought. Some of the wetland alteration is the result of taro cultivation but the vast majority of wetland loss is due to landfilling for

residential purposes. Between 1961 and 1991, nearly 25% of all remaining wetlands on Tutuila were converted to dry land through landfilling. The island's original wetland acreage was, however, significantly more extensive than that which existed in 1961. For example, archive records indicate that prior to 1900, significant portions of the Pago Pago Harbor coastal area, including what is now Pago Pago Park, Aua Village and Utulei Village, was once vegetated with mangroves. Furthermore, 95% of the coral reefs in inner Pago Pago Harbor have been completely destroyed by dredging and filling (IUCN/UNEP 1988).

Natural shorelines are also fast disappearing, aided by the interactive effects of uncontrolled sand mining and erosion. The tradition of removing sand and coral rubble from the shoreline of American Samoa continues unabated, and in fact accelerated in early 1992 as a result of reconstruction efforts in the wake of Cyclone Val. Numerous attempts by the American Samoan Government to impose restrictions on sand mining have failed.

The Territory's leading coastal zone management issues may thus be summarised as:

- steady habitat destruction through land conversion;
- accelerated soil and coastal erosion (including sand mining);
- loss of soil fertility;
- coastal reclamation;
- wetland filling;
- coral reef sedimentation, eutrophication and pollution;
- overharvesting; and
- pollution of ground, surface and nearshore waters.

Several marine species are threatened or endangered, including the hawksbill and green sea turtles (*Eretmochelys imbricata* and *Chelonia mydas*) and two species of giant clam (*Tridacna maxima* and *T. squamosa*). A third species of giant clam (*Hippopus hippopus*) is already locally extinct.

COASTAL ZONE MANAGEMENT RESPONSIBILITIES

American Samoa's Coastal Management Programme (CMP) is housed and administered within the Office of Economic Development and Planning (EDPO). Under CMP the Government of American Samoa is responsible for

coordinating a comprehensive permit and review process, using the increased technical capability of its personnel, and with sensitivity to Fa'a Samoa (the traditional Samoan way) in the exercise of government administration. The CMP includes sixteen policies that are to be considered by various agencies and technically-oriented government employees during the review of proposed projects that are likely to affect coastal areas. These policies relate to:

- shoreline development;
- coastal hazards;
- fisheries development;
- slope erosion;
- major facility siting;
- agricultural development;
- reef protection;
- recreation/ shorefront access;
- water quality;
- marine resources;
- drinking water quality; and
- unique areas.
- archaeological/ cultural/ historic resources
- air quality

Coastal zone management activities currently underway include:

- a non-point source management plan and programme which aims to prevent soil erosion, stormwater runoff, solid waste, pollution from septic tanks, piggeries and so on;
- a pollution prevention programme which focuses on protecting water quality;
- a coastal hazards mitigation programme which attempts to plan for, and advise the public on, coastal hazards such as storms and landslides;
- a wetlands management programme which aims to protect the wetlands of American Samoa through education, public awareness and village-based protection projects;
- a marine debris prevention programme whose goals include the prevention of solid waste disposal in streams and the ocean;
- public awareness and education programmes including:
 - a non-point source public education programme;
 - an anti-litter programme;
 - a marine debris prevention programme;
 - Americorps Programme (an international

- programme training young people for environmental work);
- Wetland Management Program;
- promotional items including brochures, posters, videos, t-shirts and bumper stickers;
- annual education projects including Coastal Discoveries, Marine Discoveries, Marine Science Summer Camp, Summer Camp Programmes and Reefweeks, a three-week programme for schools;
- public awareness and outreach efforts including Coastweeks (a three-week public awareness programme with many island-wide events), Earth Day programmes, religious leaders environmental conferences, newspaper releases/columns, media campaigns, TV ads, Reefweeks classroom and coloring contests as well as school competitions, school outreach and interpretive signage.

MAIN ICM ORGANISATIONS

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The CMP was established in the Territory in 1980, under the stewardship of the National Oceanic and Atmospheric Administration/ Ocean Coastal Resources Management Office of the US Federal Government. In 1990, the American Samoa Fono passed legislation on coastal management binding the Territory and its people to conform and abide by regulations and policies regarding the coastal zone. CMP legislation establishes coastal zone management areas of Tutuila; the Manu'a Island group, Aunu'u Island, Rose Island, Swains Island, and all coastal waters and submerged lands for a distance of three nautical miles seaward.

ASCMP is housed and administered within the Office of Economic Development and Planning. The ASCMP rules cover development of coastal areas, and are aimed at:

- protecting unique areas, including wetlands and reefs;
- developing strategies for coastal hazards;
- conserving marine resources; and
- coordinating the planning, monitoring, and enforcement by government agencies.

Rules and regulations include:

- authority for the Project Notification and Review System (PNRS), which is an inter-agency panel that reviews all development projects in American Samoa for compliance with Federal and Territorial laws and regulations, aimed at avoiding or mitigating damage to the environment (including coral reefs). The board specifically reviews all projects, including those which involve prohibited drilling, blasting and/or dredging, and point and non-point source pollution. Permits are required for new projects. Enforcement is provided by ASCMP (2 wetland conservation officers and 2 compliance officers). Violations result in stop orders, and continued violations are referred to the Attorney General;
- rules that prohibit dredging or filling of coral reefs and other submerged lands unless a public need is demonstrated, and provided there are no environmentally preferable alternatives available and adverse impacts are minimised;
- administrative rules that prohibit: discharge of untreated sewage, petroleum products and other pollutants or hazardous material; removing sand and aggregate material outside designated sites;

destruction of reef matter not associated with permitting; disposal of trash; and non-permitted dredge and fill activities; and

- non-regulatory measures such as public education aimed at reducing erosion and the impact of piggeries; technical assistance provided when required; and the provision of solid waste and oil collection facilities.

ASCMP has three special management areas: Leone wetland and Pala, Nu'uuli wetland and Pala and Pago Pago Bay.

- The Nu'uuli Pala is the largest mangrove swamp on Tutuila. It is designated a Special Management Area under the Coastal Management Act of 1990, in recognition of its size, fish and wildlife habitat, recreational value and general importance, including subsistence use, to the community. The wetland (excluding the lagoon) covers 50 ha of which approximately 40 ha are covered with mangroves. Also within the wetland is a narrow strip of saltwater marsh at the end of Coconut Point, and several areas of freshwater marsh. Most of the freshwater marshes and much of the mangrove areas have been disturbed by household trash disposal, clearing, and filling that has altered the hydrology of the wetlands. There are several formerly cultivated areas that are now abandoned. The adjacent Nu'uuli Village is one of the largest and fastest growing human settlements on Tutuila. Pressure to convert fringe wetlands continues to be great, with at least six cases of severe environmental disruption caused by filling wetland for individual use. The ASCMP is working with territorial and federal agencies to refine the Nu'uuli wetland management plan and to gain village support for the development of a village ordinance favouring wetlands protection. Delineation maps have been completed and are used by EDPO and the PNRS in the assessment of new land use permit applications within and adjacent to the area.
- The Leone Pala contains a mangrove swamp within an enclosed embayment. This wetland was designated a Special Management Area due to its importance as fish and wildlife habitat, its historical significance and its role as a focal point for Leone Village. It encompasses approximately 9 ha, of which some 3.4 ha are covered with mangroves. The remainder is freshwater wetland dependent on inflowing streams, and is a mixture of wooded swamp and cultivated marsh. Two streams and three springs, in addition to the tidal waters, determine the character of this unique wetland. Human impacts are similar to those at Nu'uuli, and include retaining walls, pig pens, chicken farms and trash disposal within the fringe. Similar management efforts to those used for the Nu'uuli wetland are under way. ■

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ASEPA regulations cover water quality standards and enforcement of water quality protection. This includes:

- prohibiting the discharge of oil or hazardous substances from boats (fines \$100-\$1000);
- covering regulations for the use of septic tanks, pesticides and activities resulting in soil erosion, litter and solid waste disposal;
- requiring National Pollution Discharge Elimination System (NPDES) permits for all discharges (American Samoa's Environmental Quality Act provides for standards at various distances from discharges); and
- requiring certificates for prohibited drilling, blasting and/or dredging.

Enforcement programmes include marine enforcement, solid waste hotline and enforcement, water quality violation enforcement and erosion control regulations, plans, and guidance. ■

Department of Marine and Wildlife Resources

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Deputy Director

DMWR aims to manage, protect and preserve marine and wildlife resources, including coral reef ecosystems

Regulations include:

- prohibiting the collection of coral in less than 60 feet of water
- requiring a permit for the commercial harvest of coral below 60 feet;
- prohibiting the use of explosives on reefs and the destruction of fish habitat;
- prohibiting the destruction of fish habit; and
- fishing regulations.

Regulations are enforced by DMWR's conservation office.

DMWR has a small Territorial Marine Park on Ofu, which is adjacent to the National Park of American Samoa. The park was obtained as mitigation for coral reef habitat destroyed by the construction of Faleasao Harbor on Ta'u, and regulations are yet to be developed for the area. ■

OTHER ICM ORGANISATIONS

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Fagatele Bay was established as a National Marine Sanctuary in August 1986 under the US Marine Protection Research and Sanctuaries Act. Fagatele is a small bay (0.65 sq km) which comprises a diverse coral reef community.

FBNMS is administered by the ASG/EDPO through a grant from the National Oceanic and Atmospheric Administration/Office of the Ocean and Coastal Resources Management (NOAA/OCRM), Sanctuaries and Reserves Division. At present, there are no visitor facilities or improved visitor access to the bay.

FBNMS regulations protect the biological and physical resources of Fagatele Bay. These include:

- prohibiting fishing and the gathering, taking, breaking, cutting, destroying or possessing of corals and other invertebrates;
- prohibiting vessel discharge, drilling, dredging, blasting, and other alteration of the seabed; and
- controlling anchoring (such as through the provision of mooring buoys) so there is no damage to bottom formations.

FBNMS contracts with DMWR's conservation office to patrol the Sanctuary, and NMFS agents are authorised to enforce federal laws concerning endangered species, including the Lacy Act concerning the transport of endangered species or their products. ■

National Park of American Samoa

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 Superintendent

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 Wildlife Biologist

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The US Congress authorised the National Park of American Samoa (NPAS) in October 1988. The purpose of the park is to “preserve and protect the tropical forest and archeological and cultural resources of American Samoa, and of associated reefs, to maintain the habitat of flying foxes, preserve the ecological balance of Samoan tropical forest and, consistent with the preservation of these resources, to provide for the enjoyment of the unique resources of the Samoan tropical forest by visitors from around the world”.

The NPAS is comprised of three widely separated units on the islands of Tutuila, Ta'u and Ofu, encompassing approximately 7970 acres of land and approximately 2550 acres of adjacent offshore waters. The Tutuila Unit takes in approximately 2500 acres of land and approximately 1200 acres of offshore waters, including coral reefs. This unit is located along the north-central shore of Tutuila and the park boundaries extend to approximately 1/4 mile offshore. The Ta'u Unit comprises approximately 5400 acres of land and 1000 acres of offshore waters. This unit takes in the southeastern half of Ta'u, and extends to approximately 1/4 mile offshore along the island's eastern and southern coasts. The Ofu Unit is the smallest unit, comprising approximately 70 acres of land and approximately 350 acres offshore. The park is located on the southern shore of Ofu, and extends from the shoreline to approximately 1/4 mile offshore, including the fringing reef.

The NPAS was legally established with the signing of a 50-year lease agreement between the Governor of American Samoa, acting on behalf of the village landowners, and the National Park Service (NPS) in September 1993. The lease agreement authorises the NPS to manage and use the leased premises for national park purposes.

The NPAS has recently developed a General Management Plan for the future management, development and public use of the park. The plan calls for the implementation of management strategies to ensure the long-term protection of the national park's natural, cultural and subsistence resources and the development of a full programme to interpret those resources for visitors. The national park is to be operated in a manner consistent with Fa'a Samoa.

Specific coastal zone management activities to date include:

- closing a nearshore dump site near the village of Vatia;
- developing rules and regulations, including a ban on commercial fishing in the park;
- participating in PNRS meetings (see ASCMP) which relate to the national park; and
- sponsoring resource surveys of the coral reefs in the Ofu and Tutuila Units.

The following requirements by Congress give additional direction to the NPS with regard to the management and use of the park:

“Traditional Samoan customs are to be maintained within the national park. Subsistence uses of park lands and waters are provided for. Agriculture, gathering, or fishing uses within the park are to be confined to native American Samoans and will be very limited in scope and locations. They are to be carried out with traditional tools and methods. The NPS is expected to work with village leaders to clarify and reach agreement as to the rules which are to be imposed regarding these uses.

“The NPS is required to administer the park in accordance with the 1916 Act to establish the national park system and such other authorities the Service has to protect the natural and cultural resources of the park.” ■

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Wildlife Biologist

Rose Atoll was designated a National Wildlife Refuge in July 1973. The refuge comprises two islands (Rose and Sand Islands) and the surrounding coral reef, which encloses a central lagoon.

Rose Atoll NWR is co-managed by the US Dept. of the Interior's US Fish and Wildlife Service (USFWS) in Honolulu and American Samoa's Dept. of Marine and Wildlife Resources. The mission of the USFWS refuge system is to protect wildlife. All other activities within the refuge must be compatible with wildlife conservation.

The refuge is uninhabited and access is by permit only, obtainable from the USFWS. ■

United States Coast Guard

PO Box 249
Pago Pago 96799

Tel: (684) 633-2299
Fax: (684) 633-1933

Lt. Michael Sakaio
USCG MSD Detachment

The USCG enforces regulations regarding vessel discharge (OPA 90) and levies fines for oil and sewage spills. ■

Le Vaomatua

PO Box 4570
Pago Pago 96799

Tel: (684) 688-7218
Fax: (684) 688-7218

Mr John Enright
President

Le Vaomatua is a tax-exempt non-profit organisation. Activities include environmental watch-dogging, lobbying and education. ■

SELECTED DOCUMENTS ON ICM

American Samoan Government 1995, 'American Samoa coral reef initiative strategic plan, 1995', information paper 22, *International Coral Reef Initiative Pacific Regional Workshop*, 27 Nov–1 Dec 1995, Suva, Fiji. 7 pp.

Green, A. L. 1997, *An Assessment of the Status of the Coral Reef Resources and their Patterns of Use in the US Pacific Islands*, Final report prepared for the Western Pacific Regional Fisheries Management Council, 1164 Bishop Street, Suite 1405, Honolulu Hawaii 96813, 260 pp.

Hunter, C. 1995, *Review of Coral Reefs Around American Flag Pacific Islands and Assessment of*

Need, Value and Feasibility of Establishing a Coral Reef Fishery Management Plan for the Western Pacific Region, final report prepared for Western Pacific Regional Fishery Management Council, Honolulu, Hawaii, 30 pp.

IUCN/ UNEP 1988, *Coral Reefs of the World: Vol. 3, Central and Western Pacific*, IUCN/ UNEP, Nairobi, Kenya, 329 pp., 30 maps.

NPS 1997, *General Management Plan/ Environmental Impact Statement: National Park of American Samoa*, United States Department of the Interior, National Park Service Report, October 1996.

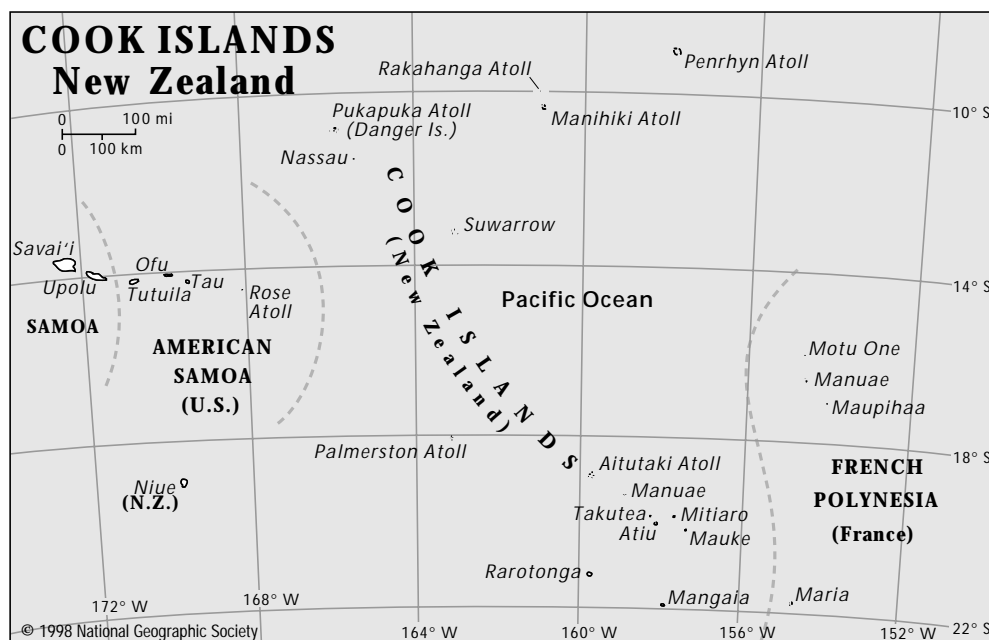
PBDC 1995, *American Flag Pacific Islands Coral Reef Initiative Management Program Planning Meeting Summary Report*, prepared on behalf of the American Flag Pacific Island Governments by Pacific Basin Development Council, 24 pp.

Templet Resources Inc. 1986, *Manu'a Economic Development and Environmental Management*, prepared for American Samoa Coastal Management Program, Pago Pago, American Samoa.

Volk, R and Kolise, T. 1991, 'Pacific Basin ICM '91: creating a futures vision', *Conference Proceedings*, Coastal Zone Management Program, Pago Pago, American Samoa.

Volk, R. D., Knudsen, P. A., Kluge, K. D. and Herdrich, D. J. 1992 *Towards a Territorial Conservation Strategy and the Establishment of a Conservation Areas System for American Samoa*, a report to the Natural Resources Commission, 114 pp. A publication of Le Vaomatua, Inc. with funding provided by the John D. and Catherine T. MacArthur Foundation through the East-West Center, Honolulu, Hawai'i.

COOK ISLANDS



PHYSICAL CHARACTERISTICS

The Cook Islands comprise 15 islands, located between 9° and 23°S latitude and 156° and 167°W longitude. The country is geographically divided by the 15th parallel into a northern group and a southern group. The more populous southern group consists of Rarotonga (a high volcanic island), four raised makatea islands (Mangaia, Mitiaro, Mauke and Atiu), one emerging atoll (Aitutaki), two atolls (Palmerston, and the uninhabited atoll of Manuae) and the uninhabited sand cay of Takutea. The Northern group consists of four inhabited atolls (Manihiki, Rakahanga, Penrhyn (Tongareva) and Pukapuka), one uninhabited atoll (Suvarrow) and an inhabited sand cay (Nassau).

Around the majority of these islands the sea floor falls rapidly to a depth of between 4000 and 5000 m. The Manihiki Plateau is the exception, with depths of between 2000 and 3000 m. The Exclusive Economic Zone is one of the largest in the South Pacific at 1830 000 sq km.

GOVERNMENT STRUCTURE

The Cook Islands is an internally self-governing state in free association with New Zealand, which is responsible for national defence.

Executive authority is vested in the British monarch, who is Head of State, and is exercised through her official representative. New Zealand maintains a High Commission on Rarotonga. Executive government is carried out by the Cabinet, consisting of the Prime Minister and normally eight other ministers. The Cabinet is collectively responsible to the Parliament, which is formed of 25 members who are elected by universal adult suffrage every five years (including one member elected by non-resident voters). The House of Ariki, which comprises up to 15 members who are hereditary chiefs, advises the government but has no legislative powers. Each of the main islands, except Rarotonga, has an elected island council and a government representative who is appointed by the Prime Minister. Local district councils are planned for Rarotonga, and expected to be established in 1998.

COASTAL ZONE MANAGEMENT ISSUES

Due to the small land mass of the islands, human activities on land have had a direct or indirect impact on the coastal zone. These impacts include:

- **Soil Erosion.** Soil erosion results from poor land management. Agriculture and deforestation washes soil into the lagoons smothering coral and freshwater spawning

sites, especially on the high islands. On Rarotonga people are now constructing houses on the inland slopes, where poorly planned land clearing and road construction sometimes causes extensive soil erosion.

- **Liquid and solid waste.** Waste management is a problem common to all islands, but especially Rarotonga where effluent seeps into the lagoon from household septic tanks, tourist resorts and farms for pigs and chickens. Poorly planned sewage systems and overflowing septic tanks are the major culprits. In most cases there is no sewage collection from pig pens and chicken sheds, despite the fact that pigs outnumber people on the island.

On Rarotonga, most inorganic rubbish is dumped at the already overfull landfill site. Irresponsible individuals also dump rubbish on the beaches and inland valleys. Apart from an aluminium can crushing centre on Rarotonga, which exports crushed cans to New Zealand for recycling, there is no recycling scheme in the Cook Islands. There have been recent positive steps by environmental NGOs and importers to initiate a kerb side rubbish sorting system to reduce waste going into the land fill site and facilitate recycling of plastics and glass.

A stock pile of hazardous agricultural chemicals on Rarotonga, which are no longer used, is a threat to the environment. A safe method of disposal is required.

- **Over-harvesting of marine resources.** Over-harvesting of certain species including tridacnid clams, reef fish and coconut crabs occurs on most islands.
- **Beach mining.** The construction industry requires sand, coral and gravel aggregates that are often taken from the beaches in the outer islands, contributing to coastal erosion. The Environment Act (1994–95) prohibits this practice on Rarotonga, but infringements occasionally occur.
- **Foreshore development.** Reclamation of land for construction and inappropriate sea-walls are major problems, mainly on Rarotonga and Aitutaki.

An early attempt at integrated Coastal Zone Management in the Pacific was the Pukapuka Project. Pukapuka in the northern Cooks was selected as typical of low islands in the Pacific and a ICM planning project was implemented.

The establishment of the Environment and Sustainable Development Task Force (ESDT) in 1992 was a first attempt to bring together a multi-sectoral government team to address environmental issues. As

its principal objective, the ESDT was to guide the preparation of a National Environment Management Strategy (NEMS) that aims to address environmental issues in the Cook Islands and provide a framework for sustainable development. The NEMS was completed and endorsed in early 1993. Included in the NEMS was support for an integrated coastal management programme. This programme is currently underway in Rarotonga, Aitutaki, Mauke, Mangaia, Manihiki and Penrhyn.

ENVIRONMENTAL LEGISLATION

The following activities on Rarotonga are prohibited under the Rarotonga Environment Act 1994/95:

- pollution of Rarotonga's waters and internal waters;
- dumping waste into the lagoon, or in such a manner that it may be washed into the lagoon;
- the removal of silt, sand, cobble, gravel, boulder, coral or any tree from the foreshore or Rarotonga waters; and
- indiscriminate disposal of toxic chemicals.

The Act also provides for the Queen's Representative to legislate for the regulation or prohibition of pollution of air, water or land, and the prevention and control of soil erosion and siltation. An Environmental Impact Assessment is required for any activity likely to affect the environment.

Other environmental legislation includes:

- The 1986 amendment to the Harbour Control Regulations 1974, which prohibits net fishing within the limits of Avatiu Harbour. These regulations also require the ship's owner to be responsible for removing any sunken, stranded, or abandoned ship from Rarotonga's harbours;
- The Animal Disease Prevention Regulations 1982 (pursuant to the Animals Act 1975) prohibits the dumping of refuse by any overseas ship within the Cook Islands Territorial Sea (12 mile limit); and
- The Marine Resources Act 1989, which is the cornerstone of the Cook Islands' control over the exploitation and management of the resources of its Territorial Sea and Exclusive Economic Zone (EEZ). The Act provides for the licensing and control of fishing vessels and fishing activities within those areas.

There are also environmental provisions relevant to the coastal zone in the Draft Shipping Bill, and the

Draft Marine Pollution Act, both expected to be tabled in parliament at a future date.

the procedures set out under the Outer Islands Local Government Act 1987.

LOCAL GOVERNMENT

The Outer Islands Local Government Act 1987 provides the Island Councils of the Outer Islands with the right to make by-laws on a range of sectors. In general, a bylaw may be promulgated which “regulates, controls, or prohibits any act, matter, or thing usually the subject matter of local control or prohibition in respect of that island”. With regard to fishing, for example, the Act provides for the regulation and control of fishing, shell fishing, pearl diving, or the use of any net within the lagoon. The Marine Resources Act 1989 also empowers Island Councils, together with local fisheries committees, to manage and develop their fishery resources. They can achieve this by recommending the promulgation of by-laws for a designated fishery, in accordance with

Few Island Councils have actually made use of these provisions to date. Bylaws which have been declared include:

- Aitutaki Fisheries Protection Bylaw 1990;
- Manihiki pearl and pearl shell bylaw 1991;
- Manihiki Milk fish by laws 1991;
- Penrhyn pearl and pearl shell by law 1993; and
- Rakahanga Bylaw, 1997 (Draft).

The Cook Islands also has traditional resource management rules and practices, in particular use prohibitions called *ra’ui*. These are applied by Island Councils to particular resources, including shoreline and offshore resources, with a view to conserving them.

MAIN ICM ORGANISATIONS

The Environment Division

PO Box 371
Rarotonga

Tel: (682) 21256
Fax: (682) 22256, or 21134

Mr Ned Howard
Director

Mr Teariki Rongo
Chief Executive Officer

The Environment Service has recently suffered from significant downsizing, in line with the Government’s restructuring policy. Staff have been reduced from a high of 18 in 1995 to 7 in 1998. The Division’s priority under these reduced staffing levels is the establishment of Environmental Impact Assessment Guidelines for Rarotonga. The Division’s previous activities in lagoon monitoring, wildlife conservation and foreshore protection are now largely left to other organisations. ■

Ministry of Marine Resources

PO Box 85
Rarotonga

Tel: (682) 28721
Fax: (682) 29721

Mr Raymond Newnham
Secretary for Marine Resources

The Ministry is responsible for promoting the development and ensuring the effective management of the Cook Islands marine resources. Among other activities, the Ministry negotiates fishery access agreements and licenses commercial fishing operations. ■

Ministry of Tourism and Transport

| | |
|------------------------|--------------------------------------|
| PO Box 61 Rarotonga | Tel: (682) 28810 Fax: (682) 28816 |
|------------------------|--------------------------------------|

Mr Henry Puna
Secretary for Tourism and Transport

Mr Aukino Taiera
Director of Shipping

| | |
|---------------------------------|------------------|
| Capt. Don Silk Harbourmaster | Tel: (682) 28814 |
|---------------------------------|------------------|

This ministry is responsible for the development and management of Rarotonga harbours, including the enforcement of regulations controlling pollution and dumping in these areas. ■

OTHER ICM ORGANISATIONS

Disaster Management Office

| | |
|-------------------------|--------------------------------------|
| PO Box 101 Rarotonga | Tel: (682) 29609 Fax: (682) 29331 |
|-------------------------|--------------------------------------|

Mr Anthony Brown
Director of Disaster Management

The office is responsible for the preparation of disaster management plans for all of the Cook Islands, covering pre-disaster preparation, mitigation, prevention, response, evacuation, rehabilitation and reconstruction. ■

Ministry of Outer Island Affairs

| | |
|-------------------------|--------------------------------------|
| PO Box 383 Rarotonga | Tel: (682) 20321 Fax: (682) 24321 |
|-------------------------|--------------------------------------|

Mr Kato Tama
Secretary for Outer Island Affairs

This ministry is responsible for all government activities and staff on the outer islands, though currently this excludes Marine Resources and Energy. ■

Office of the Prime Minister

| | |
|--------------------------|--------------------------------------|
| Private Bag Rarotonga | Tel: (682) 25494 Fax: (682) 23792 |
|--------------------------|--------------------------------------|

Mr Temu Okotai
Chief Executive Officer

The office is responsible for administering Suvarrow Atoll, declared a National Park to protect the sea bird colonies in 1978. The PM's office also has a policy division, involved in all government policy decisions, including any to do with coastal zone management. ■

Ministry of Works

PO Box 102
Rarotonga

Tel: (682) 20034
Fax: (682) 21134

Mr Keu Mataroa
Acting Secretary

The ministry is responsible for implementing some coastal zone protection projects on Rarotonga. ■

Ministry of Health

PO Box 109
Rarotonga

Tel: (682) 29664
Fax: (682) 23109

Dr Roro Daniel
Secretary for Health

Tourism Cook Islands

PO Box 14
Rarotonga

Tel: (682) 29435
Fax: (682) 21435

I'o Tuakeu Lyndsay
Chief Executive

Tourism Cook Islands actively promotes the coastal zone (beaches) of the Cook Islands as a tourist destination. ■

Ministry of Foreign Affairs

PO Box 105
Rarotonga

Tel: (682) 29347
Fax: (682) 21247

Mr Edwin Pittman
Secretary for Foreign Affairs

This is the official Cook Island Government focal point for overseas aid donors in all sectors, including coastal zone management. ■

Taporoporoanga Ipukarea Society Incorporated

PO Box 649
Rarotonga

Tel: (682) 26189
Fax: (682) 22189

Ms Jolene Bosanquet
President

This is an environmental NGO that promotes public awareness on issues affecting the environment, including the impacts of man's activities on the coastal zone. ■

Cook Islands Natural Heritage Project

PO Box 781
Rarotonga

Tel: (682) 20959
Fax: (682) 24894

Mr Gerald McCormack
Director

The project maintains a database on the natural resources of the Cook Islands, including plants and animals that inhabit the coastal zone. ■

Koutu Nui (Traditional Leaders)

PO Box 59
Rarotonga

Tel: (682) 24280
Fax: (682) 21585

Te Tika Mataiapo (Dorice Reid)
President

The Koutu Nui have played a key role in instigating marine protected areas (ra'ui) around Rarotonga. ■

**World Wide Fund for Nature (WWF) Partnership
in Conservation and Development Project**

PO Box 649
Mail Depot 8, Ngatangia
Rarotonga

Tel: (682) 25093
Fax: (682) 25131
E-mail : wwfcooks@gatepoly.co.ck

Ms Jacqui Evans
Coordinator, Cook Islands Project

WWF provides funding assistance and awareness materials for conservation related projects, including those concerning coastal zone management. (See also the entry on WWF in the 'Regional' chapter.) ■

SELECTED DOCUMENTS ON ICM

- Adams, T. J. H., Bertram, I., Dalzell, P.J., Koroo, M., Matoto, S., Ngu, J., Terekia, O., Tuara, P.N. 1996, *Aitutaki Lagoon Fishery: Report of a Field Survey by the Cook Islands Ministry of Marine Resources in Conjunction with the South Pacific Commission Integrated Coastal Fisheries Management Project, with Recommendations Towards a Fishery Management Plan*, ICFMaP Informal Reports series, SPC, Noumea.
- Baronie, F. 1995, *A Report on the State of Reef Fish Populations, Community Fishing Practices and Tourist Attitudes to Lagoon Issues in Aitutaki*, Cook Island Conservation Service, Rarotonga.
- Barrett Consulting Group, 1995, *Final Report for the Integrated Urban Infrastructure Project, Rarotonga, Cook Islands*, main report, Asian Development Bank, Manila.
- Barrett Consulting Group 1995, *Final Report for the Integrated Urban Infrastructure Project, Rarotonga, Cook Islands*, appendix vol 1, Asian Development Bank, Manila.
- Barrett Consulting Group 1995, *Final Report for the Integrated Urban Infrastructure Project, Rarotonga, Cook Islands*, appendix vol 2, zoning code and septic tank code revisions, Asian Development Bank, Manila.
- Barrett Consulting Group 1995, *Aitutaki Infrastructure Evaluation Phase 1*, Final Report, Office of the Prime Minister, Rarotonga.
- Cook Islands Conservation Service 1992, *National Environment Management Strategy*, SPREP, Apia, Samoa.
- Holden, B. 1992, *Ocean Currents and Circulation: Avarua-Motutoa, Rarotonga, Cook Islands*, SOPAC Technical Report no. 143.
- Munro, D. M. 1996, *Case Study of a Traditional Marine Management System, Pukapuka Atoll, Cook Islands*, Forum Fisheries Agency, Honiara and FAO, Rome.
- Passfield, K. D. 1993, *Survey of the O'out Fish Nursery Reserve, Aitutaki, with Management Recommendations*.
- Passfield, K. D. 1997, *Cook Islands Marine Resources Review*, WWF, Suva, Fiji.
- Passfield, K. D. and Tiraa, A. 1998, *Management Plans for the Marine Protected Areas (ra'ui) around Rarotonga*, a series of 4 plans prepared for Koutu Nui and WWF, Cook Islands Partnership Programme.
- Paulay, G. 1994, *The State of the Reef: Aitutaki Surveys, 1994*, Marine Laboratory, University of Guam.
- Preston, G., Lewis, A. D., Sims, N., Bertram, I., Howear, N., Maluofenua, S., Marsters, B., Passfield, K., Tearii, T., Viala, F., Wright, A. and Yeeting, B. 1995, *The Marine Resources of Palmerston Island, Cook Islands*, report of a survey carried out in September 1988, SPC, Noumea.
- Pulea, M. 1992, *SPREP Review of Environmental Law in the Cook Islands: Strengthening Environment Management Capabilities in Pacific Island Developing Countries*, RETA 5403, Australian Centre for International Law, Faculty of Law, University of Sydney, Australia.
- RDA International Inc. 1995, *Summary Technical Report, Cook Islands Black-lip Pearl Oyster Project*, report

prepared under the Pacific Islands Marine Resource Project, Cook Islands Component, Project No. 879-0020, RDA International Inc. Placerville, California.

Richards, A. 1993, *Fiji Fisheries Resource Profiles*, FFA Report 93/25. Forum Fisheries Agency, Honiara.

Rongo, T. 1993 *The Cook Islands State of the Environment Report*, SPREP, Apia, Samoa.

Rongo, T. 1996, *Cook Islands Environment Management Plan Report for the Island of Araura Enuu (Aitutaki)*, Cook Islands Environment Service (Tuanga Taporoporo) and SPREP.

Rongo, T. 1996, *Cook Islands Environment Management Plan Report for the Island of Tongareva (Penrhyn)*, Cook Islands Environment Service (Tuanga Taporoporo) and

SPREP.

Rongo, T. 1996, *Cook Islands Environment Management Plan Report for the Island of Akatokamanava (Mauke)*, Cook Islands Environment Service (Tuanga Taporoporo) and SPREP.

Rongo, T. 1996, *Cook Islands Environment Management Plan Report for the Island of Auau Enuu (Mangaia)*, Cook Islands Environment Service (Tuanga Taporoporo) and SPREP.

Thompson, C. S. 1986, *The Climate and Weather of the Northern Cook Islands*, New Zealand Meteorological Service Miscellaneous Publication no 188(3), Wellington, New Zealand.

FIJI



PHYSICAL CHARACTERISTICS

Fiji comprises about 844 islands and islets in an area within 15–32°S and 177–178°W. The country extends from Rotuma Island in the north to Tuvana-i-ra in the south. The Yasawa Islands are the westernmost and the easternmost is Vatoa in the southern Lau group. Fiji's jurisdiction over its national water covers approximately 1.3 million sq km.

Fiji's coastal waters encompass the main islands of Viti Levu and Vanua Levu and the islands of the Mamanuca and Yasawa groups which lie on two submerged shelves, the Viti Levu and Vanua Levu platforms. Depths here are less than 70 m in inshore areas, which are characterised by coral reefs. Water depth increases to 200–300 m outside the reef areas, then descends more gradually to the abyssal zone. Depths in the Lau group are 500–1000 m while the islands of Kadavu and those in the Koro Sea are surrounded by waters deeper than 2500 m. Greater depths occur elsewhere in Fiji waters, such as in the north where Rotuma rises from depths of 3000 m.

The south equatorial oceanic current flows southwesterly through the group, though the surface current is easterly along the southern margins of the islands due to the influence of the ESE trade winds. Water temperatures are always above 20°C and may be over 30°C in summer. The mean tidal range for

spring tides is 1.3 m and the neap range is 0.9 m, varying between 0.0 m and 1.9 m above datum.

With respect to the coastal zone, the prevailing trade winds and wave action in the windward and semi-protected areas have provided a natural mechanism for moderating the problems originating from coastal activities. By contrast, the Nadi Waters area on the lee side of Viti Levu has shown generalised coral reef mortality where poor circulation is thought to be a major contributing factor allowing unspecified pollutants to concentrate.

In areas of river outfall the build-up of silt and periodic flushing by fresh water has given rise to a soft-bottom biota conditioned to fluctuations in salinity. Coral reef development is typically very reduced in these areas. River mouths and relatively deep water adjacent to many of the islands has provided a natural sink for the terrigenous material, moderating the effect of residual siltation.

GOVERNMENT STRUCTURE

The 1990 Constitution provided for a parliamentary form of government with a bicameral legislature comprising the elected 70-seat House of Representatives and the appointed Senate with 34 members. The Constitution established a permanent majority of 37 seats in the

House to be elected by indigenous Fijians, with 27 seats to be elected by those of Indian descent, four by other races (General Electors) and one by voters of the island of Rotuma. The Senate was to be appointed by the President of the Republic, 24 members on the advice of the Great Council of Chiefs from among their own number, one member on the advice of the Rotuma Island Council, and the remaining nine selected from prominent citizens among other racial communities.

In 1996 a Joint Parliamentary Select Committee was appointed to review the Constitution (Reeves Report). Its recommendations gave rise to the Constitution (Amendment) Act 1997 which embraced the concept of a multi-ethnic government and stipulates that the Prime Minister establish a multi-party Cabinet of fair representation. This amendment came into effect on 27 July 1998 and alters the election framework. There are 71 members elected: of these 46 are elected by multi-ethnic electoral rolls and 25 from all communities registered on an open electoral roll. The Senate consists of 32 members of whom 14 are appointed by the President on the advice of the Bose Levu Vakaturaga; nine on the advice of the Prime Minister; eight on the advice of the Leader of the Opposition; and one on the advice of the Council of Rotuma.

COASTAL ZONE MANAGEMENT ISSUES

Fiji's ICM problems are varied. The dual tenure system of governance of shallow subtidal areas increases the political complexity. The reliance on the natural marine environment for the traditional subsistence and industrial fishery is at times in conflict with the development of industry and tourism.

Infrastructure and industrial development in cities and towns is creating urban pollution that may taint and otherwise adversely affect fish stocks, such as through the loss local habitats. Foreshore reclamation often involves the loss of mangroves and pollution of near-shore area with silt. Recruitment of many fish stocks is reliant on mangrove habitats. Similar problems may result from resort development in areas removed from urban areas.

The following paragraphs describe some specific ICM problems in Fiji:

- **Absence of a comprehensive Integrated Coastal Zone Management Plan.** Lack of an integrated coastal zone management plan has led to an arbitrary approach to activities in some coastal zone areas. Conflict of interest, lack of policy and unclear authority has had a

negative impact or given rise to inappropriate development. Some developments have ignored environmental impact assessment requirements without any punitive legal action by the authorities responsible for their regulation.

- **Fishery regulation.** Over-exploitation of fisheries may cause stock depletion. The harvest of undersize catch is a widespread problem. The use of harmful fishing methods such as poison (e.g. Derris) and explosives occur in some areas. The unclear status of rights under Customary Marine Tenure has occasionally given rise to conflict between fishing rights stakeholders and commercial operators. Coral harvesting involving several types of extraction has proved a source of income for local people but has been subject to controversy as to its affect on the coral reef environment.

Subsistence fishing is an important aspect of the socioeconomics of many village communities. In 1992, the estimated catch from the subsistence fishery was 16 400 t. A more recent study estimated a catch of 3515 t by subsistence fishers from rural Viti Levu and an industrial catch of 6206 t. The level of fishing activity in the outer islands is higher than in coastal communities on Viti Levu. The estimated total annual subsistence catch by coastal Fijians on Viti Levu was 470 t (Rawlinson et al. 1995). It is therefore important to guard against overexploitation and unwise usage.

- **Pollution.** Waste disposal such as Suva's Kinoya Sewage Plant or the Lautoka wastewater outfalls, though considered effective in terms of the apparent cost benefit, may contribute to the high coliform counts and heavy metal concentrations found in shellfish. Overflows from septic systems as well as industrial discharge are also considered likely sources. The Lami dump is thought to leach a variety of pollutants into Suva Harbour (Cripps 1992). Live-aboard yachts discharge raw sewage, as do some resorts. The tri-butyl tin (TBT) toxin in marine antifouling is widely used and is a localised problem in port or marina areas. Suva Harbour has the distinction of having the highest ever recorded concentration of TBT.

The Pacific Fishing Company's (PAFCO) marine outfall seaward of the barrier reef has had a localised eutrophic effect from sewage, fish offal and washings, promoting extensive algal growth. The broader, long-term picture of the extent of reef alteration is uncertain.

Residents of Viseisei Village, near Vuda Point, have complained of 'kerosene' or petroleum

taint in the shellfish and other gleaned seafood due to spills from the petroleum distributors (Shell, Mobil and BP) on Vuda Point (Watling et al. 1995).

Degradation of coral reefs in Mamanuca and Nadi waters is thought to be caused by as yet undefined pollution sources. These may originate from the sewage and wastewater effluents from the resorts or may be due to coastal-borne influences such as nutrients from eroded topsoils and fertilisers, wastewater outfalls and mill effluents.

- **Eutrophication.** General eutrophication of the inshore and fringing reef areas gives rise to the proliferation of macro-algae (principally *Sargassum*) which causes extensive coral death by abrasion and shading. The algal presence represents a change in dominance on the coral reef and with it a change in the associated biota. The number of herbivorous fishes may increase. Ciguatera may be an unwelcome result with the establishment of the toxic epiphyte *Gamberiodiscus toxicus*.
- **Sedimentation.** Though part of the natural environment, freshwater run-off during time of flood and the transport of associated sediment have had an increasingly pronounced effect on the biota of the coastal zone. The alteration of the watershed through agricultural practices and the extraction of gravel and boulder material from the creeks and rivers have enhanced the transport system for sediments into the marine environment. Coastal dredging, if not properly carried out, can give rise to the resuspension of sediments, smothering or adversely affecting biological communities. Deposition at the river mouths has been observed to be increasing to the detriment of the fishers who have observed a decline or change in the nature of their catch (e.g. Viseisei Village in Ba)(Watling et al. 1995).
- **Crown-of-thorns starfish.** Periodic fluctuations in the abundance of the crown-of-thorns starfish (*Acanthaster planci*) cause widespread coral death. Both the Fiji Dive Operators Association and Hoteliers Association have taken steps to eradicate the starfish through collection and lethal injection.
- **Natural disasters.** Cyclone surge, seismic activity and the potential for sea-level rise are all considerations in coastal zone development. Cyclones alter coastlines and the biological communities that inhabit them. Diversity within the coral reef may be enhanced by the reef's periodic destruction. Several cyclones within a season may have effects for several years, which may adversely influence tourist

appeal as the coral reef communities re-establish.

ENVIRONMENTAL LEGISLATION

There is at present an inadequate legislative infrastructure for the conservation of critical marine habitats. Environmental controls are dispersed among several different acts and regulations. In general terms environmental impact assessments (EIAs) have no formal legal status: their application is purely discretionary as part of planning permission approval or departmental licensing. Government developments are not subject to planning or licensing legislation and are not subject to any EIA requirement (Watling and Chape, 1993).

Fiji's proposed Sustainable Development Bill is an attempt to unify and strengthen environmental legislation and consolidate the varied delegation of authority relating to environmental and resource management. The Department of the Environment, in consultation with industry sectors, government and NGOs, developed a first draft in November 1996 and distributed it for public review. The draft Bill covers the following topics: environmental impact assessment, climate change and ozone depletion, pollution and waste management, management of wastes, marine pollution, management of hazardous substances, water quality management, air quality management, environmental management, resource management, integrated coastal resource management, and fisheries conservation and management. Under the new bill a Coast Resource Management Committee would be comprised of members from the Department of Environment, Department of Fisheries, Marine Department, Ports Authority, Lands Department, Mineral Resources Department, Water and Sewerage Department, Fiji Navy, Native Lands Trust Board and National Resource Management Unit. The cost of implementing the bill is currently being assessed.

Until such time as the new bill may be approved, rules and responsibilities relating to the coastal zone remain fragmented and dispersed. The following paragraphs provide an updated summary of the legislation relevant to ICM.

- **Coastal Zone.** The littoral zone, foreshore and submerged sea floor are held by the State (State Lands Act 1946). Laws require the approval of the Minister for Lands and, prior to approval, the details of the leases must be gazetted for public comment. Compensation for rights infringements and disputes fall under the State Acquisition of Lands Act. Fishing rights are compensated through the Native

Fisheries Commission. The lessee is responsible for access and environmental matters. Natural ecosystems such as mangroves and coral reefs are protected through environmental impact assessments that have become part of the conditions of the lease.

The Town Planning Act 1946 provides for the preparation of Town Planning Schemes including the conservation of natural beauties of the area including lakes, banks or rivers, foreshore or harbours and other parts of the sea, hill slopes, summits and valleys.

Legislation concerned with the protection of the natural environment includes the Native Land Trust Act. Cap 134, Rev. 1985; the National Trust for Fiji Act. Cap 265, Ed. 1973; and the Town Planning Act. Cap 139, Ed. 1978.

Harbour Act No. 3 1974 enables heavy penalties to be imposed for the pollution of harbour and coastal waters but these provisions have never been used. Fiji's marine environment is subject to a variety of laws and regulations. The Ports Authority of Fiji Regulations 1990 have strengthened enforcement against the most conspicuous acts of pollution in Fiji's ports. The Public Health Act controls sewage discharge and polluting industry though the fines are very low and offer little deterrent in themselves. Pollution has many origins and the laws dealing with them in Fiji are the least effective of all the environmental laws. (UNEP/IUCN 1988, Watling and Chape 1992).

The Department of Mineral Resources issue leases for coral sand mining. All foreshore dredging requires an EIA though this has been ignored on several occasions without punitive ramifications.

- **Fisheries.** Fisheries laws seek to conserve and perpetuate stocks. The 1992 Fisheries Act includes regulations prohibiting the use of dynamite and other explosives and poisons (including derris, rotenone, plant extracts and chemicals) for fishing. It provides minimum size limits for harvestable mangrove crabs, turtles, trochus and pearl shell, completely protects the triton and giant helmet shells (*Charonia tritonis* and *Cassis cornuta*), and prohibits the taking of eggs and killing of turtles during the 4-month nesting season. Legal controls on fishing for giant clams are restricted to the licensing of fishermen and vessels.

In 1984 Cabinet approved a memorandum from the Minister for Primary Industries setting out a broad policy for the exploitation of living

sedentary reef resources. It contains preliminary guidelines for the controlled exploitation of giant clam (*vasua*), lobster (*urau*), beche-de-mer (*dri*), trochus (*sici*), mother-of-pearl (*civa*), corals (including black coral), collector's shells, aquarium fish and seaweeds. For clams, these include the restriction of harvesting to Fijian nationals with the written approval of the owner of the customary fishing rights, minimum size limits, monitoring of catches, licensing of exports and refusal of licenses unless all of the clam is utilised, and a fair price to be paid to local suppliers. There are similar regulations for lobster stocks but those for the other resources are generally less stringent as there is believed to be less danger of over-exploitation (Anon. 1984.)

The 1992 Fisheries Act provides control over the fishery in Fiji's Territorial Waters and Exclusive Economic Zone (EEZ). The Act provides for licensing and control of fishing vessels and fishing activities but lack of financial and personnel resources has hampered enforcement of these regulations.

The Fisheries department is engaged in a Fisheries Resource Survey as part of the Commodities Development Framework (CDF). Programmes reinvestigating the viability of the culture of *Echuema* and giant clams are in progress. Beche-de-mer, trochus and other living coastal resources are being evaluated, and a survey of the subsistence and industrial fisheries in rural areas of Vanua Levu is underway.

- **Customary Marine Tenure.** The extent of indigenous Fijians' sovereignty over the sea has been a controversial subject since cession. Under Clause 4 of Fiji's 'Deed of Cession' the islands, waters, reefs and foreshores not properly alienated and not needed by Fijians are vested in Her Majesty and Her Successors. There was some uncertainty after cession as to the ownership of reefs and fishing grounds as they were traditionally the property of Fijian communities and, as with the land, were required for their use and sustenance (Pulea, 1991).

The Rivers and Streams Ordinance No. XIV of 1880 abolished traditional fishing rights in rivers and streams, which were to be perpetually open to the public for the enjoyment of all. However, the Fisheries Ordinance No. III of 1894 recognised the mataqali's rights of exclusive fishery on certain reefs and made it unlawful for any other person to do so without obtaining a license.

This was subsequently included in the Birds, Game & Fish Protection Ordinance No. 20 of 1923. Ordinance No.4 of 1941 made provisions for the "regulation of fishing". It established the Native Fisheries Commission with the duty to ascertain what customary fishing rights were the rightful and hereditary property of native owners, and to establish the title of all customary fishing rights. This was incorporated into the Fisheries Act of 1942.

The State claims legal ownership of all land below mean high water mark (MHWN) and extending outwards to the outer reef edge. Although the legal ownership resides with the State, the traditional fishing rights of indigenous Fijian customary owners have been safeguarded and recognised either by legislation or in a de facto sense. The recompensation system established in relation to mangrove and foreshore reclamation requires a developer to compensate the traditional fishing right owners for the loss of fishing rights and resources as a result of loss of nursery and breeding grounds (Lal, 1983). This compensation sum is held in a trust fund and only the interest is paid to present and future generations of customary right owners (Zann and Vuki, 1994).

Today, traditional customs and practices have evolved to regulate the use of inshore resources. Fishing rights boundaries have now been recorded for all the islands. These areas are defined geographically and fishing and other commercial activities are controlled by the mataqali which has CMT rights. The boundaries are recorded by the Native Lands and Fisheries Commission (NLFC) and are often seaward extensions of boundaries on land, although rights over the marine area are rights of use rather than ownership. Elements of management that are part of the rights exercised under the CMT system include the placement of taboos on *qoliqoli* areas (which may result from the death of a chief or someone of high rank) or on fishing practices considered to be undesirable. In the case of developments which can be shown to have adverse effects on fisheries, fishing rights compensation must be paid to the native fishing rights owners after an environmental impact and fisheries assessment has been carried out (Lal, 1984)

There are no coastal and marine protected areas (MPAs) as such in Fiji, although some terrestrial protected areas are in the coastal zone, as shown in table 3. Islands are legally protected but the surrounding reefs are not.

A privately developed *marine sanctuary* concept has been adopted around five islands in the Nadi Waters area. These are Beachcomber (Tai), Treasure (Levuka), Kadavu, Navini and Vomo and Vomo Iailai Islands. This relationship was first developed by Dan Costello and the reef rights custodians for Beachcomber and Treasure Islands in the 1970s. Similar arrangements exist with other resorts. Namenalala Island Reserve (43ha) is leased by the NLTB to a private operator who runs the vast majority of the island as a nature reserve, and who is currently attempting to lease the reef surrounding the island in order to extend the nature reserve concept into the marine environment.

New MPAs proposed include the Great Astrolabe Reef, Yadua Taba Island, Tai and Levuka Islands and Namenalala Island. A joint terrestrial and marine park is suggested for Monuriki Island in the Mamanucas (Zann, 1992). Dunlap and Singh (1980) made recommendations for the protection of marine areas throughout Fiji.

At present the National Trust of Fiji administers the first and only National Park, proclaimed by Cabinet in 1988, at the Sigatoka Sand Dunes. A 1996 application by the National Trust for the first National Marine Protected Area (encompassing islands in the Nadi Waters area) is being considered by the Ba Provincial council and Native Lands Commission. Yadua Taba Island off the west coast of Vanua Levu is managed by the National Trust in cooperation with the landowners as a sanctuary for the Crested Iguana (Singh, 1985). A marine baseline study is to be carried out for Yadua Taba, which is envisaged as a MPA.

Table 3: List of Fiji's protected areas as at October 1995 (source: NLTB, 1996)

| Protected Area | Status | Est. | Location | Type of feature | Tenure | Area (ha) | Admin. |
|---|-------------|---------------------------------|------------------------------------|------------------------|--------|--|--------|
| 1. National Park | | | | | | | |
| Sigatoka Sand Dune National Park | 1988 | South Coast Viti Levu | Sand dunes, forest, cultural sites | State, native/freehold | 240 | National Trust for Fiji, Public Trustee, NLTB, & private | |
| 2. Nature Reserve | | | | | | | |
| Draunibota and Labiko Islands | 1959 | Suva Harbour | Recreation | State | 2.16 | Forestry Dept. | |
| Vuo Island | 1960 | Suva Harbour | Forested, coastal islet | State | 1.2 | Forestry Dept. | |
| Namenalala Island Nature Reserve | 1984 | South Of Vanua Levu | Seabird colony, reefs | Native | 43 | Lessee / NLTB | |
| 3. Forest Park and Amenity Area | | | | | | | |
| Lavena Coastal Park | 1993 | North East Taveuni | Coastline, rainforest, waterfalls | Native | | Landowners/ NZ MSC/ NLTB | |
| 4. Other Recreation Areas | | | | | | | |
| Nukulau | Early 1970s | Off Suva, Viti Levu | Island, reefs | State | | Department of Lands | |
| Saweni Beach | Early 1970s | Western Viti Levu | Beach | Native | 0.5 | Forestry Department | |
| Lomolomo | Early 1970s | Western Viti Levu | Beach | Native | 0.5 | Forestry Department | |
| Wildlife Sanctuary | | | | | | | |
| Yadua Tabua Island Crested Iguana Reserve | 1991 | Off Western Coast Of Vanua Levu | Forest, crested iguana | Native | 50 | National Trust for Fiji | |

Reservations for protection of marine areas in the national rather than the landowner's interest are needed for a variety of reasons that include recreation areas, protection of representative habitats, biodiversity attributes etc. Western concepts of resource management through protected areas may be culturally inappropriate for Fiji where the reefs are continually utilised for subsistence and industrial fishery. Given the existing communal marine tenure system, the setting aside of areas as reserves would require permission and cooperation from their CMT stakeholders, who depend on the resources from the marine areas and will rightly expect not to be financially disadvantaged. This may involve short and long-term financial resources. Tourism usage may provide some of this funding.

A major drawback is the lack of a designated agency or department to undertake the task of identifying, institutionalising and administering a Parks and

Reserves system. A clear national directive is urgently needed with respect to this issue (Watling and Chape, 1992).

ICM RESPONSIBILITIES

The Department of Environment (DOE) has superseded the Environmental Management Unit in advising the government on environmental matters, reviewing development projects and conducting Environmental Impact Assessments (EIA) for various projects. The Mining act has environmental provisions, and mining is the only activity for which an EIA is required by law (Lal, 1984). The DOE oversees this legislation and any other that may relate to this activity. Depending on the nature of the development, an EIA may also be required by the Town and Country Planning Division

of the Ministry of Housing and Urban Development. The DOE then vets this impact assessment and recommendations are made.

A dual tenure system exists whereby the coastal areas are governed by legislated law of the Central Government, and managed through the mataqalis (traditional social units) under customary marine tenure systems, fishing rights and areas (*qoliqoli's*).

Other committees are responsible for particular coastal management issues. The Mangrove Management Committee of the Ministry of Land and Mineral Resources was established in 1983. It comprises representatives from 12 government departments or agencies and advises the Director of Lands on development proposals that affect mangroves.

The National Oil Pollution Committee of the Marine Department was formed in June 1991 as a merger of the Ports Authority Spills Steering Committee and the Oil Pollution Committee. Its purpose is to coordinate the preparation and implementation of a national pollution response plan. It has private and public sector representation.

The Rubbish Dump Committee of the Ministry of Housing and Urban Development has the purpose of locating an alternative solid waste disposal site so that the existing Lami dump can be closed. It has government and local authority representation. This is a coastal zone issue as the dump is located on the Lami foreshore and has caused pollution of shellfish stock in Suva Harbour as well as continued pollution from the erosion of the dump perimeter.

FIJI

MAIN ICM ORGANISATIONS

Department of the Environment, Ministry of Local Government, Housing and Environment

| | | |
|--|------|--------------|
| PO Box 2131, Government Buildings Suva | Tel: | (679) 311699 |
| | Fax: | (679) 312897 |
| Mr Epeli Nasome Director of Environment | | |
| Mr Manasa Sovaki Principal Officer | | |
| Ms Premila Kumar Environmental Impact Assessment | | |
| Mr Peni Gavidu Director Department of Town and Country Planning (Development Control Section) | Tel: | (679) 211787 |

- Established in 1993, the Department's objectives are:
- to develop national environmental policy;
 - to coordinate environmental impact assessment of development projects; and
 - to develop environmental education and awareness programmes.

The Department has eight established positions, as well as eight temporary/ aid-funded posts. High staff turnover has impeded the departmental work programme, which has focused on the implementation of the National Environment Strategy through the work of the following units:

- Environment Impact Assessment Unit;
- Waste Management and Pollution Control Unit;
- Conservation Unit;
- Environmental Information and Education Unit;
- Ozone Protection Unit; and
- Climate Change Unit.

The Climate Change Unit has prepared the Ovalau Integrated Resource Management Plan as a pilot phase for the implementation of Fiji's Inter-Coastal Resource Management Plan.

Environmental impact assessments have been carried out on numerous coastal projects including marinas, floating jetties, shipping, sewage plants, waste water treatment plants, gravel extraction, coral harvesting, resort developments, beach pollution and foreshore reclamation.

The Ministry also includes the Department of Town and Country Planning, whose brief includes planning for the sustainable development of Fiji's urban areas. ■

Mineral Resources Department, Ministry of Lands and Mineral Resources

Private Bag
Suva

Tel: (679) 381611
Fax: (679) 370039

Mr Baskar Rao
Director

Mr Peter Rodda
Principal Geologist

Mr Tevita Vuibau
Principal Scientific Officer

E-mail: t_vuibau@mrd.gov.fj

Mr Eferemi Dau
Environmental Officer

MRD has several programmes concerned with the coastal zone: 1) coastal erosion; 2) coastal protection; 3) environmental impact assessment; and 4) survey and research. ■

Ministry of Communication, Works and Energy

Ganilau House, Scott Street
Suva

Tel: (679) 315133
Fax: (679) 313747

Mr Anasa Vocea
Permanent Secretary

Mr Shandil
Director
Water and Sewerage Section
Public Works Department

Tel: (679) 315244

Fax: (679) 320313/ 303023

Sewerage wastewater outfalls occur in both nearshore waters and mangroves in the larger towns and cities. Recently developed foreshore management plans for the next two decades have been completed for Suva with regard to sewerage requirements. At present no environmental impact assessments required for government projects. ■

Fisheries Division, Ministry of Agriculture, Fisheries and Forests

PO Box 358
Suva

Tel: (679) 361122 / 361335
Fax: (679) 361184

Mr Peniasi Kunatuba
Permanent Secretary

Tel: (679) 384233
Fax: (679) 385234
E-mail: kunatubap@itc.gov.fj

Mr Maciu Lagibalavu
Director of Fisheries

Mr Erasoma Ledua
Senior Fisheries Officer

This division is responsible for policy development and regulation of fisheries. ■

Central Planning Office, Ministry of National Planning

| | |
|--|--|
| Level 8, Rewa House, Victoria Parade Suva | Tel: (679) 211648 Fax: (679) 304809 |
| Mr Peter Wise Chief Planning Officer Central Planning Office | Tel: (679) 211570 |
| The CPO assesses the costs and benefits of development projects and prioritises them for the Fijian Government. ■ | |

Ministry of Fijian Affairs and ALTA

| | |
|--|--|
| 61 Carnarvon St Suva | Tel: (679) 304200 Fax: (679) 302585 |
| Ratu Jone Radrodro Permanent Secretary | |
| Native Lands and Fisheries Commission PO Box 2100, Govt. Bldg., Suva | Tel: (679) 301001 Fax: (679) 314717 |
| Registration of Fishing Rights and Village Reserves PO Box 2100, Govt. Bldg., Suva | Tel: (679) 315572 Fax: (679) 314717 |
| This ministry is concerned with indigenous development, education and culture. It includes the Native Lands and Fisheries Commission and administrates the Registration of fishing Rights and Village Reserves. The position of the Roko Tui is the Government's agent for mataqalis liaison for coastal and other development issues throughout Fiji . ■ | |

Department of Lands and Survey, Ministry of Lands and Mineral Resources

| | |
|------------------------------------|--|
| PO Box 2222 Govt. Bldg. Suva | Tel: (679) 211516 Fax: (679) 304037 |
| Mr Jaffar Director | |
| Mr Reddy Senior Surveyor | Tel: (679) 211387 Fax: (679) 304037 |

Marine Department, Ministry of Transport and Tourism

| | |
|---|--|
| PO Box 326 Suva | Tel: (679) 315266 Fax: (679) 303251 |
| Capt. Waisale Salu Director | |
| This department controls and regulates shipping in territorial waters. ■ | |

Fiji

Ports Authority of Fiji

PO Box 780
Princess Wharf
Suva

Tel: (679) 312700
Fax: (679) 300064
E-mail: mpaf@is.com.fj

Mr Aquila Savu
Director

The Ports Authority has full control of the ports, including their administration, development and regulation. ■

Department of Tourism, Ministry of Transport and Tourism

GPO Box 1260
Suva

Tel: (679) 312788
Fax: (679) 302060

Mr Samisoni Sawilau
Director of Tourism

The department is responsible for promoting tourism, representing the Government's interests in this area and also for arbitrating development problems. ■

OTHER ICM ORGANISATIONS

National Trust for Fiji

PO Box 2089
Government Buildings
Suva

Tel: (679) 301807
Fax: (679) 305092
E-mail: nationaltrust@is.com.fj

Mr Birandra Balbir-Singh
Director

The Trust aims to advance the conservation and preservation of Fiji's heritage. Prior to the establishment of the Department of Environment, it was also the Government's advocate for conservation and environment issues, and is still involved in these areas. It is entrusted with the administration of National Parks and reserves, promotes the concept of Marine Protected Areas and is actively lobbying for their establishment. ■

Fiji Dive Operators Association

PO Box 264
Savusavu

Tel: (679) 850620
Fax: (679) 850344
E-mail: seafijidive@is.com.fj

Curly Carswell
Chairman

The association represents tourism-based dive operators throughout Fiji. It campaigns for conservation and sustainable use of the marine environment, and carries out local research and education projects in support of marine conservation. It also holds awareness workshops concerned with the sustainable use of marine resources and lobbies the Government for the establishment of Marine Protected Areas. ■

Fiji Hotel Association

| | |
|--|--|
| 42 Gorrie St. Suva | Tel: (679) 302975/ 302980 Fax: (679) 300331 |
| Mr Tony Cottrell Environmental spokesman | Tel: 666738 Fax: 666716 |
| <p>Representing the concerns of hoteliers, this is a special interest lobby and information source for the industry. In terms of the environment, it is concerned with how their activities impact on the natural assets which are central to their appeal. It also establishes artificial habitats. ■</p> | |

World Wide Fund for Nature (WWF) Partnerships in Conservation and Development Project

| | |
|---|---|
| Private Mail Bag 4 Ma'afu Street, Domain Suva, Fiji | Tel: (679) 315533 Fax: (679) 315410 E-mail wwfspp@is.com.fj |
| Mrs Asenaca Ravuvu Project Coordinator | |
| <p>The project aims to appraise natural resource-related activities by other organisations with a view to identifying, promoting and facilitating conservation effectiveness. The target groups are communities, other NGOs and government departments. ■</p> | |

Foundation for the Peoples of the South Pacific (FSP)

| | |
|--|---|
| PO Box 14447 Suva | Tel: (679) 300392/ 314160 Fax: (679) 304315 E-mail: fspsuva@mailhost.sopac.org.fj |
| Ms Veronica Lucas Director | |
| <p>FSP conducts various reef-related projects, including the Kamba Island project (AusAID funded), which is concerned with developing alternative sources of income to ease the reliance on reef resources. It is also conducting research into coral farming and reef restoration through hard coral transplantation. ■</p> | |

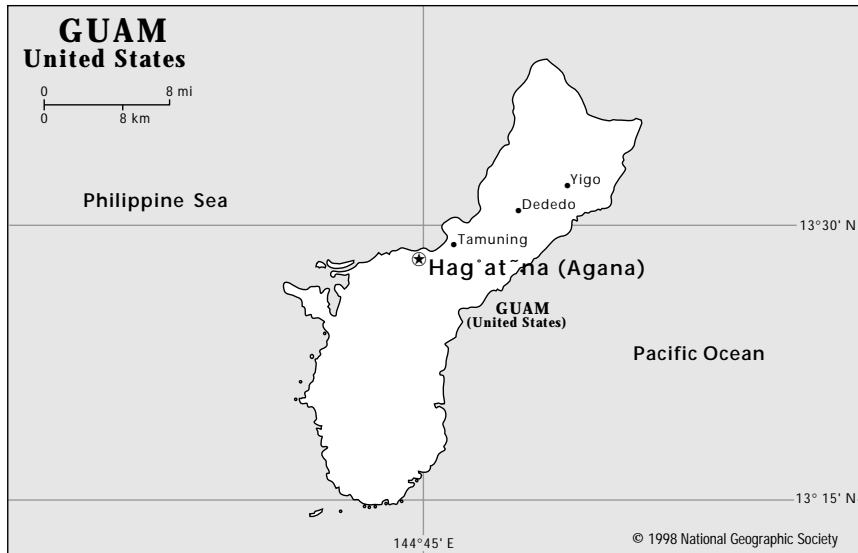
SELECTED DOCUMENTS ON ICM

| | |
|--|--|
| <p>Anon. 1984, <i>Broad Policy Exploitation of Living Sedentary Reef Resources—Preliminary Consideration</i>, Draft Cabinet Memorandum by the Minister of Primary Resources, Suva, Fiji.</p> <p>Cabaniuk, S. 1997, <i>National Biodiversity Conservation Strategy and Action Plan Towards an Assessment of the Existing Information on Biodiversity in Fiji: A Literature Review</i>, Dept. of Environment, Suva, Fiji.</p> <p>Cripps, K. 1992, <i>Survey of Point Sources of Industrial Pollution Entering the Port Waters of Suva</i>, Engineering Dept., Ports Authority of Fiji, Suva, Fiji.</p> <p>Department of Environment 1996, <i>Fiji's Draft Sustainable Development Bill</i>, Govt. of Fiji, 282 pp.</p> | <p>Dickie R., Fennery, R. M. and Schon, P. W. 1991, <i>Ports Authority of Fiji Planning Manual</i>, Engineering Dept., Ports Authority of Fiji, Suva.</p> <p>Dunlap, R. C. and Singh, B. B. 1980, <i>A National Parks and Reserves System for Fiji</i>, a report to the National Trust of Fiji.</p> <p>Government of Fiji 1990, <i>Coral Coast Tourism Development Study</i>, Department of Town and Country Planning, Government of the Republic of Fiji, Suva, Fiji, 108 pp.</p> <p>Hydrographic Office 1997, <i>Fiji Nautical Almanac for the Year 1998</i>, Marine Dept., Govt. of Fiji, 78 pp.</p> <p>Juvik, J. and Birandra Singh, B. 1989, <i>A Proposal for National Park and Reserve Establishment in the Mamanuca/Yasawa Island Groups</i>, a report</p> |
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prepared by the National Trust for Fiji and University of Hawaii.

- Lal, P. N. 1983, *Institutional Management of Mangrove Resources in Fiji*, Fisheries Division Technical Report 5: 57-75.
- Lal, P. N. 1984, 'Environmental implications of coastal development in Fiji', *Ambio* 13(5-6): 316-321.
- Lovell, E. R. 1994, *Environmental Impact Assessment of the M. V. Salamanda as an Artificial Marine Habitat*.
- Lovell, E. R. 1997, *The Coral Reefs of Ovalau Island, Fiji: Composition and Environmental Assessment*, report prepared for the Department of the Environment by Biological Consultants, Fiji.
- Lovell, E. R. 1997, 'Eutrophication of a coral reef by cannery waste in Fiji: consequences, compromise and commerce', *Proceedings of the VIII Pacific Science Inter-Congress: University of the South Pacific*.
- Lovell, E. R. and Odense, R. 1993, *Environmental Monitoring of the Construction Impacts on Coral Reefs Adjacent to the Denarau Development Project*, IAS Environmental Report No. 65. USP.
- National Trust for Fiji 1988, 'Marine reserves', in *National Trust News*, vol.2. no.3., 2 pp.
- National Trust for Fiji 1997, 'Parks and protected areas', in *National Trust News*, vol. 10 no. 1, March 1997, p. 8.
- NLTB 1996, *The Draft NLTB Tourism Policy Statement 1997-2000*.
- Nunn, P. D., Ravuvu, A. D., Kay, R. C. and Yamada, K. 1993, *Assessment of Coastal Vulnerability and Resilience to Sea-Level Rise and Climate Change: Case Study: Viti Levu Island, Fiji. Phase I: Concepts and Approach*, SPREP, Apia, Samoa.
- Nunn, P. D., Ravuvu, A. D., Aalbersberg, W., Mimura, N. and Yamada, K. 1994, *Assessment of Coastal Vulnerability and Resilience to Sea-Level Rise and Climate Change. Case Study: Yasawa Islands, Fiji. Phase 2: Development of Methodology*, SPREP, Apia, Samoa, 118 pp.
- Pulea, M. 1991, *Preliminary Report of Environmental Law in Fiji. A Description and Evaluation*, Natural Environmental Management Project TA No. 1206, Fiji.
- Rabuka, M. and Cabaniuk, S. 1989, 'The role of the Native Land Trust Board in the establishment of parks and reserves in Fiji', pp. 71-85 in *Report of the Workshop on Customary Tenure, Traditional Resource Management and Nature Conservation (Noumea, New Caledonia, 28 March-1 April 1988)*, ed P. E. J. Thomas, SPREP, Noumea, New Caledonia.
- Rawlinson, N. J. F., Milton, D. A., Blaber, S. J. M., Sesewa, A. and Sharma, S. P. 1995, *A Survey of the Subsistence and Artisanal Fisheries in Rural Areas of Viti Levu, Fiji*, ACIAR Monograph No. 35, ISBN 1 863 20 142 4.
- Singh, B. 1985, 'Owner involvement in the establishment of parks', *Report of the 3rd South Pacific National Parks and Reserve Conference, Apia, 2: 269-270*.
- South, G. R., Goulet, D., Tuqiri, S. and Church, M. (eds.) 1994, *Traditional Marine Tenure and Sustainable Management of Marine Resources in Asia and the Pacific*. International Ocean Institute, South Pacific, Suva, 318pp.
- SPREP 1980, *Country Report 4*, SPC, Noumea, New Caledonia.
- UNEP/ IUCN 1988, *Coral Reefs of the World Vol. 3: Central and Western Pacific*, compiled by S. M. Wells and M. D. Jenkins, UNEP Regional Seas Directories and Bibliographies, IUCN and UNEP ISBN 2-88032-945-0.
- Watling, D. 1985, *A Mangrove Management Plan for Fiji: Phase 1*, Government Printer, Suva, Fiji.
- Watling, D. 1986, *A Mangrove Management Plan for Fiji: Phase II—A Plan for the Mangroves of the Nadi Bay and Suva Locales*, Government of Fiji and SPC, Suva, Fiji.
- Watling, D. and Chape, S. 1992, *Environment: Fiji—The National State of the Environment Report*, prep. by IUCN and ADB with the Govt. of Fiji. 154 pp.
- Watling, D. and Chape, S. 1993, *The National Environment Strategy, Fiji*, Govt. of Fiji/ IUCN. 102 pp.
- Watling, D., Lovell, E. R. and Naqasima, M. 1995, *A Marine Survey of Vuda Point, Ba Province, Viti Levu*, Environmental Consultants (Fiji).
- Watling, D. and Mataitoga, W. 1994, *Management Plan for Yadua Taba Island Sanctuary, Bua, Fiji*, a report prepared for the National Trust for Fiji by Environmental Consultants (Fiji) Ltd.
- Zann, L. P. 1992, 'The state of the marine environment in Fiji: report on the marine environment', *National Environmental Management Project*, TA No. 1206, Fiji.
- Zann, L. P. 1994, 'The status of coral reefs in south western Pacific islands', *Marine Pollution Bulletin*, 29(1-3): 52-61.
- Zann, L. P. 1992, 'The state of Fiji's marine environment', *National Environmental Management Project Report*, TA No 1206 Dept. of Town and Country Planning, Govt. of Fiji. IUCN.
- Zann L. P. and Vuki, V. 1994, 'Marine environmental management and the status of customary marine tenure in the Pacific Islands', in *Traditional Marine Tenure and Sustainable Management of Marine Resources in Asia and the Pacific*, G. R. South, D. Goulet, S. Tuqiri and M. Church (eds) International Ocean Institute, South Pacific, Suva, 318 pp.

GUAM



PHYSICAL CHARACTERISTICS

The island of Guam (13°N latitude, 144°E longitude) is 48.3 km long and 6.4–19.3 km wide with a total land area of 541.3 sq km. The central and northern parts of the island are comprised mainly of a flat coralline limestone plateau 50–200 m above sea level. Other physical characteristics of Guam's coastal area include a shoreline length of 187.5 km, coral reef length of 128.7 km, 63 km of sandy beaches and 13 km of mangrove mudflats. In addition, there is one significant lake with an area of 68 hectares, 97 perennial streams and 40 watersheds. A major groundwater lens is located in the central to northern area that has the capacity to provide approximately 227 million litres per day of well water. The southern part of the island is volcanic in origin and rises to a height of 406 m on Mt Lamlam. The climate is warm and humid with a mean temperature of 27°C (range of 24–30°C). The average annual rainfall is 2500 mm.

The island of Guam became a territory of the US in 1898 and citizenship was granted in 1950 to persons born in Guam. The population is 162 308 and is comprised mainly of Chamorros (42%), Filipinos (23%), Caucasians (14%) and Micronesians (10%).

GOVERNMENT STRUCTURE

Guam is an unincorporated territory of the US with an elected representative in the US Congress. The Government of Guam consists

of three branches: executive; legislative; and judicial. The head of the executive branch is a popularly elected governor. The governor and lieutenant-governor are elected for four year terms. The legislature is unicameral, consisting of 15 senators elected for two-year terms.

COASTAL ZONE MANAGEMENT RESPONSIBILITIES

The Bureau of Planning's Coastal Resource Management Program is responsible for all activities relating to coastal management. The Director of the Bureau of Planning is responsible for managing and implementing the territorial government's policies which relate to coastal management. The entire island of Guam falls within the defined Coastal Resource Management Program.

Within the provisions of the Bureau of Planning's Coastal Resource Management Program, a number of objectives have been created. These are:

- to protect, restore or enhance existing coastal wetlands base and create new coastal wetland areas;
- to prevent or reduce threats to life and destruction of property by eliminating developments and redevelopments in high hazard areas and anticipating and managing effects of potential sea level rise;
- to attain increased opportunities for public access to coastal areas of recreational,

historical, aesthetic, ecological or cultural value;

- to reduce marine debris entering the nation's coastal and ocean environment by managing uses and activities that contribute to their entry;
- to prepare and implement special area management plans for important coastal areas; and
- to plan for the use of ocean resources.

In addition to the Bureau of Planning's lead role in coastal zone management, the Guam Environmental Protection Agency and Aquatic and Wildlife Division are primary agencies in addressing ICM issues. Other Government of Guam agencies that contribute to the permit process, resource management, conservation

and development, along with conducting studies and research include the University of Guam, Department of Commerce, Department of Land Management, and Department of Parks and Recreation. Federal agencies with offices on Guam that are involved in aspects of coastal zone management include the National Marine Fisheries Service, US Fish and Wildlife, US Army Corps of Engineers, and US Coast Guard.

There are numerous conservation areas, nature preserves, historic shipwreck sites and parks around the island, including the following:

- Haputo ecological area reserve;
- Orote ecological area reserve;
- Guam Territorial Seashore Park; and
- National Park of War in the Pacific.

MAIN ICM ORGANISATIONS

Coastal Zone Management Program, Bureau of Planning

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Agana 96932

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Michael L. Ham
Administrator

E-mail: mham@kuentos.guam.net

The Guam Coastal Management Program is a local programme (State) authorised and funded by the Federal Government through the Coastal Zone Management Act of 1972 as amended. The programme is networked in design, consisting of six agencies that carry out various functions such as permitting, monitoring and enforcement. It employs eight professional staff who coordinate development and environmental issues between Government of Guam agencies, between the government and private sector interests, and between Government of Guam and Federal agencies. The programme develops and suggests policy for environmental issues and for community planning issues. It is a primary reviewing agency for the Guam Land-Use Commission, and is responsible for Federal consistency review, which allows the Government of Guam to review and significantly affect Federal actions and permits. The programme is designed to be the balance between the community's development needs and wants, and the environment's capacity for supporting that development. It is the only such voice in the government. ■

Guam Environmental Protection Agency

PO Box 22439
GMF, Barrigada 96921

Tel: (671) 475-1658/9
Fax: (671) 477-9402

Mr Jesus T. Salas
Administrator

Mr Jordan Kaye
Chief Planner

Tel: (671) 475-1662/3

Mr Mike Gawel
Planner IV, Planning and Environmental Review Division

Tel: (671) 475-1649

The Environmental Protection Agency in Guam is responsible for activities relating to coastal management that specifically address environmental quality and protection issues.

GEPA was established in 1973 with Public Law 11-91, a public policy which states that "a high quality

of environment be maintained at all times to guarantee an enjoyable life for all people at present and in the future, and that environmental degradation of the quality of land, water, and air by any pollutants, including all physical, chemical and biological agents, should not be allowed.”

The Administrator of Guam Environmental Protection Agency (GEPA) is responsible for managing and implementing the territorial government's policies which relate to environmental quality. Within the provisions of GEPA's programmes, a number of environmental regulations have been created. The organisational framework of GEPA consists of the following:

- **Administration:** carries out all necessary internal and external coordination, interface and interaction. Overall leadership, direction, management and prosecution stems from this programme.
- **Environmental planning and review:** involves environmental planning, review and evaluation of project plans both on land and water; environmental impact assessments and statements, and environmental protection plans. It constitutes the Agency's direct membership role in the Development Review Committee which is the technical arm of the Territorial Land Use Commission and Territorial Seashore Protection Commission. This programme is also involved in environmental task forces and ad-hoc groups as well as public information outreach. It holds the lead role in promoting and fostering environmentally sound and sustainable growth and development in Guam.
- **Water Pollution Control:** aims to protect the territory waters from all point and non-point sources of water pollution. This is one of the largest and most critical programmes of environmental protection. It affects the health of all members of the community and the ecological state or health of Guam as a natural resource as well as growth and development. Permitting, inspection and coordination activities are continuous and extensive.
- **Safe Drinking Water:** responsible for ensuring that Guam's residents have clean and safe drinking water and that there are no contaminants exceeding the maximum levels specified by regulations. The main objective is to plan, develop, implement and enforce regulations to ensure that Guam's water resources are being properly protected and conserved for the use of present and future generations.
- **Water Resources Management:** responsible for collecting groundwater data, reviewing proposed water development projects, and inspecting existing as well as under-construction water production facilities and recharge and impoundment basins. It is also responsible for well development and operating regulations including permitting and wellhead protection, as well as protecting and ensuring the sound and safe development of Guam's finite water resources.
- **Solid/ Hazardous Waste Management:** maintains activities in solid and hazardous waste management, spill prevention control and countermeasures, underground storage tanks and emergency responses.
- **Air Pollution and Radon Control:** aims at controlling Guam's air quality for the protection of public health and property.
- **Pesticide Enforcement:** regulates the use of pesticide products under federal and local pesticide acts. This involves the registration of pesticides and prohibiting the use of any pesticides inconsistent with product labelling, as well as safeguarding the public against unlawful use of pesticides.
- **Monitoring Services:** provides field and laboratory support for the agency's other water, air and land regulatory programmes. This entails monitoring all territorial waters, air monitoring for sulphur dioxide emissions and particulates, and biological monitoring of Guam's marine environment.

To better prevent pollution, Guam's Water Resources Protection and Management Plan was adopted in 1997, including a Pesticide Management Program. GEPA's programmes to improve water quality comprise the following:

- Section 401 Water Quality Certification;
- National Pollutant Discharge Elimination System permits;
- Individual Wastewater System permits;
- Sewer Connection permits;
- Soil Erosion and Sediment Control Regulation's Clearing and Grading permits;

- Section 319 Non-Point Source Program;
- Feedlot Waste Management;
- Land Use and Wetland Use permits under the Guam Land Use Commission;
- Seashore Protection permits under the Guam Seashore Protection Commission;
- The Wellhead Protection Program; and
- Well Licensing Program.

In addition to the above responsibilities, GEPA also administers the following legislation: Water Resources Conservation Act, Sewer Connection Regulations, Water Pollution Control Act, Toilet Facilities and Sewage Disposal and Guam Water Quality Standards. ■

Division of Aquatic & Wildlife Resources, Department of Agriculture

PO Box 2950
Agana 96923

Tel: (671) 734-3946/ 3947
Fax: (671) 734-6570

Mr Robert D. Anderson
Chief

Tel: (671) 735-3979 or 735-3955/6

Mr Gerry Davis
Fisheries Supervisor

Tel: (671) 753-3984

The division has various responsibilities related to the management and conservation of marine, freshwater and land-based wildlife resources. It also has responsibilities through its Conservation Officer Section to enforce local and Federal laws that pertain to these resources. The division is part of the permit review process and issues permits for the importation of live animals. The division's programmes are federally-funded and include the following.

Fisheries:

- public information and education on Guam's Fish and Wildlife Restoration and Endangered Species programmes;
- technical guidance to projects affecting Guam's fish resources;
- Merizo Pier and boat ramp facility;
- development of inshore fishing access facilities;
- Masso Reservoir restoration;
- offshore fisheries survey;
- marine fish habitat improvement and aggregating devices;
- maintenance and redeployment of DAWR fish aggregating devices and SWMs;
- fabrication and deployment of shallow water moorings;
- freshwater monitoring; and
- inshore fisheries survey.

Wildlife:

- development and testing of control methods for enhancing reproduction-affected endangered native forest birds and fruit bats;
- captive breeding of endangered native birds;
- population numbers and distribution of Phillippine turtle-doves;
- technical guidance to projects affecting Guam's wildlife resources;
- population size and distribution of wild Asiatic water buffalo on Guam;
- development of an experimental population of Guam rails in the Commonwealth of the Northern Mariana Islands (part of the Endangered Species programme);
- population size and distribution of black francolin on Guam;

- determination of current population size and distribution of Guam deer;
- population size and distribution of wild pigs on Guam;
- survey for Mariana crows and their nest sites (part of the Endangered Species programme);
- survey and inventory of non-game birds;
- roost site characteristics of Marianas fruit baits; and
- current status, distribution and natural history of Marianas fruit bats.

Five marine preserves have been formed through PL 24-21 (1998) that will be administered by the division when implemented. The reserves include Tumon Bay, Pati Point, Piti Bay, Sasa Bay and Achang Bay. Within a marine preserve, the taking of aquatic animals is restricted. Unless specifically authorised, all types of fishing are prohibited in a preserve including shell collecting, the use of gaffs and the removal of sand or rocks. ■

OTHER ICM ORGANISATIONS

University of Guam

| | |
|--|---|
| UOG Station Mangilao 96923 | Tel: (671) 735-2990 Fax: (671) 734-2296 |
| Dr Gustav Paulay Director, Marine Laboratory | Tel: (671) 735-2175/6 Fax: (671) 734-6767 Email: gpaulay@uog9.uog.edu |
| Dr Hiro Kurashina Director, RFT Micronesian Area Research Centre | Tel: (671) 735-2151 Fax: (671) 734-7403 Email: kurashin@uog9.uog.edu |
| Dr Harley I. Manner Professor of Geography | Tel: (671) 734-9125/ 9155 Fax: (671) 734-5255/ 5362 Email: hmanner@uog9.uog.edu |

The Marine Lab conducts research on the marine resources relevant to the Western Pacific. In addition to its graduate degree programme, the Lab provides various environmental and resource studies and assessments throughout the SPC region.

As well as the Marine Lab, the University has the Micronesian Area Research Centre (MARC) which carries out cultural studies in addition to holding a reference resource on Micronesia and the Pacific Islands. ■

**Division of Economic Development and Planning,
Department of Commerce**

| | |
|-------------------------------|--|
| 102 M. Street Tiyon 96913 | Tel: (671) 475-0340/ 0321 Fax: (671) 477-9031 |
| Mr Joseph C. Cruz Director | |
| Ms Dot Harris Planner IV | Tel: (671) 475-0332 Fax: (671) 475-0331 Email: harrisd@ns.gov.gu |

The Department of Commerce, through its Economic Development and Planning Division (EDP), is responsible for overseeing commercial fisheries activities within the Exclusive Economic Zone of Guam. Commerce is the coordinating agency for Guam's participation in the Western Pacific Fisheries Regional Management Council, which is one of seven US regional fisheries management councils under the National Marine Fisheries Service of the US Department of Commerce. The agency also serves as

representative to various national, regional and international organisations that address issues related to the coastal zone. In addition, the agency coordinates the Guam Ad hoc Fisheries Advisory Committee, which addresses local commercial fisheries issues. EDP collects and compiles data on the tuna transshipment industry on Guam, which is coordinated with the National Marine Fisheries Service in Honolulu, Hawaii. The agency's Economic Development and Planning Division conducts various planning efforts that address coastal zone development and management issues. The department, through EDP, is the Government's lead agency in aquaculture development. EDP also administers the Guam Aquaculture Development and Training Center. ■

Guam Territorial Seashore Protection Commission, Department of Land Management

PO Box 2950
Agana 96932

Tel: (671) 475-5278/52
Fax: (671) 477-0883

Mr Carl J.C. Aguon
Director/ Executive Secretary
Territorial Seashore Protection Commission

Mr John T. Anderson
Chief Planner

Tel: (671) 475-5201
Email: jtander@ns.gov.gu

The seashore reserve is under the jurisdiction of the Territorial Seashore Protection Commission (21GCA, Chapter 60 and 63). The seashore reserve consists of the land and water area of Guam extending seaward to the 10 fathom (60 ft) contour. This includes all islands within the Government's jurisdiction except Cabras and those villages wherein residences have been constructed along the shoreline prior to the effective date of the Seashore Act (PL 13-154, 1976). It extends inland for a distance on a horizontal plan of 10 m or the nearest public right-of-way (least of the two). Any development within the seashore reserve, whether on land or under water, must obtain the Commission's approval. Since such development activities require the issuance of a permit from one or more government agencies, these permits must be approved by the Commission before being granted by the permit issuing agency. ■

Department of Parks and Recreation

PO Box 2950
Agana 96932

Tel: (671) 475-6296/7
Fax: (671) 472-9626
Email: parks@ns.gov.gu

Mr A. J. Sonny Shelton
Director

Email: sshelton@ns.gov.gu

The department administers rules and regulations effecting the recreational use of the coastal waters of Guam. ■

US National Marine Fisheries Service Guam Office of Enforcement

PO Box 3238
Agana 96932

Tel: (671) 477-4725/472-7200
Fax: (671) 472-7310

Mr Fred Kyle
Special Agent

The office is responsible for the enforcement of federal marine laws and regulations related to fisheries and marine life including the Magnuson-Stevenson Act, Lacey Act, Marine Mammal Protection Act and the Endangered Species Act. ■

US Fish and Wildlife Service Guam Office of Enforcement

| | |
|---------------------------|---|
| PO Box 23774 GMF 96921 | Tel: (671) 472-7151/46 Fax: (671) 472-7150 |
|---------------------------|---|

| | |
|---|---------------------|
| Vacant (Currently operated out of Hawaii) Special Agent, Office of Enforcement | Tel: (808) 541-2681 |
|---|---------------------|

| | |
|---|--|
| Mr Roger DiRosa Manager, Guam National Wildlife Refuge PO Box 8134, MOU-3 Dededo 96912 | Tel: (671) 355-5097 Fax: (671) 355-5098 Email: roger_dirosa@mail.fws.gov |
|---|--|

The US Fish and Wildlife Service on Guam has two components. The first is the Office of Enforcement which is concerned mainly with the enforcement of Federal laws and regulations pertaining to fisheries and wildlife including the Endangered Species Act. The second component is the Guam National Wildlife Refuge which administers the refuge's (Ritidian, Northern Guam) cultural, fisheries and wildlife resources. ■

US Army Corps of Engineers

| | |
|--|--|
| 115 San Ramon Street, Suite 302 Agana 96910 | Tel: (671) 472-8091 Fax: (671) 349-5155 |
|--|--|

| | |
|--|--|
| Mr Frank Dayton Chief, Guam Operations Office | Email: francis.dayton@pod01.usace.army.mil |
|--|--|

The US Army Corps of Engineers has jurisdiction over structures that lie in, on over, or under all tidal waters and for all dredging and/or filling in all tidal waters under Section 10 of the River and Harbor Act of 3 March 1899. Permits are also required for the discharge or placement of all fill and/or dredged material into tidal and non-tidal waters and their adjacent wetlands under Section 404 of the Clean Water Act of 1972. Section 103 of the Marine Protection Research and Sanctuaries Act of 1972 requires a permit for the transportation of dredged material that is to be dumped into ocean waters. ■

US Coast Guard

| | |
|---|--|
| Marianas Section PSC 455, Box 176 SPO-AP 96540-1056 | Tel: (671) 339-2001 Fax: (671) 339-2004 |
|---|--|

Capt. Richard Asaro
Commanding Officer

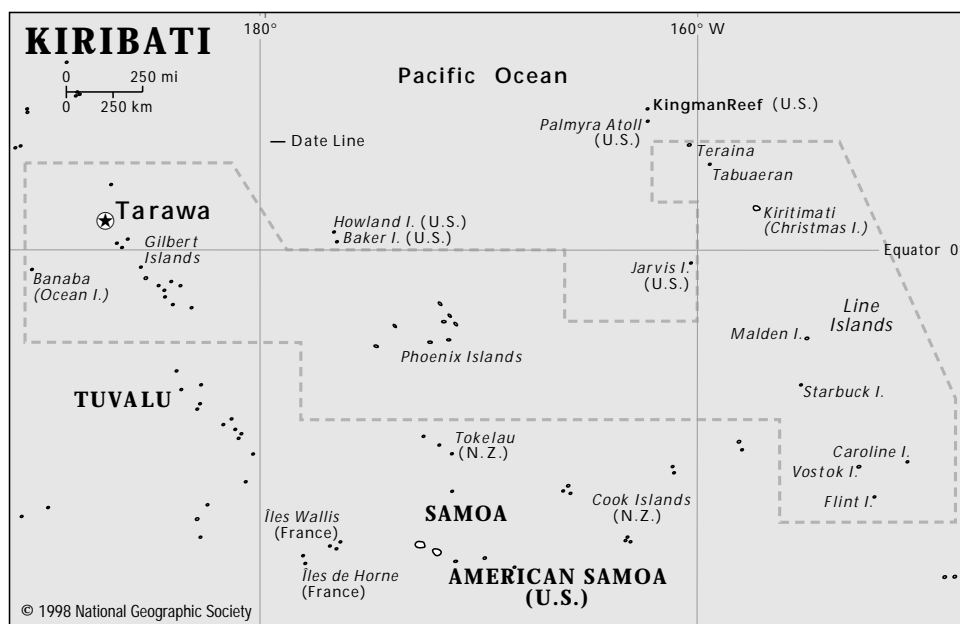
| | |
|--|-----------------------------|
| Lt. Dawn Kallen Marine Safety Officer | Tel: (671) 339-2001 ext 163 |
|--|-----------------------------|

A major responsibility of the Coast Guard is its search and rescue function which covers an area of approximately 2.5 million sq mi of the Western Pacific. The US Coast Guard is the premier maritime law enforcement body in the waters of the US EEZ. This includes enforcement of fisheries laws in the EEZ. It administers and enforces marine recreational and commercial vessel safety. The Coast Guard is also responsible for aids to navigation. The Coast Guard has an area contingency plan that addresses a wide range of disasters including oil spills. In regard to oil spills, the Coast Guard coordinates with Government of Guam and Federal agencies in the containment and recovery of marine wildlife impacted by spills. ■

SELECTED DOCUMENTS ON ICM

- Bureau of Planning—Guam Coastal Management Program 1991, *Coastal Management Program Final Report*, Government of Guam, Agana.
- Bureau of Planning—Guam Coastal Management Program, *Man, Land and Sea Newsletter* (published bi-monthly).
- Bureau of Planning—Guam Coastal Management Program, *Man, Land and Sea* (monthly television series aired on Guam Public Television).
- Bureau of Planning—Guam Coastal Management Program, *The Wetlands of Guam: A Birthright in Jeopardy* (video).
- Bureau of Planning—Guam Coastal Management Program, Wildlife Fliers.
- Bureau of Planning—Guam Coastal Management Program. Public Shoreline Access.
- Bureau of Planning—Guam Coastal Management Program. *Guidebook to Development Requirements on Guam*.
- Bureau of Planning—Guam Coastal Management Program. *Procedures Guide for Achieving Federal Consistency with the Guam Coastal Management Program*.
- Guam Environmental Protection Agency 1998, *Guam Water Quality Assessment Report*.
- Guam Environmental Protection Agency, Numerous EIS and EIAs are available.
- Guam Planning Council 1998, *I-Tano'-Ta Land Use and Planning Code*.
- Marine Laboratory, University of Guam, Numerous technical reports available on a wide range of information relevant to coastal zone management issues.

KIRIBATI



PHYSICAL CHARACTERISTICS

The Republic of Kiribati comprises 33 low-lying coral atolls located in the Central Pacific. The country has three main island groups:

- the Gilbert group to the west which consists of 12 atolls, four low-lying coral islands and the once phosphate-rich Banaba (Ocean Island) which is the country's only raised coral island (80 m above sea level);
- the Phoenix group lying approximately 2000 km southeast of the Gilbert group, and which consists of three atolls and five table reef islands;
- the Line islands lying approximately 4000 km to the east of the Gilberts group which consists of three northern and five southern islands and includes Kiritimati, the largest island in Kiribati.
- over 90% of the population lives in the Gilbert group, with one-third of the total population living on Tarawa atoll, the capital and commercial centre of Kiribati.

Kiribati lies within the equatorial region of the Central Pacific. Easterly trade winds predominate most of the year with wind-generated currents generally traveling in an east-to-west direction. Westerly winds, often associated with storms, are rare but do occur, especially during extended rainy

seasons and El Niño events. Kiribati lies close to the equator and outside the normal cyclone belts to the north and south of the equator. It also lies well outside the path of mid-latitude storm events. However the effect of distant storms and cyclones can sometimes be felt in the northern-most and southern-most islands.

GOVERNMENT STRUCTURE

Kiribati has a democratic system of government. Legislative power is vested in the unicameral Maneaba ni Maungatabu (Parliament). It has thirty-nine members elected by universal adult suffrage for four years (subject to dissolution), one nominated representative of the Banaban community and, if he is not an elected member, the Attorney-General as an ex-officio member. The Head of State is the Beretitenti (President), who is also Head of Government, and is elected by direct popular vote. The President governs with the assistance of the Vice-President and Cabinet, which consists of eleven Ministers (whom he appoints from among the members of the Maneaba) and the Attorney General. Executive authority is vested in the Cabinet, which is responsible to the Maneaba.

There are four political parties: Maurin Te Maneaba Party (Government), the Kiribati United Party, the National Progressive Party and Boutokan aia Koaua Kain Kiribati. In mid-1997 the three latter parties

joined forces to form a coalition party called Boutokan inaomatan aia koaua Kain Kiribati (BIKK).

Island councils, created under the Local Government Act of 1984, consist of elected local councillors led by a Chief Councillor and representing local village and island interests. They make decisions and develop their own by-laws relating to planning, resource conservation and development projects specific to the needs of the island. By-laws must be reviewed by the Attorney General's office for consistency with other laws and regulations.

COASTAL ZONE MANAGEMENT ISSUES

Due to the small size of the islands the people of Kiribati depend almost exclusively on the coastal waters and adjacent shore for their livelihood. The coastal areas are used for almost anything from bathing, recreation and food gathering, to extraction of sand and rock for construction, building of sea-walls and causeways and dumping of rubbish. Such activities have resulted in a change of equilibrium in the coastal zone which has become more apparent in the more populated islands and atolls. However the situation is most acute in the urban centre of South Tarawa where the combined effects of population density, overexploitation of coastal resources and unregulated coastal development is greatest. In the outer islands similar coastal zone management problems associated with increasing populations are evident but on a smaller scale.

Coastal erosion is a widespread problem in Kiribati. Most of the coastal erosion is a consequence of unregulated human activity which has caused a change in the dynamic equilibrium of the coastal areas. Factors contributing to coastal erosion include:

- unguided construction and inappropriate design of sea-walls built to reclaim land from the foreshore or to protect the shoreline;
- removal of beach rock from reef areas, allowing increased wave action on the shoreline;
- removal of sand and gravel from the beach for construction purposes; and
- cutting down of mangroves and coastal vegetation.

The construction of solid causeways across natural reef passages to provide road access between the separated small islets of an island has been a common practice over the past thirty years. This has affected the state of lagoon fish stocks and their capacity for recruitment as well as the lagoon water

quality. On Makin and Marakei, causeway construction resulted in reduced flushing, causing salinity variation and resulting in loss of fish and shellfish populations in the lagoon. In Butaritari and Tarawa the construction of causeways resulted in the blocking of spawning migration routes of adult lagoon species and prevented recruitment of larval fish from the ocean into the lagoon. In the populated areas of Tarawa the decrease in circulation caused by the causeways has resulted in poor lagoon water quality and contamination of edible shellfish stocks.

The blasting of reefs to construct new boat channels or to improve old ones is practiced extensively in Kiribati. Most of the effects are short term and include the killing of fish and invertebrates in the vicinity of the blast. However the newly exposed broken coral surfaces provide a good habitat for filamentous algae. These algae are host to the parasitic dinoflagellate *Gambierdiscus toxicus*, responsible for producing the toxins that cause reef fish to become ciguatoxic, and hence inedible. In other countries, including neighbouring Tuvalu, reef blasting has been implicated in outbreaks of ciguatera poisoning in humans.

In South Tarawa an extension of the port area and facilities is currently being undertaken. It is expected that the dredging for sand fill from the adjacent lagoon area would cause increased suspended sediment in the lagoon, at least around the construction sites. Nearby coral reefs and fish are likely to be negatively affected by this project. In addition there are plans to significantly increase the number of fishing boats using Tarawa as their base of operations. If these plans come to fruition there is a prospect of increased pollution of the harbour and lagoon from fish processing waste, human sewage, and fuel and lubrication oils.

The coastal fishery resources of Kiribati provide the main source of protein, and a significant source of income, recreation and cultural value for the people. With the increasing fishing pressure from the ever-growing population, effective fishery management initiatives should be imposed in order to ensure that these resources are used sustainably. Marine parks and some Island Council by-laws have been established to restrict some fishing activities. However enforcement of these regulations is lacking and their effectiveness cannot always be assessed.

Various activities coordinated by the Environment Unit are underway to mitigate some ICM problems. Environmental public awareness-raising activities are conducted through radio interviews, singing competitions, cleaning competitions and through a drama group on radio and live performances. An attempt to include environmental programmes in the curriculum for primary schools has also been made

but has not yet been very successful due to lack of resources. More recently sand mining sites and dumping sites have been selected and are monitored by the Lands and Survey Division.

ENVIRONMENTAL LEGISLATION

Environmental issues and problems were never viewed as a major concern in Kiribati until the late 1980s. This is reflected in the lack of comprehensive environmental laws and regulations. The Government is nevertheless aware of the need to protect the environment in order to achieve sustainable development. This is demonstrated clearly in the Kiribati Seventh Development Plan (DP7) which notes the need to protect scarce resources, control over-fishing, protect mangrove resources, stop coastal erosion and create environmental awareness through appropriate education in schools and media.

A review of environmental legislation was undertaken by Pulea and Farrier (1993). They examined 45 relevant legislative instruments. The existing legislation provides some control over human activities in Kiribati but in the main does not specifically relate directly to the protection of the environment. The most important laws relevant to ICM are:

- the Native Lands Ordinance, 1956, and subsequent amendments, as well as the Non-Native Lands (Restriction on Alienation) Ordinance, 1974, and the State Acquisition of Lands Ordinance, 1954;
- the Local Government Act, 1984, including Town Council By-laws;
- the Land Planning Ordinance, 1973;
- the Foreshore and Land Reclamation Ordinance, 1969 (regulates activities within the foreshore and allows certain foreshore areas to be declared unavailable for unlicensed sand and gravel extraction);
- the Marine Zones (Declaration) Act (No. 7 of 1983);
- the Laws of Kiribati Act, 1989
- the Kiribati Ports Authority Act, 1990, the Shipping Act, 1990 and the Harbours Ordinance, 1957 (the Harbours Ordinance prohibits the removal of materials from within harbour limits);
- the Fisheries Ordinance, 1977 and subsequent amendments, as well as the Fisheries Conservation and Protection Regulations, 1979, the Fisheries Regulations, 1981 on Vessel

licences and a number of Island Council By-Laws that regulate fishing practices in relation to fishing areas, times and types of fish;

- the Mineral Development Licensing Ordinance, 1978;
- the Public Utilities Act;
- the Merchant Shipping (Oil Pollution) (Gilbert Islands) Order, 1975;
- the Nuclear Installations (Gilbert and Ellice Islands) Order, 1972;
- the Public Health Regulations;
- the Closed Districts Act, 1990;
- the Prohibited Areas Ordinance, 1957; and
- the Wildlife Conservation Ordinance (cap 100).

A Draft Environmental and Conservation Act was drawn up in 1996 based on the Environmental Legislation Review. The Act has been formally submitted and is pending parliamentary approval. However the difficulties of reconciling economic development goals with environmental conservation and protection has been and continues to be a delaying factor. Most of the present issues of coastal zone management are covered in the Draft Act, but it tends to reflect the Tarawa situation. The extent of the Act should be looked at also in relation to the other outer islands where the ICM problems are not as significant.

The National Environment Management Strategy (NEMS) provides a long-term perspective of a range of strategies and programmes through which Kiribati can achieve sustainable development. One of the objectives of the environmental sub-sector of the NEMS is to develop and implement coastal zone planning and management in order to have a coordinated approach to coastal zone management.

Coastal zone management is an important issue in Kiribati. Legislation to directly protect the coastal zone is lacking, although some legislation exists to limit human activities and thus indirectly protect coastal areas. As in other countries, future developments are likely to bring new ICM issues. The Draft Environment and Conservation Act once approved is expected to establish the framework for future issues.

MAIN ICM ORGANISATIONS

Six government ministries share the responsibility for coastal zone management and planning.

Ministry of Environment and Social Development

PO Box 234, Bikenibeu
Tarawa

Tel: (686) 28000/ 28211
Fax: (686) 28334

Teken Tokataake
Secretary for Environment and Social Development

Tererei Merang
Environment Coordinator, Environment Unit

This ministry was formed in early 1995 from the (then) Ministry of Environment and Natural Resources Development and the Ministry of Health, Family Planning and Social Welfare. The ministry is responsible for managing the environment and protection of all natural resources through the efforts of its Environment Unit, which was originally established in 1991. The recently-formed Coastal Zone Management Sub-Committee is chaired by the Environment Unit Coordinator and has prepared a draft Coastal Protection Policy. ■

Ministry of Natural Resource Development

PO Box 64, Bairiki
Tarawa, Kiribati

Tel: (686) 21099
Fax: (686) 21120

Tinian Reiher
Permanent Secretary for Natural Resource Development

Maruia Kamatie
Chief Fisheries Officer, Fisheries Division

The Ministry of Natural Resource Development is responsible for the development and management of Kiribati's living resources through its Fisheries and Agricultural Divisions. It also has a small Mineral Unit that deals with non-living resource prospecting and extraction. ■

Ministry of Home Affairs and Rural Development

PO Box 75, Bairiki
Tarawa

Tel: (686) 21092
Fax: (686) 21133

Mikaere Baraniko
Secretary for Home Affairs and Rural Development

Erene Nikora
Chief Lands Officer, Lands and Survey Division

The ministry has a Central Land Planning Board which regulates all developments within the country. The ministry also has a Land and Survey Division that is responsible for the designation of areas for sand and gravel extraction, and which monitors coastal erosion. The Chief Lands Officer is in charge of the Lands and Survey Division and issues licenses for extraction of rock, gravel and sand for construction purposes. Within the Lands and Survey Division there is also a Physical Planning Unit which is responsible for formulating land use policies, and an Urban Planning Section which plays an important role in environmental management and planning. ■

Ministry of Works and Energy

PO Box 498, Betio
Tarawa

Tel: (686) 26192
Fax: (686) 26172

Tabokai Kiritome
Secretary for Works and Energy

This ministry is responsible for providing adequate fresh water, sewerage systems and electricity to the public through its Public Utility Board (PUB). Its Public Works Department (PWD) is responsible for the construction and maintenance of causeways and public roads and for the protection of coastlines. ■

Ministry of Health and Family Planning

PO Box 268, Bikenibeu
Tarawa

Tel: (686) 28100
Fax: (686) 28152

Dr Takeieta Kienene
Secretary for Health and Family Planning

This ministry is in charge of public health standards. In particular the ministry is responsible for monitoring the quality of fresh water resources and implementing safe sanitation methods through its National Water and Sanitation Committee. ■

Ministry of Information, Communication and Transport

PO Box 487, Betio
Tarawa

Tel: (686) 26003
Fax: (686) 26193

Meita Belabure
Secretary for Information, Communication and Transport

Miteti Abete Merang
Director of Marine, Marine Division

This ministry is responsible for maintaining communication between the islands of Kiribati and between Kiribati and the world. Its Marine Division, headed by the Director of Marine, is responsible for ensuring that safe and seaworthy standards are maintained by local shipping. The Division is also responsible for reef blasting of new boat channels, maintenance of old channels and the maintenance of mooring buoys and navigational beacons. ■

OTHER ICM ORGANISATIONS

Ministry of Education, Training and Technology

PO Box 263, Bikenibeu
Tarawa

Tel: (686) 28091
Fax: (686) 28222

Taakei Taoabe
Secretary for Education, Training and Technology

This ministry's responsibilities include school curriculum content and development; it is therefore involved in environmental education programmes aimed at schoolchildren. ■

Ministry of Finance and Economic Planning

PO Box 67, Bairiki
Tarawa

Tel: (686) 21082
Fax: (686) 21307

Taneti Mamau
Secretary for Finance and Economic Planning

Reina Timau
Chief Planning Officer, Planning Office

The Planning Department oversees all major development projects in the country, including those with significance for the coastal zone. ■

Ministry of Commerce, Industry and Tourism

PO Box 510, Betio
Tarawa

Tel: (686) 26158
Fax: (686) 26223

Bureti Williams
Secretary for Commerce, Industry and Tourism

Responsible for promotion of tourism and industry, all of which is centered on the coastal zone in Kiribati. ■

Police Patrol Boat

PO Box 497, Betio
Tarawa

Tel: (686) 26488
Fax: (686) 26387/ 26559

Tuare Ioane
Acting Commissioner of Police

The patrol boat is responsible for the apprehension of foreign fishing vessels operating illegally within Kiribati's waters. ■

Aia Maea Ainen Kiribati (AMAK)

PO Box 234, Bikenibeu
Tarawa

Tel: (686) 28517
Fax: (686) 28334

Tekarei Russell
Director

This is the mother National Women's Organisation that aims to promote the recognition of women's role in today's society. ■

Te Itoingaina

PO Box 79, Bairiki
Tarawa

Tel: (686) 21038
Fax: (686) 21401

Aroita Williams
Coordinator

This is the Catholic Church Women's Organisation, which is actively involved in all of the AMAK'S activities but aims directly at Catholic women. ■

Te Reitan Ainen Kiribati (RAK)

PO Box 80, Bairiki
Tarawa

Tel: (686) 21132
Fax: (686) 21435

Teoraiti Raiota
Coordinator

This is the Protestant women's organisation. Its operation is very similar to the Catholic Women's Organisation and it is also affiliated to the AMAK. ■

Foundation for the People of the South Pacific (FPSP)

PO Box 43, Bairiki
Tarawa

Tel: (686) 28101
Fax: (686) 28082

Sylvia Linggi
Director

The FSP in Kiribati has been involved in a lot of projects that aim to improve the general health and life of the public. They have a number of environmentally-related projects and have been very active in environmental campaigns relating to management of the coastal areas. ■

Atoll Research Programme (ARP)

PO Box 101, Bairiki
Tarawa

Tel: (686) 21493
Fax: (686) 21348

Temakei Tebano
Manager

The ARP is a Tarawa-based research centre that is part of the Marine Studies Programme of the University of the South Pacific in Suva, Fiji. The centre encourages research, mostly in the coastal marine areas in order to enhance the livelihood of the people on atolls and to assist in maintaining the future sustainability of atoll environments. ■

Maurin Kiribati

c/o ARP, PO Box 101, Bairiki
Tarawa

Tel: (686) 26488
Fax: (686) 26387/ 26559

Dr Alolae Cati
Coordinator

This is a new organisation that aims to revive the traditional medicine of the Kiribati people. In doing so the organisation promotes the conservation of coastal plants having medicinal value, as well as improved public health through the creation of a clean coastal environment. ■

Wildlife Conservation Unit, Ministry of Line and Phoenix Islands

London, Kiritimati
Line Islands

Tel: (686) 81217
Fax: (686) 81278

David Yeeting
Permanent Secretary, Line and Phoenix Group

Katino Tebwaki
Wildlife Warden

The unit is responsible for the protection of Kiritimati's unique wildlife, including seabird breeding colonies. Specific activities in the past have included programmes of elimination of feral cats and other introduced species. ■

Karikirakean Mwengaraoin Kiribati (KMK)

PO Box 51, Bairiki
Tarawa, Kiribati

Tel: (686) 21241
Fax: (686) 21416/ 21010

Tiree Kabuta
Director

KMK succeeded Save The Children (US) in Kiribati in 1991 and has 6 staff (3 administrative and 3 technical). Its mandate is to improve home health, housing and environment in the outer islands of Kiribati. The organisation receives its funds from the New Zealand Government and NZ Save the Children Fund and has close links with Save the Children's US, NZ and other branches.

KMK has no specific coastal management responsibilities, but is involved in the provision of low-cost housing, sanitation and water supply, all of which impinge on the coastal zone. ■

Island Councils

Each island has an individual council, with the Chief Councillor as the responsible head. There are two councils for South Tarawa, the Betio Town Council and the Teineinano Urban Council. ■

Betio Town Council (BTC)

PO Box 477, Betio
Tarawa

Tel: (686) 26477

Buretau Kaureata
Clerk to the BTC

Rutiano Benetito
Chief Councillor

Teineinano Urban Council (TUC)

PO Box 42, Bairiki
Tarawa

Tel: (686) 21294

Karekeman Teio
Clerk to the TUC

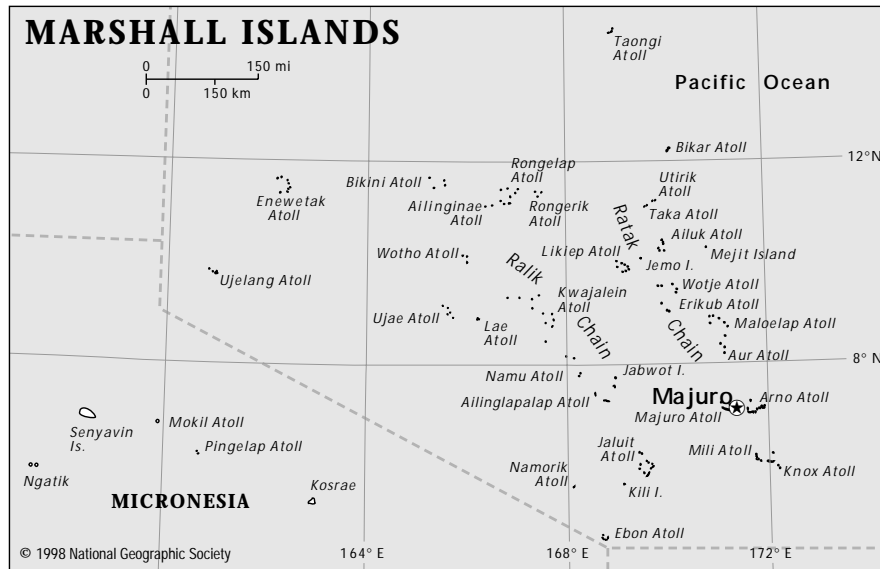
Bauro Atanibeia
Chief Councillor

SELECTED DOCUMENTS ON ICM

- Abbott, R. R. and Yeeting, B. 1995, 'The use of inter-island passages by larval and juvenile fish to enter Tarawa lagoon', in *BioSystems Analysis, Tarawa Lagoon Management Plan, Vol II: Tech. Report*.
- Beets, J. 1995, 'Finfish resources in Tarawa lagoon: documentation of population declines', in *BioSystems Analysis, Tarawa Lagoon Management Plan, Vol II: Tech. Report*.
- Byrne, G. 1991, 'Sediment movement on Tarawa, Kiribati', *Workshop on Coastal Processes in the South Pacific Island Nations*, Lae, Papua New Guinea, 1-8 October, SOPAC Tech. Bulletin 7, Suva, Fiji.
- Catala, R. L. A. 1957, 'Report on the Gilbert Islands: some aspects of human ecology', *Atoll. Res. Bulletin*, 59: 1-187.
- Chen, C. W., D. K. Leva and Kimmerer, W. J. 1995, 'Circulation and the value of passage channels to water quality of Tarawa Lagoon', in *BioSystems Analysis, Tarawa Lagoon Management Plan, Vol II: Tech. Report*.
- Crocombe, R. and Mason, L. (eds) 1988, *Micronesian Politics: Politics in the Pacific Islands*, vol 3 of the series, Institute of Pacific Studies, University of the South Pacific, Suva, Fiji.

- Crutz, B. and Preston, G. L. 1988, 'Summary of a survey of the deep water shrimp resources of the Northern Gilbert Islands, Kiribati', Background paper 88, *Workshop on Pacific Inshore Fishery Resources*, South Pacific Commission, Nouméa, New Caledonia.
- Danielson, R. E., Abbott, R. R., Kimmerer, W. J. and Etuati, K. 1995, 'Microbiological contamination of water and shellfish in Tarawa lagoon, Kiribati: remediation strategies for contaminated shellfish', in *BioSystems Analysis, Tarawa Lagoon Management Plan, Vol II: Tech. Report*.
- Johannes, R. E. 1992, *Management Strategies for Tarawa Lagoon, Kiribati*. Trip Report No. 2. (cited in Paulay, G. 1995).
- Johannes, R. E. and Yeeting, B. 1995, 'I-Kiribati knowledge and traditional management of lagoon resources', in *BioSystems Analysis, Tarawa Lagoon Management Plan, Vol II: Tech. Report*.
- Johannes, R. E., Kimmerer, W., Kinzie, R., Shomura, E. and Walsh, T. 1979, *The Impact of Human Activities on Tarawa Lagoon*, SPC, Noumea, New Caledonia.
- Kimmerer, W. J. 1995, 'Water chemistry and lower trophic levels', in *BioSystems Analysis, Tarawa Lagoon Management Plan, Vol II: Tech. Report*.
- Kiribati, Republic of 1993, *Kiribati National Environmental Management Strategy*, prepared for SPREP and the Government of Kiribati, SPREP, Apia, Samoa.
- Kiribati, Republic of 1995a, *North Tarawa Conservation Area Project Document*, prepared by the Environment Unit for the Ministry of Environment and Social Development, Tarawa, Kiribati.
- Kiribati, Republic of 1995b, *Urban Management Plan for South Tarawa, Republic of Kiribati*, Ministry of Home Affairs and Rural Development, Tarawa, Kiribati.
- Kiribati, Republic of 1996a, *Draft Environment and Conservation Act for Kiribati*, Office of the Attorney General, Tarawa, Kiribati.
- Kiribati, Republic of 1996b, *Proposed Regulations for the Protection and Management of the Coastal Zone in the Republic of Kiribati*, Office of the Attorney General, Tarawa, Kiribati.
- Lee Jones, H. and Brewer, W. A. 1996, *Coastal Zone Protection and Resource Management Plan for the Republic of Kiribati*, Draft Annex No. 3, Asian Development Bank TA No. 2199-KIR.
- Metz, W. 1996, *The Mangroves of Kiribati : An Inventory, Feasibility and Management Study*, UFS/ FAO/ UNDP, Ministry of Natural Resources Development, Tarawa, Kiribati.
- Paulay, G. 1995, 'Benthic ecology and biota of Tarawa lagoon: influence of equatorial upwelling, circulation and human predation', in *BioSystems Analysis, Tarawa Lagoon Management Plan, Vol II: Tech. Report*.
- Paulay, G. and Kerr, A. M. 1995, 'Coral reefs and coral communities of Tarawa', in *BioSystems Analysis, Tarawa Lagoon Management Plan, Vol II: Tech. Report*.
- Phillips, G. D. 1995, 'A survey of Tarawa residents and their perceptions of Tarawa lagoon', in *BioSystems Analysis, Tarawa Lagoon Management Plan, Vol II: Tech. Report*.
- Preston, G. L., Yeeting, B. M., Kamatie, M., Uan, J., Reiti, T. and Tuake, T. 1992, *Reconnaissance of the Pearl Oyster Resources of Abaiang and Butaritari Atolls, Kiribati*, SPC, Nouméa, New Caledonia.
- Pulea, M. and Farrier, D. 1993, *Environmental Legislation Review—Kiribati*, SPREP, Apia, Samoa.
- Sims, N. A., Preston, G. L., Yeeting, B. M. and Alfred, R. 1990, *Pearl Oysters in Christmas Island, Kiribati, and the Potential for Development of a Pearl Culture Industry*, SPC, Nouméa, New Caledonia.
- Tebano, T. 1991, *Is it Development or Destruction? The Impact of Physical Innovations on Atolls: Biological and Ecological Implications*, USP Marine Studies Programme. Tech. Report Series 1991, No. 8.
- Tebano, T. and Paulay, G. 1995, 'Variable recruitment and changing environments create a fluctuation resource: the biology of *Anadara* (Bivalvia: Arcidae) in Tarawa', in *BioSystems Analysis, Tarawa Lagoon Management Plan, Vol II: Tech. Report*.
- Teiwaki, R. 1988, *Management of Marine Resources in Kiribati*, Atoll Research and Development, Institute of Marine Resources, University of the South Pacific, Suva, Fiji.
- Wilson, C. 1994 *Kiribati: State of the Environment Report*, SPREP, Apia, Samoa.
- Yeeting, B. 1995 'The bonefish resources in Tarawa Lagoon', in *BioSystems Analysis, Tarawa Lagoon Management Plan, Vol II: Tech. Report*.
- Zann, L. P. 1990, 'Traditional management and conservation of fisheries in Kiribati and Tuvalu atolls', in *Traditional Management of Coastal Systems in Asia and the Pacific: A Compendium*, eds K. Ruddle and R. E. Johannes, UNESCO, Jakarta.

MARSHALL ISLANDS



PHYSICAL CHARACTERISTICS

The Republic of Marshall Islands (RMI) consists of 29 atolls and five islands situated in the central Pacific Ocean (5–15°N, 162–173°E) and lying in two parallel island chains known as the *ratak* (sun rise) and *ralik* (sunset) groups. There are almost 1225 individual islands and islets with a total land area of 70 sq miles. The climate is hot and humid with an annual mean daily temperature of 27°C and mean annual rainfall of 3350 mm. The northernmost islands are very dry, but they become progressively wetter further south.

In 1988 the total population was 43 380, with an annual growth rate of 3.8%. Almost half of the population lives on the capital Majuro atoll while a further 19% live on Ebeye island on Kwajalein atoll. The estimated mid-year population in 1994 was 54 069.

GOVERNMENT STRUCTURE

The elected president is both the Head of State and in charge of a cabinet of ministers. The legislature, or Nitijela, has 33 members elected every four years. Legislative power is centralised with no provinces or states. The 12 member council of chiefs (Iroij) has a consultative

function on land and custom issues. Each inhabited atoll has a local government consisting of a council and mayor. The local government has jurisdiction over most coastal zone and marine management issues on each atoll.

COASTAL ZONE MANAGEMENT ISSUES

The greatest environmental impacts on the coastal zone in RMI are concentrated in the urban centre of Majuro, and to a lesser extent in Ebeye. These impacts can be broadly attributed to increasing population pressure and the growing consumer economy in these areas. A 1988 report declared seven areas of the Majuro lagoon unsafe for swimming or fishing, primarily due to high coliform counts. A sewage reticulation system that will use ocean outfall is being extended throughout Majuro township. Solid waste disposal is used for reef reclamation in Majuro and there is a litter and plastic debris problem throughout the lagoon area.

Coastal erosion problems are associated with causeways and dredging activities in the main urban centres. The extensive causeway construction along the southeastern coast of Majuro has also restricted water circulation in the lagoon, leading to a deterioration of water quality in the DUD area (Delap-Uliga-Djarrit, the three suburbs that make up

the larger urban area of Majuro town). Pearl oysters showed poor growth and survival in the southeastern corner of Majuro lagoon, while the results from other areas of the lagoon were satisfactory.

There is also minimal regulation of dredging activity, with a major land reclamation and lagoon sand mining project adjacent to the one boat channel close to DUD continuing to act without proper permits. Much of the township also has resorted to ad hoc land reclamation and attempts to stabilise the beachfront, usually with poorly designed concrete sea-walls, or coral rubble enclosed in wire mesh gabions. Armour-rock revetments protect the airport runway and a few stretches of coastline in Majuro and some outer islands. The armour-rock is quarried from the reef flat by blasting operations.

There is an ongoing ciguatera problem in Majuro, but it is mainly confined to apex predators (f. *Serranidae* and *Lutjanidae*) from the outer reef, and there are no clearly-proven anthropogenic causes.

A recent influx of Asian-based live reef fish export operations to the Republic of the Marshall Islands has caused some concerns. These businesses are able to operate at the sole discretion of the respective Island Councils, with minimal oversight by the National Government authorities.

Some of the uninhabited northern atolls are considered to have 'reserve' status under traditional law, but it is unclear how binding this is, and how effective these protections are.

Two of the northern atolls (Bikini and Enewetak) were used for atomic weapons testing by the US during the 1940's and 1950's. Three other atolls suffered from extensive radioactive fallout. Repopulation efforts are now under way on most of these affected islands.

ENVIRONMENTAL LEGISLATION

Marine resource exploitation and management is regulated by the following Acts:

- *Marine Zones (Declaration) Act 1984*, which defines the internal waters, archipelagic waters, the territorial sea, the exclusive economic zone and the contiguous waters;
- *Public Lands and Resources Act*, which defines all marine areas below the ordinary high water mark as government-owned;
- *Marshall Islands Marine Resources Authority Act 1988*, which sets out the powers and

responsibilities of the Marshall Islands Marine Resources Authority (MIMRA);

- *Marshall Islands Marine Resources Authority (Amendment) Act 1989*, which prohibits the use of drift nets;
- *Marine Resources Act*, which regulates fishing and protects endangered species in the Marshall Islands;
- *Marine Resources (Trochus) Act 1983*, which regulates the harvesting of trochus;
- *Endangered Species Act (1975)*;
- *National Environment Protection Act (1984)*, which provides for the establishment of a National Environment Protection Authority;
- *Coast Conservation Act 1988*, which makes provision for coastal zone survey and the development of a coastal zone management plan by the Director of the EPA; and
- *Marine Mammals Protection Act 1990*.

ICM PLANS AND ACTIVITIES

The only plan that was to be implemented during the Second Five-Year (1992/93–1996/97) Development Plan was the Majuro Atoll Erosion Control Plan. It provided for an in-depth feasibility study covering the design and funding of causeway improvements, including the construction of culverts, to protect buildings and historical grave sites. However, due to unavailability of funds, this plan has not yet been implemented.

Another plan has been developed out of the Biodiversity Convention, with support from the Global Environmental Facility. This National Plan for Biodiversity and Conservation Concerns has resulted in surveys of biodiversity (compilation of species lists) for four atolls. This has usually consisted of surveys and interviews with community leaders on each island, with a compilation of lists of resources available, descriptions of use practices and an assessment of the current status of the resource. This community-consultative process will eventually identify areas of need for management, resulting in a Biodiversity Strategy and Action Plan for each island.

There is also a SPREP-supported conservation project in Jaluit Atoll, looking at biological resources. This falls under the South Pacific Regional Biodiversity Conservation Programme.

MAIN ICM ORGANISATIONS

Environmental Protection Agency (EPA)

PO Box 1322
Majuro 96960

Tel: (692) 625-3035/ 5203
Fax: (692) 625-5202

Mr Jorelik Tibon
General Manager

Mr Abraham Hicking
Water Resources / Quality

Mr Karness Kusto
Public Awareness

Mr Risen Tarbillin
Environmental Permits

In 1984 the Nitijela established the Environmental Protection Agency (EPA) to preserve and improve the quality of the environment. It is a statutory body linked to the Ministry of Health Services. The EPA is led by a five-member board, with four members from Majuro and one member from Ebeye, and interacts with international organisations such as UNDP, SPREP, WHO, UNICEF, US EPA and US Department of Interior. The EPA now operates under the Coast Conservation Act of 1988.

The total number of staff in the EPA is 11, down from an earlier peak of 15. These reductions have ensued as a result of the gradual phase-out of Compact funds. The administrative head of the EPA is the General Manager. There is one full-time public education officer, two environmental specialists, two water specialists and two secretaries. In addition, a health inspector has been transferred from the Ministry of Health Services. The EPA interacts with international organisations such as UNDP, SPREP, WHO, UNICEF, the US EPA and the US Department of Interior.

The EPA's responsibilities include enforcement of environmental regulations concerning marine and freshwater quality standards, solid waste disposal, sewage systems, earthmoving, pesticides, hazardous/toxic materials and coastal erosion. The specific regulations administered are EIS, solid waste, public water supply, earthmoving, toilet facilities and sewage disposal, pesticides and marine water quality. Air pollution regulations have been drafted, but not yet enacted. Other specific objectives are to monitor surface and groundwater sources and coastal areas to assess point-source pollutants and take corrective measures to protect the environment and to conserve land and marine resources.

Regulations under EPA law regarding earthmoving activities and shoreline construction are widely ignored, with a public perception that such rights and responsibilities rest with the traditional landowners.

Water quality monitoring activities in Majuro have measured fecal coliform levels throughout Majuro lagoon from 1986 until the present. Sampling is concentrated in the urban centre of Majuro, where greatest evidence of contamination occurs. The South Pacific Bureau for Applied Geoscience (SOPAC) has conducted studies of bathymetry, physical water quality and current patterns in Majuro lagoon. ■

Coastal Management Office, Majuro Atoll Local Government

PO Box 796
Majuro 96960

Tel: (692) 625-5143
Fax: (692) 625-3757

Mr Riyadh Mistry
Project Manager, Coastal Management Program

Ms Chastity Lautez
Project Assistant

Mr Wilbur Allen
Administrator

Mr Ladie Jack
Executive Councilman

The Majuro Atoll Local Government (MALGOV) is active in coastal management issues, with coastal erosion control efforts and management of coastal fisheries as the primary concerns. MALGOV's activities and effectiveness have increased as a result of the recently-implemented project 'Formulation of a coastal management plan for Majuro Atoll', and the formation of the Interagency Coastal Management Project Working Group. This is a pilot project receiving financial and technical support from UNDP and technical support from SOPAC. It was designed, based upon the recommendations of SPREP and SOPAC, to bring together the diverse aspects of Coastal Zone Management including public education, scientific studies, government policies and procedures, and local participation.

Coastal mapping, sand and aggregate assessment, shoreline erosion control strategies, numeric modelling of lagoon circulation and water quality classification have been the focus of the scientific component of the project. A geographic information system (GIS) is being used to update the available maps. The ICM project has placed an economic value on Majuro's coastal resources and a ground breaking (in Micronesia) valuation study completed by the project emphasises the links between environment and economic issues.

Several training activities and seminars addressing resource economics, coastal fisheries and the role of planning have targeted political representatives. Majuro's local government leaders, including 13 elected council members and one traditional leader, attended two participatory workshops organised by the coastal project. Vigorous discussions marked this workshop as council members sought to understand the planning process and to reconcile funding and traditional land use issues. Shoreline management, public or tourist access to beaches, solid waste management, sand and gravel production and coastal fisheries surfaced as the most important concerns.

A second workshop focused on coastal fisheries management. Protected areas, restrictions on permits, size and catch were among the solutions considered after council members voiced their experiences and perceptions of problems in Majuro atoll. Council agreed to formulate an ordinance consistent with national law and fisheries policy to address these issues. Legislation is being introduced at the local government level to regulate coastal fisheries, and mooring buoys and fish aggregation devices (FADs) have been installed.

Publications and audio-visual materials have been produced in the Marshallese language describing coastal problems and solutions. A first-ever publication in the Marshallese language addressing coastal issues highlights the cooperation of the UNDP project with regional agencies to promote public understanding of complex coastal issues. *Kabbe ko an Aelon in Pacific* is a 38-page illustrated book (in colour) with a local flavour, based on a 1996 publication by SOPAC. Other outputs of the project have included pamphlets summarising results and a 15-minute video on underwater pollution in Majuro lagoon.

It is anticipated that the project's findings and practices can eventually be extended to the other islands. ■

Marshall Islands Marine Resources Authority

PO Box 860
Majuro 96960

Tel: (692) 625-3262 / 4962
Fax: (692) 625-5447

Mr Danny Wase
Director

Mr Danny Jack
Coastal Fisheries Management

Governed by Marshall Islands Marine Resources Act 1988. MIMRA is responsible for overall conservation and management of marine resources including:

- conservation, management and control of exploration and exploitation of all marine resources;
- participation in planning and execution of programmes related to fisheries;
- management of the exclusive economic zone; and
- fishing agreements with distant-water fishing nations. ■

OTHER ICM ORGANISATIONS

Department of Lands and Survey, Ministry of Interior

PO Box 18
Majuro 96960

Tel: (692) 625-8240
Fax: (692) 625-5353

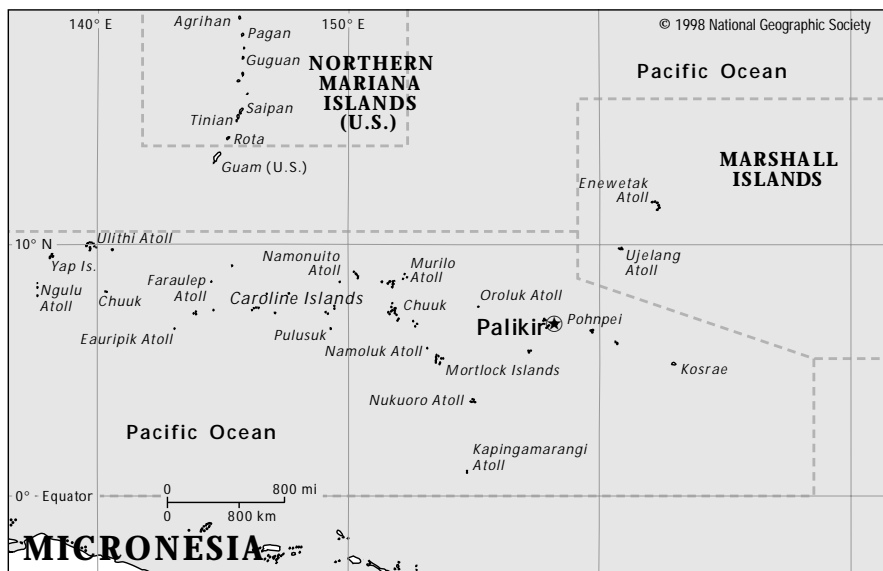
Mr Albert Andrike
Mapping

The Department of Lands and Survey is involved in the Integrated Coastal Management Project Working Group. They primarily provide assistance on measurement and control of coastal erosion through beach profiling and with the collation of maps. ■

SELECTED DOCUMENTS ON ICM

- Anon. 1989, *Survey of Arno Atoll for Shoreline Protection and Transportation Needs*, (review draft), US Army Engineer District, US Army, Fort Shafter, Honolulu.
- Crawford, M. 1993, *Republic of the Marshall Islands National Environmental Management Strategy, Parts A and B*, SPREP, Apia, Samoa.
- Crawford, M. et al. 1992, *Executive Summary, Vulnerability Assessment to Accelerated Sea Level Rise—Case Study: Majuro Atoll*.
- Curren, F. 1993, *Study of the Enewetak Trochus Resource, with Recommendations for Management and Marketing*, University of Hawaii Sea Grant College Program, Honolulu, Hawaii.
- Harding, E. 1992, *SPREP Review of Environmental Law in the Republic of the Marshall Islands. Strengthening environment management capabilities in Pacific Island Developing Countries*, RETA 5403, Australian Centre for International Law, Faculty of Law, University of Sydney, Australia.
- Harris, L. G. et al. 1992, *A Preliminary Study of Commercially Important Reef Fish Populations and Reef Structure on 13 Reefs in the Majuro Atoll Lagoon, Republic of the Marshall Islands*.
- Holthus, P., et al. 1992, *Vulnerability Assessment to Accelerated Sea Level Rise—Case Study: Majuro Atoll*, SPREP, Apia, Samoa.
- King, P. 1997, *The Economic Value of Majuro Atoll's Coastal Resources*, UNDP-MALGov.
- Milone, P., Posner, G., Shomura, R. and Tuttle, R. 1985, *Potential for Fisheries Development in the Marshall Islands*, International Development Cooperation Agency.
- Office of Planning and Statistics 1992, *Second Five-Year Development Plan*, Republic of Marshall Islands, Majuro.
- Smith, A. J. 1992, *Republic of the Marshall Islands Marine Resources Profiles*, Forum Fisheries Agency, Honiara.
- Thomas, P. E. J., et al. 1988, *Northern Marshall Islands Natural Density and Protected Areas Survey*, SPREP, Noumea.
- US Army Corps of Engineers 1973, *Environmental Assessment for Quarrying Operations in the Kwajalein Missile Range*, US Army Corps of Engineers, Pacific Ocean Division, Honolulu, Hawaii.
- US Army Corps of Engineers n.d. *Coastal Resources Inventory for Arno Atoll*.
- US Army Corps of Engineers n.d. *Coastal Resources Inventory for Kwajalein Atoll*.
- US Army Corps of Engineers 1989, *Coastal Resources Inventory for Majuro Atoll*.

FEDERATED STATES OF MICRONESIA



PHYSICAL CHARACTERISTICS

The Federated States of Micronesia (FSM) stretch more than 2500 km across two time zones in the Western Pacific, lying between 1°S and 14°N latitude and between 135 and 166°E longitude. It includes the former Eastern and Western Carolines, with the exception of Palau, which is now a separate nation. There are 607 islands, 65 of which are inhabited. The islands vary from three large, high mountainous islands of volcanic origin to small atolls covering approximately 2.6 million sq km. Yap is a continental island, and there are 31 atolls, 6 low coral islands, 2 barrier reefs and 27 fringing reefs. However, the total land area is only 705 sq km, with an additional 7218 sq km of lagoon area. In contrast, the FSM Economic Exclusive Zone covers 2978 000 sq km, reaching south of the equator and to the Philippine Sea.

The FSM consists of four states. From west to east they are: Yap State with a land area of 1196 sq km and a lagoon area of 1053 sq km; Chuuk (formerly Truk) State with a total land area of 127.4 sq km, made up of 7 major island groups, the largest being Chuuk Proper which has 98 islands (14 of volcanic origin) and islets of which 41 are on the barrier reef encircling the more than 2080 sq km lagoon; Pohnpei (formerly Ponape or Senyavin Islands) State with a land area of 343.7 sq km consisting of Minto Reef and 8 major island groups; and Kosrae (formerly Kusaie) State with a land area of 111.8 sq km and no lagoon.

The total population of the FSM during the 1994 census was 105 506. Chuuk State registered 53 319, (50.5%); Pohnpei, 33 692 (31.9%); Yap, 11 178 (10.6%); and Kosrae, 7317 (6.9%). While these numbers don't seem large, population and density problems become apparent when viewed alongside previous census figures. For instance, the percentage distribution of the population across the states has changed remarkably from 1920 to 1994. Pohnpei and Kosrae's percentage share of the FSM population increased from 19.4 to 31.9% and 2.7 to 6.9% respectively. In contrast, Yap's share decreased from 28.1 to 10.6% due to migration to Guam, Pohnpei and Hawaii. The population of Chuuk has remained relatively constant at 49.9% in 1920 and 50.5% in 1994. Population density figures (per square mile) from 1973 to 1994 show similar increases: Yap, 171 to 243; Chuuk, 645 to 1088; Pohnpei, 143 to 255; and Kosrae, 92 to 170.

The annual rate of population growth between 1973 and 1994 varies according to the year calculated and the age group targeted, although generally these figures fall within the range of 1.9 to 3.0%. For instance, the number of 45–49 year olds increased by 1.9% from 1973 to 1980, 0.5% from 1980 to 1989 and 7.0% from 1989 to 1994. For the same periods the number of 15–19 year olds increased 1.5, 3.3 and 3.3% respectively.

The average temperature in the FSM is about 80°F with little variation, though the early morning hours in the mountainous interiors can reach as low as

60°F. The relative humidity is about 80%. Rainfall varies in the different states and atolls. Pohnpei Island with its 350 inches of rain in the mountains to 200 along the coast is the wettest. Other islands and atolls are much drier. Typhoons can hit at any time, but are most common between September through November.

GOVERNMENT STRUCTURE

In 1986, the FSM became an independent federated nation under the Compact of Free Association with the United States. The economic features of this association will expire in 2001. The nation became a member of the United Nations in 1991. The national capital is located in Palikir in Pohnpei State. The Congress is unicameral consisting of 10 senators apportioned by population who serve two-year terms, and one senator at-large elected from each state for a four-year term. The president and vice president are chosen by the Congress from the at-large membership to form the executive branch. They appoint cabinet members pending approval by the Congress. Currently Chuuk has five two-year term senators in Congress, Pohnpei three, Kosrae one, and Yap one. An independent Supreme Court is the third branch of the government. The Chief Justice and not more than five Associate Justices are appointed for life. There are no political parties in the nation.

Although the national government is meant to have primacy over state governments, states are strong and there are still some areas over which the states and national governments argue. Each of the four states has a popularly elected governor, lieutenant governor and legislature, which is unicameral. In conjunction with state government, each state has other levels of popularly elected government officials at municipal or village levels. Traditional leaders, especially in Yap and Pohnpei, can influence political decision-making to various degrees depending upon the issues involved. Religious leaders, especially in Pohnpei and Kosrae, also have considerable influence in political decision-making.

Each state has its own administrative organisations, plans and strategies for fisheries and land development and management. The state governments are responsible for the state waters 12 nautical miles from the island baseline.

Despite the nation's political independence the FSM has been heavily dependent in economic terms upon the United States for funding due to interrelationships under the Compact of Association; however, the Compact's economic assistance terminates in 2001, with negotiations over possible

future arrangements due to begin soon. The American need to continue a strong role in the area has waned considerably since the end of the Cold War, and most politicians in the nation recognise that the FSM must now find other means to finance itself. As a result, Asian businessmen and governments are being courted for economic assistance in many areas.

COASTAL ZONE MANAGEMENT ISSUES

CM issues in the FSM reflect today's rapidly changing economic picture. On the one hand, funds from the Compact of Association with the US are quickly running out, forcing local and state governments to downsize and restructure. On the other, agencies and private individuals are spending money to finish projects that have been long in the developing stages, leading to extensive dredging in coastal areas for land and road fill. Coastal lands are being disturbed as roads are built and houses erected to serve an increasing and more mobile population.

Future development in FSM will mean increased exploitation of the nation's resources, one of the most important being fish. Such development will require increased harvesting and increased use of coastal lands and waters to support the industry and its increasing infrastructure.

At the local level increased *sakau* (kava) production has led to deforestation which in turn has caused erosion and resultant water runoff into the mangroves and rivers. A heavy reliance on pig production for customary feasts and traditional burials has led to increases in pig rearing. The wastes from this are flushed in greater quantities into the coastal areas.

ENVIRONMENTAL LEGISLATION

The National Constitution of FSM, adopted in 1979 and amended in 1991, is the basis for legal authority and decision-making in the country. However, laws and regulations to control and protect the environment have been established both at the national and the state levels. Environmental protection authority has essentially been transferred to the state governments since 1991. Thus much of the coastal management responsibility now lies in the hands of state agencies, although at the national level some responsibility is vested in the administrators of Marine Resources and Agriculture departments.

COASTAL ZONE MANAGEMENT RESPONSIBILITIES

The state government institutions actively involved in coastal management include Yap State's Environmental Protection Authority and the Departments of Conservation and Development (Kosrae), Conservation and Resources

Surveillance (Pohnpei), Marine Resources and Agriculture (Chuuk) and Resources and Development (Yap).

The involvement of non-government organisations in coastal management related activities are limited. Groups such as youth, church, local community, tourism and service organisations can be engaged in activities related to coastal management.

MAIN ICM ORGANISATIONS

FSM Department of Economic Affairs

PO Box PS 12
Palikir
Pohnpei, FM 96941

Tel: (691) 320-2620/5133
Fax: (691) 320-5854/ 2079
E-mail: fsmrd@mail.fm

Mr Sebastian Anefal
Secretary

Mr Moses Nelson
Chief, Fisheries Unit

Mr John Wichep
Mangrove Project Officer

E-Mail: jwichep@mail.fm

This new department developed out of a major restructuring in early 1998 that combined many former divisions under one roof and with different names. The department is responsible for marine resources and coastal resources management and for providing technical advice and support to the state governments that also have coastal resource management responsibilities. The now defunct Department of Resources and Development previously held many of these responsibilities. ■

FSM Department of Health Services

PO Box PS 70 Palikir
Pohnpei, FM 96941

Tel: (691) 320-2609
Fax: (691) 320-5263/5375

Hon. Dr Eliuel K. Pretrick
Secretary

Mr Natcha Siren
Chief, FSM Environmental Protection Agency

Mr Jones George
Administrator, Archives Historic
Preservation Program

Tel: (691) 320-2343
Fax: (691) 320-5634

This department coordinates federal health-related programmes with the states and reviews relevant research proposals at national level. ■

Micronesian Maritime Authority

PO Box PS 122, Palikir
Pohnpei, FM 96941

Tel: (691) 320-2700/5181/5866/ 2009
Fax: (691) 320-2383

Bernard Thoulag
Chief Executive Officer

This authority grants licensing rights to foreign fishing vessels as well as monitoring vessel activity and catches. ■

Pohnpei Department of Resources Management and Development

| | |
|---|--|
| PO Box 562 Pohnpei, FM 96941 | Tel: (691) 320-2611/2411 Fax: (691) 320-5599 |
| Mr David Panuelo Director | E-Mail: dirrnd@mail.fm |
| Mr Herson Anson Chief, Division of Resources Management and Development | Tel: (691) 320-7457 Fax: (691) 320-6386 E-mail: herson@mail.fm |
| Mr Valentin A. Martin Deputy Chief, Marine and Coastal Management | Tel: (691) 320-2795 Fax: (691) 320-6204 |
| Mr Adelino Lorens Chief, Division of Agriculture and Forestry | Tel: (691) 320-2400 E-Mail: pniforestry@mail.fm |

Pohnpei Environmental Protection Agency

| | |
|---|---|
| PO Box Pohnpei, FM 96941 | Tel: (691) 320-2927 Fax: (691) 320-5265 |
| Mr Elden Hellan Director | Tel: (691) 320-2927 Fax: (691) 320-5265T |
| <p>The EPA is involved in the permitting process for any construction or development within the coastal zone. It reviews environmental impact statements, is responsible for monitoring water quality and is involved in pollution control and cleanup. It also becomes involved in oil spills within state waters. The EPA is currently having a difficult time with pig owners cleaning pens in waterways and coastal areas. It enforces sanitation laws and closely watches the permitting of land fill in mangrove areas. ■</p> | |

Pohnpei Office of Historic Preservation

| | |
|---|--|
| PO Box Pohnpei, FM 96941 | Tel: (691) 320-2652 Fax: (691) 320-5706 |
| Mr Emensio Eperiam Historic Preservation Officer | |

Pohnpei Tourism Office

| | |
|--------------------------------|--|
| PO Box 66 Pohnpei, FM 96941 | Tel: (691) 320-2421 Fax: (691) 320-6019 |
| Mr Bumio Silbanuz Director | E-Mail: Pohnpeivb@mail.fm |

Chuuk State Department of Commerce and Industry

| | |
|---|--|
| Weno Chuuk, FM 96942 | Tel: (691) 330-2552 Fax: (691) 330-4157 |
| Mr Nakama Sana Director | |
| Mr Elvis Killion Historical Preservation Officer | |

Chuuk State Department of Planning and Statistics

Weno
Chuuk, FM 96942

Tel: (691) 330-2598
Fax: (691) 330-4236

Mr Rokucho Billy
Director

Chuuk Department of Resources and Development

PO Box 207, Weno
Chuuk, FM 96942

Tel: (691) 330-2660/ 2661
Fax: (691) 330-4157

Mr Manikis Sonis
Director

Mr Mathews S. Lokopwe
Chief, Conservation and Management

Chuuk Agriculture Division

Weno
Chuuk, FM 96942

Tel: (691) 330-2755

Mr Hans Williander
Director

Chuuk Environmental Protection Agency

PO Box 189, Weno
Chuuk, FM 96942

Tel: (691) 330-4150
Fax: (691) 330-2613

Mr Joseph M. Konno
Chief

Chuuk Visitor's Bureau

PO Box
Chuuk, FM 96942

Tel: (691) 330-4133/4342
Fax: (691) 330-4194
E-Mail: grmori@mail.fm

Mr Simiram Sipenuk
Executive Director

Kosrae Department of Agriculture and Land

PO Box 82
Kosrae, FM 96944

Tel: (691) 370-3017
Fax: (691) 370-3952

Mr Nena S. Nena
Director

This department also includes the Historical Preservation Office and the Public Land Management Office. ■

Kosrae Department of Commerce and Industry

Tofol
Kosrae, FM 96944

Tel: (691) 370-3044
Fax: (691) 370-2066

Mr Singkitchy George
Director

Mr Justus Aloka
Chief, Tourism

Tel: (691) 370-2228
Fax: (691) 370-2187

Kosrae Department of Fisheries and Marine Resources

PO Box 1066
Kosrae, FM 96944

Tel: (691) 370-3031
Fax: (691) 370-3362

Mr Dais F. Aloka
Director

Kosrae Department of Health Services

PO Box 127
Kosrae, FM 96944

Tel: (691) 370-3199
Fax: (691) 370-3073

Mr Asher P. Asher
Director

Kosrae Review Commission

Tofol
Kosrae, FM 96944

Tel: (691) 370-2076
Fax: (691) 370-3346

Mr Simpson Abraham
Marine Conservation, and Review Commission Officer

This office manages fisheries programmes in Kosrae. ■

Yap State Department of Resources and Development

PO Box 251, Colonia
Yap, FM 96943

Tel: (691) 350-2294
Fax: (691) 350-4494

Andy Tafileichig
Chief, Marine Resources Management Division

E-Mail: mcmandyyap@mail.fm

The review an implementation of the Yap State Marine Resources and Coastal Management Plan is this department's responsibility. ■

Yap State Environmental Protection Agency

PO Box 178
Yap, FM 96943

Tel: (691) 350-2113/2317
Fax: (691) 350-4113

James Gilmar
Executive Director

The Yap EPA was created under the Environmental Quality Protection Act passed by the Yap State Legislature. The office is staffed by 10 members and is involved in the permitting process for construction or development within the coastal zone. It reviews environmental impact statements, issues permits for construction and development and monitors water quality. Current activities relevant to ICM include cCoastal water monitoring, particularly in relation to road building and fish transshipment in port. A 'Marine Resources and Coastal Management Plan' has been pending approval for some time. ■

OTHER ICM ORGANISATIONS

College of Micronesia—Federated States of Micronesia

| | |
|---------------------------------|--|
| PO Box 159 Pohnpei, FM 96941 | Tel: (691) 320-2480 Fax: (691) 320-2479 |
|---------------------------------|--|

| | |
|--|------------------------|
| Spensin James Vice President, Instructional Affairs | E-mail: sjames@mail.fm |
|--|------------------------|

| | |
|---|--|
| Ahser Edward Sea Grant Extension Agent | Tel: (691) 320-2523 E-mail: aedward@mail.fm |
|---|--|

The college works with the National Government providing reports concerning coastal studies and fisheries projects, and performs research and works on coastal management projects. Most funding for this work comes from University of Hawaii-Manoa. Additional funding comes from COM-FSM and Land Grant-Cooperative Extension Service. The college also offers an Associate of Science degree in Marine Science. ■

College of Micronesia—Land Grant

| | |
|----------------------------------|---|
| PO Box 1179 Pohnpei, FM 96941 | Tel: (691) 320-2728/2462 Fax: (691) 320-2726 |
|----------------------------------|---|

| | |
|--|------------------------|
| Simon Ellis Regional Aquacultural Extension Agent | E-Mail: sellis@mail.fm |
|--|------------------------|

The Regional Aquaculture Extension Programme provides technical assistance and training for the development of aquaculture in the United States Affiliated Pacific Islands. Funding is mainly provided by the Pacific Aquaculture Development Program (financed by the US Department of Interior) and the Center for Tropical and Subtropical Aquaculture (financed by the US Department of Agriculture). ■

Micronesia Islands Conservation

| | |
|---------------------------------|--|
| PO Box 159 Pohnpei, FM 96941 | Tel: (691) 320-2480 Fax: (691) 320-2479 |
|---------------------------------|--|

| | |
|-------------------------------|------------------------|
| Mr Spensin James President | E-Mail: sjames@mail.fm |
|-------------------------------|------------------------|

| | |
|-------------------------------|----------------------------|
| Mr Harvey Spegal Treasurer | E-mail: educcomfsm@mail.fm |
|-------------------------------|----------------------------|

MIC is a non-profit NGO, run solely by volunteers, which provides funds for various environmental issues on Pohnpei including river and coastal cleanups. It is a major sponsor for the Earth Day events and works with other organisations on environmental awareness. It is funded through membership dues, donations and sales of posters and booklets. ■

The Nature Conservancy

| | |
|---------------------------------|--|
| PO Box 216 Pohnpei, FM 96941 | Tel: (691) 320-4267 Fax: (691) 320-7422 |
|---------------------------------|--|

| | |
|---|--|
| Mr Bill Raynor Director, FSM Country Program | E-Mail: braynor@tnc.org or: braynor@mail.fm |
|---|--|

The Pohnpei Field Office has been involved with the development of community-based watershed management, now being extended in the coastal areas. The office also provides assistance to emerging NGOs in the FSM. ■

National Aquaculture Center

PO Box JF
Kosrae, FM 96944

Tel: (691) 370-2069
Fax: (691) 370-2069

Mr Kevan Charley
Acting Manager

Utwa-Walung Conservation Area

PO Box 539
Kosrae, FM 96944

Tel: (691) 370-3483
Fax: (691) 370-5839
E-mail: MarinePark@mail.fm

Mr Madison Nena
Director

This is a marine park located between the villages of Utwa and Walung. Included in this park is the wreck of the pirate Bully Hayes, the Leonora. No fishing, collection of invertebrates or hunting is permitted. ■

Yap State Historical Preservation Office

PO Box 426, Colonia
Yap, FM 96943

Tel: (691) 350-4226
Fax: (691) 350-4256

John Tharngan
Historical Preservation Officer

Yap State Institute of Natural Science

PO Box 215
Yap, FM 96943

Tel: (691) 350-3115
Fax: (691) 350-2455
E-Mail: 105121.1143@compuserve.com

Marjorie C. Falanruw
Director

This is a non-profit organisation chartered under the laws of the FSM and Yap State. It seeks to increase knowledge of the natural environment of Yap State, promote sustainable agriculture and fisheries practices, and conduct research on a variety of terrestrial and marine topics. ■

SELECTED DOCUMENTS ON ICM

- Ajisaka, Tetsuro, Sachito Enomoto, et al. 1986, 'Seaweeds mariculture in Pohnpei', in *The Prompt Report of the Fourth Scientific Survey of the South Pacific*. Report 6, Subject II pp. 53-56, University Center for the South Pacific, Kagoshima University and Community College of Micronesia, The Shibundo Printing Co. LTD. Kogoshima, Japan.
- Dahl, C. 1989 'Developing a coastal resource management plan for Kosrae State, Federated States of Micronesia' Case Study No. 23, *Fourth South Pacific Conference on Nature Conservation and Protection Areas*, Port Vila, Vanuatu, September 4-12.
- Enomoto, Saichito, Spensin James, et al. 1986, 'Marine algae from the atoll of Ant Pohnpei chlorophyceae', in *The Prompt Report of the Fourth Scientific Survey of the South Pacific*, Report 5, Subject II. University Center for the South Pacific, Kagoshima University and Community College of Micronesia, The Shibundo Printing Co. LTD. Kogoshima, Japan.
- Gawel, M. J. 1993, *Federated States of Micronesia: State of the Environment Report*, SPREP, Apia, Samoa.
- Graham, T. 1991, *Reef Fisheries in Yap Proper: Status of the Traditional Authority Environment and Implications for Management*, MRMD Report, November 1991.
- Harding, E. 1992, *SPREP Review of Environmental Law in the Federated States of Micronesia: Strengthening Environment Management Capabilities in Pacific Island Developing Countries*, RETA 5403, Australian Centre for International Law, Faculty of Law, University of Sydney, Australia.
- Integrated Renewable Resource Management for US Insular Areas*, Congress of United States, Office of Technology Assessment. Washington, D.C. 20510-8025.
- Inoue, Akio and Gawel, Mike 1986 'A toxic dinoflagellate in Pingelap Island and Truk Islands Federated States of Micronesia,' in *The Prompt Report of the Fourth Scientific Survey of the South Pacific*, Report 3, Subject II, University Center for the South Pacific, Kagoshima University and Community College of Micronesia, The Shibundo Printing Co. LTD. Kogoshima, Japan.
- Lekisi, Henry 1986, 'Deep sea tuna hand lining in Pohnpei', in *The Prompt Report of the Fourth Scientific Survey of the South Pacific*, Report 1, Subject II, University Center for the South Pacific, Kagoshima University and Community College of Micronesia, The Shibundo Printing Co. LTD. Kogoshima, Japan.
- Maragos, J. E. 1986, *Coastal Resources Development and Management in US Pacific Islands: 1. Island by Island Analysis*, Office of Technology Assessment, US Congress, Washington, D.C. 20510-8025.
- Matsuda, Yoshiaki and Gawel, M. et al. 1986, 'Fisheries development in Truk and Pohnpei Federated States of Micronesia', in *The Prompt Report of the Fourth Scientific Survey of the South Pacific*, Report 5, Subject IV, University Center for the South Pacific, Kagoshima University and Community College of Micronesia, The Shibundo Printing Co. LTD. Kogoshima, Japan.
- Ministry of Agriculture, Forestry, and Fisheries Japan 1995, *US Japan Joint Research for Conservation and Management of Mangrove Forests in the South Pacific Islands—Structures of Mangrove Forests on Pohnpei Island*, Report of the Bilateral International Joint Research by Special Coordination Funds Promotion for Science and Technology (FY 1993) Forestry and Forest Products Research Institute.
- Nationwide Environmental Management Strategies—FSM 1993*, Asian Development Bank, The World Conservation Union, SPREP, Apia, Samoa.
- Nakahara, R. H., Lee, J. S. et. al. *Water Resources Data: Hawaii and Other Pacific Areas, Water Year 1988*, US Geological Survey Report HI 88-2.
- Office of Planning and Statistics 1992, *Second National Development Plan: 1992-1996*, Federated States of Micronesia.
- Soil Survey of Island of Ponape, FM*, US Department of Agriculture, Soil Conservation Services.
- Sudo, K. I. 1984, 'Social organization and types of sea tenure in Micronesia', in *Maritime Institutions in the Western Pacific*, eds K. Ruddle and T. Akimichi, Senri Ethnobiological Studies No. 17, National Museum of Ethnology, Osaka, pp. 203-230.
- Tsuda, Roy (ed) 1978, *Marine Biological Survey of Yap Lagoon*, Technical Report 45. University of Guam Marine Lab. Guam.
- US Corps of Army Engineers, *Chuuk Coastal Resources Atlas*.
- US Corps of Army Engineers, *Kosrae Coastal Resources Atlas*.
- US Corps of Army Engineers, *Kosrae Coastal Resource Inventory*, Environmental Section, Honolulu.

US Corps of Army Engineers, *Pohnpei Coastal Resources Atlas*.

US Corps of Army Engineers, *Yap Coastal Resources Atlas*.

Ushijima, I. 1982, 'The control of reefs and lagoon: some aspects of the political structure of Ulithi Atoll' in *Islanders and Their World: A Report of Cultural Anthropological Research in the Caroline Islands of Micronesia in 1980-81*, ed M. Aoyagi, Committee for Micronesian Research, St. Paul's University, Tokyo, pp. 35-75.

Van der Brug, Otto 1983, *Water Resources of Kosrae*, US Geological Survey Water-Resources Investigation Report 83-4161, Department of Interior, Honolulu.

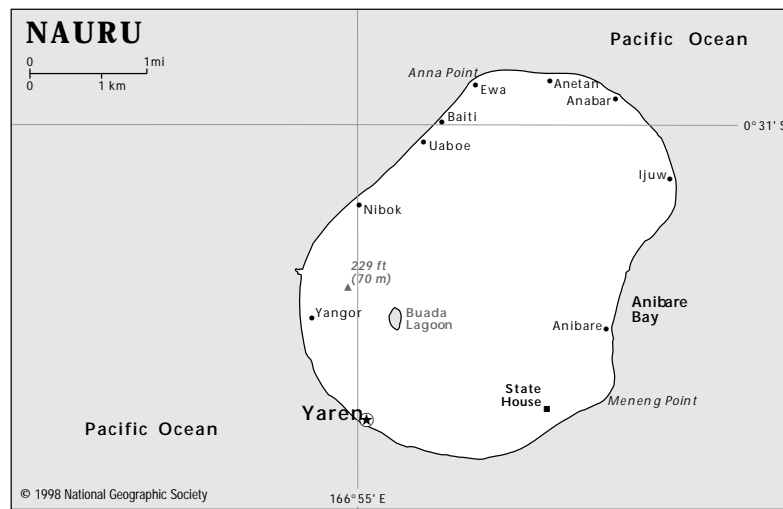
Water Resources of Ponape 1983 US Geological Survey Water-Resources Investigation Report 83-4139, Department of Interior, Honolulu.

Water Resources of Truk, 1983 US Geological Survey Water-Resources Investigation Report 83-4161, Department of Interior, Honolulu.

Water Resources of the Yap Islands, 1983, US Geological Survey Water-Resources Investigation Report 83-4161, Department of Interior, Honolulu.

Wiens, Herold J. 1965, *Atoll Environment and Ecology*, Yale University Press.

NAURU



PHYSICAL CHARACTERISTICS

Nauru is a single, raised coralline island located 41 km south of the equator at 166.93°E longitude and 0.31°S latitude. It has a land area of only 21 sq km and a circumference of 19 km. The ground rises from a sandy beach to form a 50–300 m wide belt of relatively fertile land encircling the island. Further inland, coral cliffs rise to a central plateau about 30 m above sea level. The plateau is composed largely of phosphate-bearing rock which covers about 60% of the island and which has been mined extensively, providing Nauru with most of its income. Phosphate reserves are approaching depletion and are expected to run out soon after the year 2000.

The island is surrounded by a narrow fringing reef, which encloses small lagoon pockets in some areas. Much of the reef dries at low tide, making water access difficult for even small boats. These can only operate from two boat passages, one on the western side of the island (the Gabab channel) and one on the east (Anibare channel). The Nauru Phosphate Corporation also operates a small boat harbour just north of the Gabab channel, where small vessels can, if necessary, be lifted out of the water by crane.

The island has no freshwater streams or other bodies of fresh water, apart from one or two springs. A body of brackish water, the Buada lagoon, is located near the centre of the island, and several other small brackish ponds are present.

Nauru's estimated 1994 mid-year population was 10 600 persons. Despite its tiny land area, Nauru has

an EEZ that extends over more than 430 000 sq km and is very rich in marine life. Even the near-shore open ocean areas are frequented by an abundance of tuna and other pelagic fish species which contribute significantly (more than half) to local fish catches.

GOVERNMENT STRUCTURE

Legislative power is vested in the unicameral parliament, with eighteen members elected by universal adult suffrage for up to three years. Executive authority is vested in a Cabinet, which consists of the President of the Republic, elected by the parliament, and ministers appointed by him. The Cabinet is collectively responsible to parliament. Responsibilities for administration are divided between the Nauru Local Government Council and the Government. The Council, an elected body of nine members from the country's fourteen districts, elects one of its members to be Head Chief.

COASTAL ZONE MANAGEMENT ISSUES

Due to the generally poor, highly porous soil and irregular rainfall, cultivation in Nauru is generally restricted to the coastal belt where coconut palms and pandanus grow, and to the fringe of land surrounding the Buada lagoon where bananas, pineapples and some vegetables are grown. The main use of coastal waters is for fishing and gleaning, as well as recreation. The coastal zone is thus an important source of food production, and will

probably become more so as phosphate revenues decline and the populace needs to rely on home-grown rather than imported foodstuffs. Despite a relatively high GDP derived from large-scale phosphate mining and significant food imports, Nauruans continue to favour fresh fish as a food product.

As phosphate resources are now almost depleted, the country needs to develop alternative sources of income to replace mining revenues. With porous soils and uncertain rainfall, Nauru offers limited opportunity for agricultural production, and fisheries development is considered to be the principal economic prospect for the future. The Government is currently exploring the feasibility of establishing a domestic, commercial tuna fishery. Although Nauru's tuna resources are considered to be abundant, increased domestic production is constrained by the restriction in the size of fishing craft that can be used due to the lack of harbour. To address this problem the Government is planning to widen and deepen the Anibare small boat channel. This would serve the dual purpose of providing a launching and retrieval point for fishing craft up to 11 m in length, as well as

enabling improved cargo discharge when the western channel is unworkable due to adverse winds.

A Marine Protected Area has been proposed for part of the Anibare Bay but so far no steps have been taken towards its formal establishment.

COASTAL ZONE MANAGEMENT RESPONSIBILITIES

Nauru has no coastal protection strategy or legislation, and coastal management does not yet have a formal establishment within a government department. The Department of Island Development and Industry carry out all coastal management strategies and decisions in conjunction and consultation with the Department of Public Works and Community Services. There are no non-government organisations with coastal management responsibilities.

MAIN ICM ORGANISATIONS

Department of Public Works and Community Services

Yaren

Tel: (674) 555-6180/ 6181
 Fax: (674) 444-3791

Mr John Brechterfield
 Director (Administration)

Mr Barry Grundler
 Director (Operations)

The department's mandate in regard to coastal management is to protect Nauru's dwellings and other engineered structures through the use of seawalls or other barriers from coastal forces, with the least damage or effects on the natural coastal environment. The department contains the Civil and Building Division which is chiefly responsible for coastal protection works and other coastal development. Departmental staff number 300-400 persons, of whom about 100 work in the Civil and Building Division.

Specific responsibilities related to coastal management include:

- protecting houses and other coastal construction development from damage due to coastal forces;
- regulating set-back strategies so that buildings are an acceptable distance from high-water levels; and
- consulting the Department of Island Development and Industry as to the best possible engineered coastal protection barriers and the least possible adverse effects on the natural coastal environment.

Current activities relating to coastal management include:

- construction of coastal protection barriers for the protection of houses and other onshore facilities; and
- construction of breakwaters and other walls to mitigate or halt coastal erosion. ■

Department of Island Development and Industry

Yaren

Tel: (674) 444-3181
Fax: (674) 444-3791

David Agir
Secretary for Island Development and Industry

The Department of Island Development and Industry has many divisions including Airlines, Culture and Tourism, Telecommunications, Lands and Survey, and Environment. Coastal management issues and projects fall under the Environment Division. Departmental policy includes the protection of Nauru's coasts and the natural environment.

Responsibilities related to coastal management include:

- formulating and developing coastal protection systems and management plans to protect houses and onshore facilities;
- formulating and managing plans to protect the natural coastal environment; and
- offering expertise and advice to the Department of Public Works and Community Services and other building firms with regard to any ongoing or new coastal developments.

Current activities relating to coastal management include:

- monitoring and assessing coastal zones through the use of internal and external consultants;
- producing reports on any coastal problems such as sand or coastal erosion;
- preparing plans and projects for rehabilitation and protection of troubled coastal areas; and
- making recommendations to Cabinet concerning any of the above. ■

Fisheries and Marine Resources Authority

PO Box 449
Aiwo District

Tel: (674) 444-3769
Fax: (674) 444-3812

Mr Anton Jimwereiy
Chief Fisheries Officer

Mr Charleston Dejye
Senior Fisheries Officer - Coastal

Fisheries development and management were previously the responsibility of the Department of Island Development and Industry, but in 1997 the Nauru Fisheries and Marine Resources Authority Act came into force. The Act established the Authority as an entity with the powers and functions to regulate and develop activities relating to Nauru's fisheries and marine resources. In the same year the Fisheries Act (1997), which regulates both foreign and domestic fishing activities, was passed into law, along with the Sea Boundaries Act (1997), which establishes Nauru's claim over a 12-mile territorial waters zone, a 24-mile contiguous zone, and a 200-mile EEZ.

Until recently the Marine Resources Act of 1978 governed the management of fisheries in Nauru, but made no reference to inshore fisheries. There is thus no history of management for Nauru's inshore fishery, and there were no regulations in force until the passing of the Fisheries Act in 1997, although some informal restrictions, such as a ban on the use of floating gill-nets for flying-fish capture, existed. The new Act makes provision for the regulation of domestic fishing activities, but implementation of these provisions as they relate to inshore fisheries has not yet proceeded very far.

The Authority has six staff who are variously involved in the development and management of oceanic and coastal fisheries. ■

OTHER ICM ORGANISATIONS

Nauru Phosphate Corporation

Nauru Tel: (674) 555-4171

Although not strictly involved in coastal zone management per se, this is the island's biggest economic force, and the one whose activities (which include mining, engineering, phosphate transportation and shiploading) are most likely to have direct impacts on the coastal zone. NPC operates Nauru's only boat harbour and has deployed several deep-water moorings nearby where visiting cargo vessels of up to 300 000 tonnes may tie up. NPC has also been involved in the deployment of fish aggregating devices and often assists other community or government projects through the loan of heavy equipment or donation of materials and funds. ■

Nauru Environmental Association

PO Box 452 Tel: (674) 444-3252
Nauru Fax: (674) 444-3001

Mr Tiree Kabuta
Director

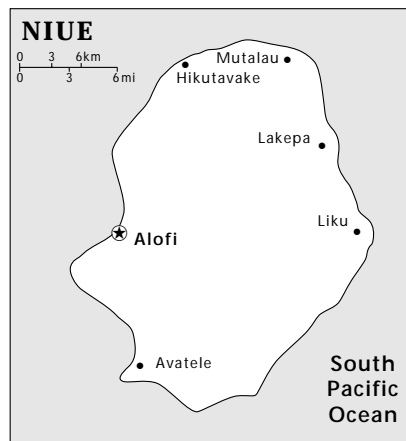
Mr Nelson Tamakin Tel: (674) 444-3252
Fax: (674) 444-3791

The association's mandate is to 'clean and green' the environment which has been marred by phosphate mining, to educate people on environmental issues (including those affecting the coastal zone) and to assist recycling initiatives. ■

SELECTED DOCUMENTS ON ICM

- Anon. 1996, 'A description of the activities of governments and other organisations in promoting marine resources development', *Nauru Country Statement, 26th Regional Technical Meeting on Fisheries*, SPC, Noumea, New Caledonia.
- Cusack, P. J. 1987, 'Phosphate, FADs and fish', *SPC Fisheries Newsletter*, No. 43, SPC, Noumea, New Caledonia.
- Dalzell, P. J. and Debaio, A. 1994, *Coastal Fisheries Production on Nauru*, SPC, Noumea, New Caledonia.
- Dalzell, P. J., Debaio, A. and Jacob, P. 1992, *A Preliminary Account of Coastal Fisheries in Nauru with an Outline for a Catch Monitoring Programme*, SPC, Noumea, New Caledonia.
- De la Cruz, E. 1992, *Buada Lagoon Experimental Milkfish Pilot Project*, FAO South Pacific Regional Aquaculture Development Project.
- Mead, P. D. and Cusack, P. J. 1990, *Deep Sea Fisheries Development Project*, report on first visit to the Republic of Nauru, 4 April-4 May 1990: Phase 1 of the Nauru Fish Aggregation Device (FAD) Project, SPC, Noumea, New Caledonia.
- Petit-Skinner, S. 1981, *The Nauruans*, MacDuff Press, San Francisco.
- Watt, P. 1993, *Offshore Fisheries Development Project, FAD project phase III, bottom contour survey*, Nauru, 28 April-2 May 1993, SPC, Noumea, New Caledonia.
- Weeramantry, C. 1992, *Nauru: Environmental Damage Under International Trusteeship*, Oxford University Press.

NIUE



PHYSICAL CHARACTERISTICS

Niue consists of a single uplifted coral atoll located at about 19°S latitude and 169°W longitude. The island, which had an estimated 1994 mid-year population of 2100 persons, is 19 km long by 18 km wide and has an area of 258 sq km. In general formation it takes the shape of two terraces, the lower being 27 m above sea level and the upper saucer-shaped plateau rising to 65 m. A narrow coral reef encircles a precipitous and broken coastline characterised by steep cliffs and numerous small sandy beaches.

Niue's soil, composed of worn-down coral, is fertile but not abundant. This factor, combined with the rocky and broken terrain, makes cultivation difficult. Traditional slash and burn techniques have drained the soil of much of its nutrients and more conservationist agricultural practices are now being encouraged. Less than 40% of the land is suitable for cultivation and the fragmented nature of land ownership, together with the considerable number of absentee landlords living in New Zealand or elsewhere, result in there being little suitable land available for sustained cultivation.

Reef gleaning and fishing are important activities; however, due to the absence of a wide protective lagoon most fishing from boats is carried out in the open sea, often using small canoes which are carried down steep cliff paths to the water. Alofi has a harbour equipped with a crane so that small vessels can be lifted out for storage or during rough weather.

In addition to the main island, Niue's territory also includes the distant reefs of Beveridge, Antiope and Harran, and it has an EEZ that extends over 390 000

sq km. However, the small size of Niue, its lack of infrastructure and the very difficult operating conditions for locally-based vessels preclude Niue from major involvement in tuna harvesting or processing, or in providing services to foreign fishing vessels, and the government has no aspirations in this regard.

GOVERNMENT STRUCTURE

Niue enjoys self-government in free association with New Zealand. The New Zealand Government, however, remains responsible for the island's defence and external affairs. Executive government is carried out by the Premier and three other Ministers. Legislation is the responsibility of the Niue Assembly, which has twenty members (14 village representatives and six elected on a common roll) but New Zealand, if called upon to do so by the Assembly, will also legislate for the island. There is a New Zealand representative in the Territory.

ENVIRONMENTAL LEGISLATION

In the past the Niue Concerted Action Plan (1988–90) served as a blueprint for development activities in the country. Environmental concerns were not foremost within it; its main thrust was to work for the maintenance of a Living Community on Niue by stemming emigration, and this remains a preoccupation of the Government. A draft Environmental Management Bill that would provide the legal framework for a coastal management programme was under consideration in 1994. However, although widely supported, this has not yet been put in place.

Government is responsible for the management of Niue's fisheries, and undertakes this role through a centralised system of regulation and enforcement which extends to the licensing of all fishing craft in Niue, from small canoes to distant-water fishing vessels. Formal management of inshore fisheries is through a centralised set of fishery regulations which were promulgated in 1995, and which establish size limits and closed seasons for some species, total bans on catching and/ or export of others, and licensing and sea safety requirements for small vessels. Quotas have also been established for giant clams and lobsters. A traditional system of management, based on total harvesting prohibitions for fixed periods of time, has also been used in Niue and provisions still exist for its use.

In future it is anticipated that the majority of marine resource management activities will be included

within an integrated coastal zone management programme currently under development. The establishment of a number of marine reserves is anticipated as part of the plan.

COASTAL ZONE MANAGEMENT ISSUES

The main environmental issue relating to coastal management is the conservation of coral reefs, particularly those off Alofi which are being adversely affected by siltation. Some over-harvesting of coral reefs is also occurring, and is being addressed through the development of regulations as outlined above, as well as through development projects aimed at promoting the use of alternative resources such as tuna and other pelagic species.

MAIN ICM ORGANISATIONS

Ministry of Agriculture, Forestry, Fisheries and Public Works

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Fax: (683) 4010/ 4232

Mr Sauni Tongatule
Director

Mr Sioneheke Leolahi
Principal Fisheries Officer

Mr Brendon Pasisi
Fisheries Research Officer

Responsibility for fisheries and marine resource matters is vested in the Fisheries Division of the Department of Agriculture, Forests and Fisheries. This division is a small organisation managed by a director and supported by four professional and technical staff. The division has a number of ongoing activities relevant to coastal zone management, including the deployment of fish aggregation devices to promote the exploitation of pelagic resources, the introduction of trochus and other species thought to have commercial potential, and the development and promulgation of fishery regulations relating to coastal marine resources. ■

Environment Unit, Community Affairs Office

PO Box 77
Alofi

Tel: (683) 4021/ 4019
Fax: (683) 4391

Ms Esther Pavihi
Mr Logopati Seumanu

The Community Affairs Office has responsibility for coordinating environmental management in Niue, and includes Niue's Environment Unit. With responsibility for on-the-ground management split between a number of agencies and landowners, the key role of the unit is to prepare policy and programmes for implementation by others. ■

OTHER ICM ORGANISATIONS

Ministry of Justice and Lands

PO Box 42
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Fax: (683) 4232

The ministry is responsible for issues relating to land use in Niue including those affecting the coastal zone. ■

SELECTED DOCUMENTS ON ICM

- Anon. 1993, *Niue National Environmental Management Strategy*, SPREP, Apia, Samoa.
- Cernhorsky, W. O. 1970, 'The littoral marine molluscs of Niue Island', *Records of the Auckland Institute and Museum*, 7, pp. 175–186.
- Crossland, J. 1979, 'Fisheries at Niue', *SPC Fisheries Newsletter*, 18, pp. 9–11, SPC, Noumea, New Caledonia.
- Fusimalohi, T. 1978, *Report on the SPC Deep Sea Fisheries Development Project in Niue (3 July–31 August 1978)*, SPC, Noumea, New Caledonia.
- Gillett, R. D. 1987, *Hawaiian-style Decapterus Fishing Trials in Niue*, FAO/ UNDP Regional Fishery Support Programme Document 87/4, FAO, Suva, Fiji.
- Government of Niue 1991, *Niue Country Report for the United Nations Conference on Environment and Development (UNCED), Brazil 1992*, Alofi, Niue.
- Lane, J. 1993, *Niue State of the Environment Report, 1993*, SPREP, Apia, Samoa.
- Mead, P. 1980, *Report on the Second Visit of the SPC Deep Sea Fisheries Development Project to Niue (24 August - 25 October 1979)*, SPC, Noumea, New Caledonia.
- Mead, P. 1997, *Report on Third Visit to Niue (19 May 1982–16 February 1983)*, unpublished report No. 8, SPC, Noumea, New Caledonia.
- Peteru, C. 1993, *Environmental Legislation Review—Niue*, Report prepared for the South Pacific Regional Environment Programme and the Government of Niue, SPREP, Apia, Samoa.
- Polovina, J. J., Moffitt, R. B. and Benco, R. L. 1987, *Chartlets of Selected Areas Around Niue Island*, National Marine Fisheries Service, Southwest Fisheries Center Administrative Report H-87-9, 8 pp.
- Punu, B. 1992, *Biodiversity Overview of Niue*, Report prepared for the South Pacific Biodiversity Conservation Programme SPREP, Apia, Samoa.
- Schiller, C. 1989, *The Status of Coconut Crab Stocks on Niue*, ACIAR consultancy report, Australian Centre for International Agricultural Research, Canberra, Australia.
- SPC 1984, *An Assessment of the Skipjack and Baitfish Resources of Niue*, Skipjack survey and assessment programme final country report No. 15, SPC, Noumea, New Caledonia.
- Yaldwyn, J. C. 1970, *The environment, natural history and special conservation problems of Niue Island*, Working Paper 8, Regional Symposium on the Conservation of Nature: Reefs and Lagoons, SPC, Noumea, New Caledonia.

NORTHERN MARIANA ISLANDS



PHYSICAL CHARACTERISTICS

A typical island arc system, the Commonwealth of the Northern Mariana Islands (CNMI) consists of 14 islands that are oriented in a north-south direction over a distance of 543 km. The archipelago is located 22.5–14.1°N latitude and 145–146°E longitude and has a total land area of 475 sq km. From north to south, the islands which comprise the CNMI include: Uracas (2.6 sq km), Maug (actually a three island complex) (total 2.08 sq km), Asuncion (7.28 sq km), Agrihan (29.64 sq km), Pagan (48.36 sq km), Alamagan (11.44 sq km), Guguan (3.9 sq km), Sarigan (4.94 sq km), Anatahan (32.5 sq km), Farallon de Medinitta (1.04 sq km), Saipan (120.9 sq km), Tinian (101.92 sq km), Aguijan (7.02 sq km) and Rota (85.28 sq km). Although Guam is the southernmost and largest island of the Marianas archipelago, it is politically separate from the CNMI and is described under a separate chapter.

The islands are geologically divided into two distinct types; the older arc islands are raised limestone while the more recent and younger arc islands are still volcanically active. The older islands, Rota, Aguijan, Tinian, Saipan and Farallon de Medinilla have fringing and/or barrier reef systems. In contrast, the active volcanic arc islands have relatively little coral reef development. All islands north of Esmeralda

Bank (i.e., Anatahan, Sarigan, Guguan, Alamagan, Pagan, Agrihan, Asuncion, Maug and Uracas) are classified as 'recent' with respect to geological time.

Although all the islands in the CNMI have various stages of fringing reef systems, Saipan is the only island that also has a well-developed barrier reef/lagoon system. The Saipan Lagoon is approximately 30 750 sq km in size and the only area in the CNMI where substantial areas of seagrass meadows are found. Typical for this type of reef system in the Pacific, the barrier reef/ lagoon system lies on the western (leeward) side of the island with the reef located approximately 8 km offshore at its furthest point. It is reported that the CNMI contains 45 sq km. of near shore (0–3nm) reefs and 534 sq km of offshore (3–200 nm) reefs.

Freshwater wetlands (i.e., ponds and/ or marshes) are only found on the islands of Saipan, Tinian and Pagan. Saipan wetlands are believed to have received the greatest anthropogenic-related impact of any other island; an estimated 60% loss since the pre-World War II era when the Japanese cleared most of the islands vegetation for sugarcane agriculture. The Coastal Resources Management Division (CRMD) estimates that Saipan contains 281 hectares of non-tidal wetlands with approximately 37% under public domain. The largest single contiguous wetland in the CNMI is the Lake Susupe marsh complex. Located on

Saipan, this large wetland comprises 60% of the total wetlands known in the CNMI. Other typical wetland habitat types, such as mangroves, are considered insignificant and occur only in two small areas of Saipan.

GOVERNMENT STRUCTURE

From 1914 to 1944, the Northern Mariana islands were under Japanese mandate. However, in 1947 (after World War II) the Mariana Islands (with the exception of Guam) became part of the Trust Territory of the Pacific Islands and was administered by the United States. As determined by an island-wide plebiscite, the people of the Northern Marianas voted to become 'self-governing' under the United States flag. The Covenant was the negotiated document on which this relationship is based, and was agreed upon by both parties in January 1978. Special exemptions identified in the Covenant allowed the CNMI to control immigration, customs, wages and taxes. The Covenant also limits fee-simple ownership of land to persons of Northern Mariana Island descent with a maximum lease term of 55 years to all others. American citizenship was conferred on island residents on 4 November 1986. Although US citizens, CNMI nationals do not vote in Presidential elections nor do they have a voting delegate in the US House of Representatives.

The CNMI Government has three branches: executive; legislative; and judicial. The executive branch is headed by a governor and a lieutenant-governor who are elected for four-year terms. The bicameral legislative branch consists of the Senate (9 members elected for six-year terms) and the House of Representatives (15 members elected for two-year terms) with elections being held every two years. Rota, Saipan, Tinian and the Northern Islands each have an elected mayor. The two island political parties, Democratic and Republican, have no relationship to the US mainland political parties.

The CNMI is under the American Judicial System and other than those US laws the Covenant specifically exempts in the CNMI, most US Federal laws apply, including environmental laws and regulations. Under certain circumstances both Federal and local CNMI environmental permits are required prior to project commencement. Examples include wetland filling activities, the taking of US listed Endangered Species, or discharges of pollutants into water bodies.

Only Saipan, Tinian and Rota are regularly inhabited with 89% of the total population living on Saipan. Saipan serves as the government and administrative

centre of the CNMI and is the most highly populated. The indigenous population of CNMI consists of Chamorros and Carolinians and the unofficial 1995 Mid-Decade Census indicates this group comprises less than 35% of the total population. Alien contract workers comprise approximately half of the total population and include citizens from the Philippines, Peoples Republic of China and Bangladesh. Income sources include tourism, garment manufacturing, trade and services with a 1995 Gross Island Product estimated at \$550 million.

COASTAL ZONE MANAGEMENT ISSUES

Although development-related talks have been long discussed in relation to some of the northern islands, several islands can not be developed as they have been designated solely for use as wildlife sanctuaries (Guguan, Uracas, Maug and Asuncion). With the limited travel opportunities to the islands north of Saipan, impacts on marine resources are presently minimal.

Expansion of the Saipan Harbor is an ongoing dredge and fill project which started in 1993 and involves dredging the entrance channel and turning basin, and tripling the current capacity of dock facilities. The targeted completion date is 1999. This is an extremely difficult project to manage from an environmental perspective and both the Coastal Resources Management Division (CRMD) and the Department of Environmental Quality (DEQ) have been actively involved in assessing impacts to adjacent reef systems as well as attempting to develop appropriate mitigation plans as impacts are identified. Additionally, the US Army Corps of Engineers (USCOE) was involved through their Section 10/404 permitting programme, working closely with the local CRMD and DEQ offices.

Non-point source (NPS) pollution programmes have been developed by both the CRMD and DEQ. In the past staff have focused their efforts on maintaining water quality in the Saipan Lagoon and Laulau Bay, a relatively large bay located on the windward side of Saipan. The current NPS focus is in the West Tapochau (Garapan) and projects include developing TMDLS and conducting wetland enhancement demonstration projects to improve the quality of storm-water runoff.

The DEQ water quality regulations were updated and promulgated in January 1997. These water quality standards are the basis by which the DEQ issues the Section 401 Water Quality Certification, a required complimentary permit for most USCOE permits. These water quality standards will be revised again in 1999.

The DEQ has established a weekly coastal water quality monitoring programme which collects surface water samples from various permanent sampling stations along the Saipan Lagoon. Water samples are collected quarterly from the east (windward) side of Saipan, Rota and Tinian beaches.

The Puerto Rico dump has the potential of being the single most important environmental problem on Saipan. This open dump was started by the US Military during the Trust Territory period along the shore of the Saipan Lagoon. Since its inception, the dump has steadily encroached into lagoon waters and has reached elevations of 15 m above sea level. Although actual contamination of adjacent marine resources has not been documented, the potential impacts of this unregulated dump site could be serious. Presently, the CNMI Government, in coordination with the DEQ, CRMD, US Environmental Protection Agency and the USCOE, is examining options for establishing a sanitary landfill at an inland site and closing the Puerto Rico dump.

As Saipan is a tourist destination, the CRMD regulates many of the tourist-based water-related activities in the Saipan Lagoon. These regulations are meant to minimise use conflicts and maximise lagoon use by dedicating certain areas of the lagoon to specific activities, such as banana boat rides and parasailing. Recently an updated Saipan Lagoon Use Master Plan was completed and is presently under review by the CRMD and other CNMI agencies for possible adoption.

Coastline erosion along certain sections of the lagoon beach has become a problem over the past years as typhoon-related damage is occurring at a greater rate than natural restoration. The CRMD, in conjunction with the USCOE, has implemented a beach restoration and erosion project to slow the process. The programme was completed several years ago and is being monitored by the USCOE for determination of its success or failure.

The CRMD includes a permit condition in all major siting permits which prohibits sand mining within 150 ft (45.75 m) from the mean high water mark on any beach.

COASTAL ZONE MANAGEMENT RESPONSIBILITIES

Management responsibilities over coastal resources are shared between the Coastal Resources Management Division (CRMD), the Division of Environmental Quality (DEQ) and the Division of Fish and Wildlife (DFW). Minimising physical anthropogenic impacts to the coastal

resources is first addressed by the CRMD through its permitting programme, while DEQ is primarily responsible for monitoring the quality of groundwater; fresh water and marine waters. The DFW focuses its efforts on maintaining biological populations and communities at a level sufficient to sustain existing fishery efforts. This is accomplished through monitoring various biological parameters for indications of over-fishing.

The CRMD developed an integrated multi-agency administrative application review procedure for larger projects that exceed minimal standards established by regulations. In order to establish regulatory guidelines within certain environmentally sensitive areas, the programme set up five Areas of Particular Concern (APC): the shoreline, lagoon and reef, wetlands and mangroves, port and industrial, and coastal hazards. Within each of these APCs, activities were prioritised which would be authorised under certain conditions. Ideally, non-compatible activities would not be issued permits.

In addition the Division of Environmental Quality (DEQ) is responsible for a wide range of technical assistance and regulatory programmes aimed towards protection of public health and the environment. The DEQ administers grants from the US Environmental Protection Agency and is responsible for marine and freshwater water quality monitoring, groundwater resources management, solid and hazardous waste management, waste water management and air emissions. It also provides permitting programmes in enforcing compliance with environmental standards and conducts an outreach programme for public awareness about environmental issues.

ENVIRONMENTAL LEGISLATION

The Coastal Resources Management Program was created in 1983 by Public Law 3-47, the Coastal Resources Management Act. This programme is funded through US Federal grants, primarily NOAA, and subsidised locally through permit fees and fines. The local ICM programme was approved by the OCRM in 1980. Regulations were promulgated in 1986 and were amended on three occasions during 1994.

In response to the growing concerns of unorganised and uncontrolled development, the Saipan Zoning Law was passed (Public Law 6-32) and implemented in 1993. However, after one year and the problem of very complex regulations, certain segments of the population complained that the Zoning Act was restricting the rights of property owners to do as they wish with privately owned land. As a result the

NORTHERN MARIANA ISLANDS CONT'D

Saipan delegation suspended the Zoning Act in 1994. Recent government efforts during 1998 have revisited the concept and the original form is being modified with a view to possible resubmission for enactment.

The Commonwealth Mitigation Bank was established by Public Law 10-84, which was signed by the Governor in January 1998. This will be primarily utilised as mitigation for the taking of US-listed endangered species as authorised by a Section 10 Incidental Take permit which would be issued by the US Fish and Wildlife Service.

The DEQ water quality regulations were updated and promulgated in January 1997 and addressed:

- classification and establishment of water use areas;
- specific water quality for surface waters;
- Section 401 Water Quality Certification; and
- land disposal of waste water.

In addition, revisions to the Drinking Water Regulations were adopted by the DEQ in 1994

[Commonwealth Register, Vol.16(07)] and to the Underground Storage Tank regulations in 1992 [Commonwealth Register, Vol.14(09)]. Air Pollution Control Regulations were adopted by the DEQ in 1987 [Commonwealth Register, Vol.9(1)] and are currently being revised.

The Department of Lands and Natural Resources adopted the Submerged Lands Regulations in 1989 [Commonwealth Register, Vol. 11(03)] while fish and wildlife regulations were adopted in 1986 [Commonwealth Register, Vol. 8(06)], 1988 [Commonwealth Register, Vol. 10(11)] and 1990 [Commonwealth Register, Vol. 12(07)]. The establishment of the CNMI endangered species list was adopted in 1991 [Commonwealth Register, Vol. 13(01)].

Rota Local Law 9-1, passed in 1994, established the Rota-Sasanhaya Fish Reserve. This is the first marine conservation area to be formally recognised in CNMI.

MAIN ICM ORGANISATIONS

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Dr Joaquin A. Tenorio
Secretary

DLNR Coastal Resources Management Division (CRMD)

AAA 2852 Box 1001
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Saipan, MP 96950

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Mr Peter J. Barlas
Acting Director

The CRMD is a line agency under the direction of the Secretary, Department of Lands and Natural Resources.

The CNMI Government initiated the development of a Coastal Zone Management (ICM) programme plan during 1978. This plan was approved by the US National Oceanic and Atmospheric Administration (NOAA) in 1980. The enabling legislation, which formulates the mandate of the Coastal Resources Management Division (CRMD), is Public Law 3-47.

After NOAA approved the local ICM programme plan, the CNMI became eligible to receive US Federal granting funds for programme support. For the 1997 financial year, the NOAA provided US\$646 000 in programme funds. Additional programme funds are generated locally through permit administrative

fees and fines. Project supplemental funds for the 1997 financial year were estimated at US\$361 000 however, due to the current downturn in the economy, this figure will probably not be realised.

The CRMD is charged with overseeing and coordinating the ICM permitting programme for development-related uses of the coastal zone and APC's as specified in the regulations. In addition, they have jurisdiction over any 'major projects' on land if they meet a certain threshold, i.e., have the 'potential to significantly affect coastal resources'. As per the application requirements, an environmental impact statement is required in every major siting application package.

CMRD is headed by a director who is appointed by the Governor. The Saipan office contains approximately 14 personnel, divided into administrative, permitting, mapping (GIS) and enforcement sections. The Rota office has two staff and the Tinian office has one person; their responsibilities are primarily related to enforcement.

The CRMD Board of Directors consists of six members: Secretary, Department of Commerce; Secretary, Department of Lands and Natural Resources; Executive Director, Commonwealth Utilities Corporation; Historical Preservation Officer; Director, Division of Environmental Quality; and Secretary, Department of Public Works. The primary responsibility of the CRMD Board members is to review major siting application packages, develop appropriate permit conditions related to their areas of expertise and make the decision on whether a permit will be issued. In order for a CRMD permit to be valid, all six board members and the CRMD Director must sign the signature page of the permit.

In addition to issuing development permits, the CRMD also has an Enforcement Section which follows-up permitted activities regarding compliance with permit conditions, and identifies those projects currently underway which should have CRMD permits.

The CRMD also serves as a coordinating body for US government agencies involved in various permitting process: US Army Corps of Engineers, US Environmental Protection Agency, US Coast Guard, US Fish and Wildlife Service and US National Marine Fisheries Service.

Current activities relating to coastal resource management include establishment of a geographic information system workstation, Rota island-wide natural resource conservation plan and updating the Saipan lagoon use management planry ■

OTHER ICM ORGANIZATIONS

DLNR Division of Fish and Wildlife (DFW)

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Lower Base
Saipan, MP 96950

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Mr Richard Seman
Director

As with the CRMD, the DFW is also a line agency directly under the Secretary, Department of Lands and Natural Resources. The responsibility of monitoring subsistence, recreational and commercial fishing activities within CNMI waters lies with the DFW. To achieve this goal, several on-going surveys have been established, some since 1984, to quantify and characterise fishing effort and landings from both nearshore and offshore waters. These surveys include the Commercial Purchase Survey, the Inshore Creel Survey and the Offshore Creel Survey. Other species-specific population surveys, for example of sea cucumbers and trochus, are also conducted depending upon fishing pressures or proposed fishing ventures.

There have been efforts by the DFW to designate marine parks around Saipan, Tinian and Rota since at least 1991. The ecosystem approach to protecting coral reefs has not been fully accepted in the CNMI as evidenced by the lack of commitment from various administrations in officially designating marine parks or sanctuaries. The one exception, the Rota-Sasanhaya Fish Reserve is the only marine conservation area to actually receive such designation. ■

Department of Public Works Division of Environmental Quality (DEQ)

PO Box 1304
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Mr Ignacio Cabrera
Director

The DEQ is a line agency directly under the direction of the Secretary, Department of Public Works. It is mandated by the Commonwealth Environmental Protection Act 'to develop and administer programmes, including where appropriate, a system of standards, permits, or prohibitions, to prevent or regulate activities concerning the discharge of pollutants to the air, land, water, wetlands and submerged lands'.

DEQ is headed by a director who is appointed by the Governor. The Saipan office contains approximately 20 personnel divided into seven sections: Administrative, Wastewater/ Earth-moving and Erosion Control, Above-ground/ Underground Storage Tank and Pesticide Management, Air and Toxic Waste Management, Non-Point Source Pollution/ Marine Monitoring, Safe Drinking Water and an Environmental Surveillance Laboratory. The Rota office has four personnel and there is one staff member at the Tinian office.

DEQ administers a federal grant from the US Environmental Protection Agency and is responsible for water quality monitoring, groundwater resources management, marine water monitoring, solid and hazardous waste management and wastewater management. The agency is also responsible for a wide range of technical assistance and regulatory programmes aimed at protection of public health and the environment. It provides permitting programmes in enforcing compliance with environmental standards and conducts an outreach programme on public awareness about environmental issues. Other roles of DEQ include providing technical advice to water and sewage authorities and coordinating emergency responses to contamination by hazardous materials.

Regulatory programmes, such as permitting individual waste water disposal systems and well drilling, help protect groundwater resources. Additionally, DEQ permits are required for above- and below-ground fuel storage tanks and power generators. The non-point source pollution programme requires earth-moving and erosion control permits for all mechanised earth-moving activities. The DEQ also issues complimentary Section 401 Water Quality Certification for all US Army Corps of Engineers Section 10/404 permits.

The DEQ has formed an interagency Marine Monitoring Team consisting of staff from DEQ, CRM, DFW and Northern Marianas College. The team is responsible for monitoring the near-shore coral reef ecosystem and is collecting data on sedimentation rates, nutrient levels, coverage of coral and algae and fish communities. Data will be used to monitor long-term changes and evaluate impacts of development projects, and this will serve as the basis on which damage to reef areas can be assessed. ■

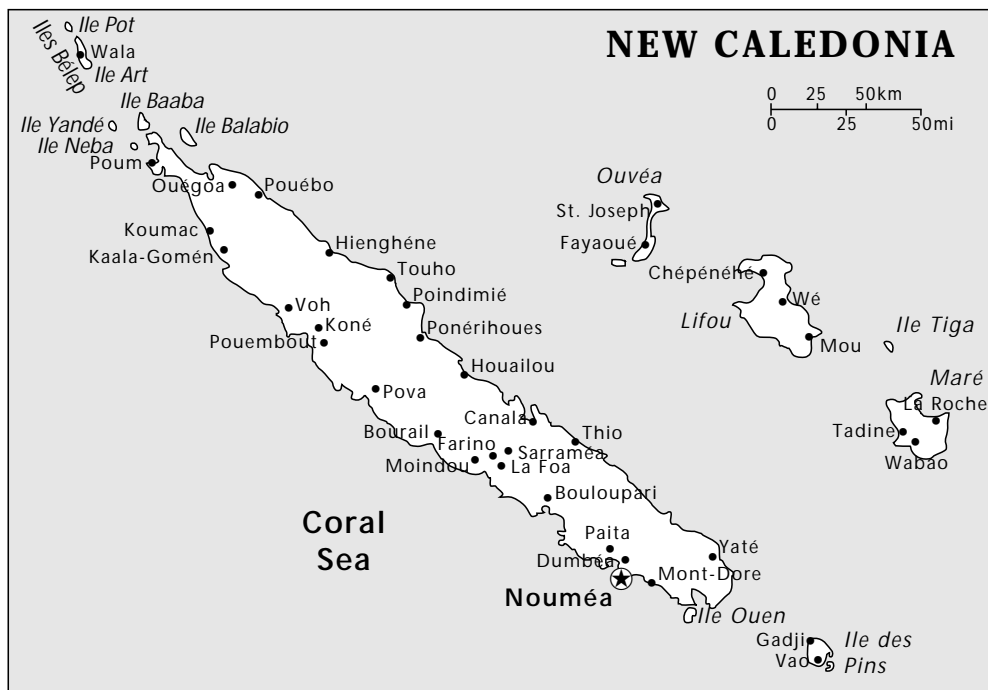
SELECTED DOCUMENTS ON ICM

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| <p>Adams, T., Aldan, C. Alfred, V., Bertram, I., Bukurrou, A., Cruz, J., Flores, T., Ilo, L., Rasa, F., Seman, R., Taitano, J., Taman, J., Mendiola, T., Santos, D. and King, H. 1994, <i>Assessment of the Northern Marianas Trochus Resource and Recommendations for Management of the Fishery</i>, Draft Report of the CNMI/SPC Fisheries Survey Team to the Chief of the Division of Fish and Wildlife, 36 pp.</p> <p>Amesbury, S. S. 1996, <i>Re-survey of Fish Resources in the Saipan Lagoon</i> (draft), Report to the CNMI Coastal Resources Management Office, December 1996. 15 pp.</p> <p>Amesbury, S.S., Lassuy, D.R., Myers, R.F. and Tyndzik, V. 1979, <i>A survey of the fish resources of Saipan</i></p> | <p><i>Lagoon</i>, University of Guam Marine Laboratory Technical Report No. 52. 58 pp.</p> <p>Asakura, A. and Furuki, T. (eds) 1994, <i>Biological Expedition to the Northern Mariana Islands</i>.</p> <p>Asakura, A. T., Kurozumi and Komai, T. 1994, 'Anomura (Crustacea: Decapoda) collected from the Northern Mariana Islands, Micronesia', in <i>Biological Expedition to the Northern Mariana Islands</i>, Natural History Research, Special Issue, Number 1: 275-283, Natural History Museum and Institute, Chiba.</p> <p>Asano, N. 1938, 'Experiment of Trochus transplantation in Saipan Island', <i>South Seas</i></p> |
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- Fishery News* 2 (3) [in Japanese]. English translation by M. Izumi 1987, 'Summary translations of trochus research from South Seas Fisheries News 1937–1939'. FAO/UNDP Regional Fishery Support Programme Document 87/2, Suva, Fiji.
- Chandran, R. 1988, *The Distribution and Abundance of Holothurians in Saipan Lagoon, Mariana Islands*, MS Thesis, University of Guam, 64 pp.
- CNMI Division of Fish and Wildlife 1996, *FY95 Annual Report on the Sport Fish Restoration Research Program; period covered 1 October 1994 to 30 September 1995*, CNMI Division of Fish and Wildlife, 27 pp. and appendices.
- CNMI Division of Fish and Wildlife 1994, *Biological Analysis of the Near Shore Reef Fish Fishery of Saipan and Tinian*, CNMI Division of Fish and Wildlife Technical Report No. 94-02, 124 pp.
- CNMI Division of Fish and Wildlife 1996 *Checklist of Fishes of the Commonwealth of the Northern Mariana Islands*, CNMI Division of Fish and Wildlife, 35 pp.
- CNMI Division of Fish and Wildlife 1994, *Report on Bottom Fish Data Generated from SPC Training Cruises and the F/V SUN*, CNMI Division of Fish and Wildlife Technical Report No. 94-01, 49 pp.
- CNMI Division of Fish and Wildlife 1996 *The Deep Water Shrimp Fishery of the Northern Mariana Islands*, CNMI Division of Fish and Wildlife Technical Report No. 96-02, 30 pp.
- Commonwealth of the Northern Mariana Islands Water Quality Assessment 305(b) Report* 1998, Division of Environmental Quality, 67pp.
- Donaldson, T.J., Myers, R. F. Moyer, J. T. and Schupp, Peter V. 1994, 'Zoogeography of fishes of the Marianas, Ogasawara and Izu Islands: A preliminary assessment', in 'Biological Expedition to the Northern Mariana Islands', *Natural History Research*, Special Issue, Number 1: 303–332, Natural History Museum and Institute, Chiba.
- Duenas and Swavelly, Inc. 1985, *Saipan Lagoon Use Management Plan*, prepared for the CNMI Coastal Resources Management Office, 4 volume set.
- Eldredge, L. G. 1983, *Mariana's Active Arc: A Bibliography*, University of Guam Technical Report #82. 19 pp.
- Engineering Science 1991, *Environmental Assessment—Kagman Golf Course*, submitted to the Coastal Resources Management Office by S.C. Properties, Inc.
- Gourley, John E. *The Commonwealth of the Northern Mariana Islands: An Assessment of the Coral Reef Resources under Local and Federal Jurisdiction*. Micronesian Environmental Services: WPAC Contract Number 96-WPC-119, 69 pp.
- Green, Alison. *An Assessment of the Status of the Coral Reef Resources, and their Patterns of Use, in the US Pacific Islands*, NOAA Contract Number NA67AC0940, 259 pp.
- Grigg, R. W. 1993, 'Precious coral Fisheries of Hawaii and the US Pacific Islands', *Marine Fisheries Review* 55(2):50–60.
- Grigg, R. W. and Eldredge, L. G. 1975, *The Commercial Potential of Precious Corals in Micronesia Part 1: The Mariana Islands*, University of Guam Marine laboratory Technical Report #18, 16 pp.
- Hamano, T. 1994, *Stomatopod Crustaceans from the Northern Mariana Islands, Micronesia*.
- Hamm D., Quach, M., So, L.M.K. and Chan, N. 1995, *Fishery Statistics of the Western Pacific*, vol X, NMFS Southwest Fisheries Center, Honolulu Lab., Administrative Report H-95-05.
- Hamm D., Dowdell, F. and Quach, M. 1994, *Fishery Statistics of the Western Pacific*, vol IX, NMFS Southwest Fisheries Center, Honolulu Laboratory, Administrative Report H-94-02.
- Hamm D., Chan, N. and Quach, M. 1996, *Fishery Statistics of the Western Pacific*, vol XI, NMFS Southwest Fisheries Center, Honolulu Laboratory, Administrative Report H-96-08.
- Hayashi, K., Komai, T. and Asakura, A. 1994, 'Macrura (Crustacea: Decapoda: Stenopodidea, Caridea and Palinulidea) collected from the Northern Mariana Islands, Micronesia', in 'Biological Expedition to the Northern Mariana Islands', *Natural History Research*, Special Issue, No 1: 267–273, Natural History Museum and Institute, Chiba.
- Hunter, C.L. 1995, 'Review of status of coral reefs around American flag Pacific islands and assessment of need, value, and feasibility of establishing a coral reef fishery management plan for the Western Pacific Region', Final Report to the WPRFMC 30 pp. in *Biological Expedition to the Northern Mariana Islands*, Natural History Research, Special Issue, Number 1: 291-292, Natural History Museum and Institute, Chiba
- Irimura, S., Shigei, M., Saba, M., Kogo, I. and Asakura, A. 1994, 'Echinoderms collected from the Northern Mariana Islands, Micronesia', in 'Biological Expedition to the Northern Mariana Islands', *Natural History Research*, Special Issue, Number 1: 293–297, Natural History Museum and Institute, Chiba.
- Jones, R. S., Randall, R. H. and Tsuda, R. T. 1974, *A Candidate Marine Environment Impact Survey for Potential US Military Projects on Tinian Island, Mariana Islands*, University of Guam Marine Laboratory Technical Report Number 9. 143 pp

- Kurozumi, T. and Asakura, A. 1994, 'Marine molluscs from the Northern Mariana Islands, Micronesia' in 'Biological Expedition to the Northern Mariana Islands', *Natural History Research*, Special Issue, Number 1: 121-168, Natural History Museum and Institute, Chiba.
- Myers, R. F. 1991, *Micronesian Reef Fishes*, Coral Graphics, Territory of Guam, USA. 298 pp.
- Natural History Research*, Special Issue, No 1, Natural History Museum and Institute, Chiba, 344 pp.
- Office of Planning and Statistics 1989, *Overall Economic Development Strategy*. Commonwealth of Northern Mariana Islands, Saipan.
- Pacific Basin Environmental Consultants, Inc. 1984, *Final Report—Biological and Physical Survey of Bahia Laulau, Saipan*, 159 pp. and appendices.
- Polovina, J. 1985, 'Variation in catch rates and species composition in hand-line catches of deep-water snappers and groupers in the Mariana Archipelago', *Proceedings of the Fifth International Coral Reef Congress, Tahiti*, Vol.5, pp. 515-520.
- Polovina, J. and Ralston, S. 1986, 'An approach to yield assessment for unexploited resources with application to the deep slope fishes of the Marianas', *Fishery Bulletin* 84(4):759-770.
- Radtke, H. and Davis, S. 1995, *Analysis of Saipan's Seafood Markets*, A report prepared for the CNMI Division of Fish and Wildlife, Solicitation number RFP94-0006.
- Ralston, S. 1988, 'Length-Weight regressions and condition indices of Lutjanids and other deep slope fishes from the Marianas Archipelago', *Micronesia*, 21:189-197.
- Randall, R. H. 1997, *A Biological and Geological Assessment of the Holocene and Modern Fringing Reef System Developed Along Uyulan Beach, Rota, Mariana Islands*, Report to IOTA Partners, 57 pp.
- Randall, R. H.(ed) 1985, *A Marine Survey of the Tanapag Reef Platform Adjacent to Unai Paupau*, final report to the Office of Coastal Resources Management, 55 pp.
- Randall, R. H. (ed) 1987, *A Marine Survey of the Northern Tanapag Reef Platform, Saipan, Mariana Islands*, University of Guam Technical Report No. 87. 147 pp.
- Randall, R. H., Rogers, S.D., Irish, E.E., Wilkins, S.C., Smith, B.D. and Amesbury, S.S. 1988, *A Marine Survey of the Obyan-Naftan Reef Areas*, University of Guam Marine Laboratory Technical Report No. 90. 56 pp.
- Richmond, R. (ed) 1995, *A Regional Management Plan for a Sustainable Sea Cucumber Fishery for Micronesia* (draft), results of a workshop held at the University of Guam on 3-5 March 1993, 77 pp.
- Takeda, M., Fukui, Y. Wada, K and Asakura, A. 1994, 'Brachyura (Crustacea: Decapoda) from the Northern Mariana Islands, Micronesia', in 'Biological Expedition to the Northern Mariana Islands', *Natural History Research*, Special Issue, Number 1: 285-290, Natural History Museum and Institute, Chiba.
- The CNMI's Northern Frontier*, Jan-Jun 1996, A newsletter published by the Northern Islands Mayor's Office. 24pp
- Tsuda, R. T. 1996, *Survey of Commercially-valued Sea Cucumbers (Echinodermata: Holothuroidea) in the Saipan Lagoon* (draft), report to the CNMI Coastal Resources Management Office, 20 pp.
- US Department of Commerce 1995, *Fisheries of the United States, 1994*, NOAA/NMFS Current Fishery Statistics No. 9400. 113 pp.
- Uchida, Richard N. 1983, *Summary of Environmental and Fishing Information on Guam and the Commonwealth of the Northern Mariana Islands: A Review of the Plankton Communities and Fishery Resources*, NOAA/NMFS Technical Memorandum # NOAA-TM-NMFS-SWFC-33, 159 pp.
- WPRFMC 1996a Pelagic fisheries of the Western Pacific Region', *1995 Annual Report*, Honolulu, Hawaii.
- WPRFMC 1996b, 'Bottom fish and sea mount ground fish fisheries of the Western Pacific Region', *1995 Annual Report*, Honolulu, Hawaii.

NOUVELLE CALÉDONIE/ *NEW CALEDONIA*



ORGANISATION DU TERRITOIRE

La Nouvelle-Calédonie est un Territoire français Outre-mer. Son statut actuel est défini par la loi référendaire du 9 novembre 1988, issue des accords de Matignon du 26 Juin 1988. Cette loi identifie quatre collectivités territoriales, l'Etat, le Territoire, les Provinces et les Communes. Le projet de textes de loi a fait l'objet d'un accord signé le 20 août 1988 (accords Oudinot).

ORGANISATION OF THE TERRITORY

New Caledonia is a French Overseas Territory. Its current status is laid down by the Referendum Act of 9 November 1988 proceeding from the Matignon Accord of 26 June 1988. This Act identifies four Territorial authorities: the State, the Territory, the Provinces and the Municipalities. The draft legislation was the subject of an agreement signed on 20 August 1988 (Oudinot Agreements).

L'ETAT

L'Etat est représenté par le Délégué du Gouvernement, Haut-Commissaire de la République qui veille à la légalité des actes des collectivités du Territoire. Il est le garant de l'application des accords de Matignon. Le Haut-Commissaire est également l'exécutif du Territoire. Pour l'exercice de ces compétences, l'Etat dispose de services et établissements publics sur le Territoire, placés sous l'autorité du Haut-Commissaire. Certains d'entre eux sont des services mixtes Etat/Territoire.

THE STATE

The State is represented by the Government's Delegate, the High Commissioner of the Republic, who ensures that the actions of the Territorial authorities are within the law. He is the guarantor for the enforcement of the Matignon Accord. The High Commissioner is also the Territory's executive. To exercise these powers, the State has government authorities and public entities in the Territory, placed under the authority of the High Commissioner. Some of these are combined State/Territorial authorities.

LE TERRITOIRE

Le Territoire est doté d'un Congrès formé des trois assemblées de Province, soit 54 membres. Le Territoire délibère sur l'ensemble des matières relevant de ses compétences, principalement la fiscalité (le Territoire redistribue les ressources fiscales) et les réglementations de sa compétence. L'exécutif du Territoire est le Haut-Commissaire qui, à ce titre, prépare et exécute les délibérations du Congrès et notamment le budget du Territoire. Pour l'exercice de ces compétences, le Territoire dispose de services et établissements publics, plusieurs d'entre eux étant des services mixtes Etat/Territoire.

LES PROVINCES

La loi référendaire de 1988 a institué trois provinces : la Province des Îles (qui regroupe les 3 îles des Loyauté), la Province nord (partie nord de la Grande Terre) et la Province sud (partie sud de la Grande Terre). Celles-ci constituent des collectivités territoriales disposant d'une compétence de droit commun et dont les décisions sont exécutoires de plein droit.

Elles sont chacune dotées d'une Assemblée de Province comprenant respectivement 7, 15 et 32 membres, élus au suffrage universel direct et à la représentation proportionnelle pour une durée de six ans. Le Président de l'assemblée est le chef de l'exécutif et de l'administration de la Province. Les assemblées ont en charge le développement économique, social et culturel des Provinces ; elles votent le budget provincial et délibèrent dans les matières qui sont de leur compétence. Les provinces sont dotées de services publics provinciaux chargés des délibérations de l'assemblée.

Compétences en matière de gestion des zones côtières.

Conformément à la loi référendaire de 1988, qui définit les compétences des collectivités, les responsabilités en matière de gestion des zones côtières sont partagées entre l'État, le Territoire et les Provinces. En effet la loi référendaire précise que:

- L'exploration, l'exploitation, la gestion et la conservation des ressources naturelles biologiques et non biologiques de la zone économique (188 milles depuis la limite extérieure des eaux territoriales) sont de compétence Etat (article 8.4 de la loi référendaire).

THE TERRITORY

The Territory has a Congress consisting of three Provincial Assemblies with an overall membership of 54. The Territory rules on all matters within its jurisdiction, mainly taxation (the Territory redistributes tax resources) and the regulations for which it is responsible. The Territory's executive is the High Commissioner who, in this capacity, formulates and implements the decisions of the Congress including the budget of the Territory. To exercise its powers, the Territory has government authorities and public entities, several of these being combined State/Territorial authorities.

THE PROVINCES

The Referendum Act of 1988 set up three Provinces: the Island Province (comprising the 3 Loyalty islands), the Northern Province (northern part of the mainland) and the Southern Province (southern part of the mainland). These constitute Territorial authorities with common law jurisdiction, their decisions being enforceable by right.

Each Province has a Provincial Assembly of 7, 15 and 32 members respectively, elected by direct universal suffrage and by proportional representation for a term of six years. The President of the Assembly is the head of the Provincial executive and administration. The assemblies are responsible for the economic, social and cultural development of the Provinces; they pass the Provincial budget and rule on the matters within their jurisdiction. The Provinces have public Provincial authorities responsible for the Assemblies' decisions.

Powers relating to coastal zone management

In accordance with the Referendum Act of 1988 which lays down the powers of the authorities, the responsibilities relating to coastal zone management are shared between the State, the Territory and the Provinces. The Referendum Act specifies that:

- the exploration, exploitation, management and conservation of the biological and non-biological natural resources of the Economic Zone (188 miles from the outer limit of the territorial waters) shall be the State's jurisdiction (Article 8.4 of the Referendum Act); and
- the State shall exercise its sovereignty and ownership rights over its public and private maritime domain (Article 8 of the Referendum Act).

- L'Etat exerce ses droits de souveraineté et de propriété sur son domaine public et privé maritime (article 8. de la loi référendaire).

Le domaine public et privé maritime, qui appartient à l'Etat, est constitué par la zone des 50 pas géométriques, les eaux intérieures et l'espace couvert par la mer territoriale (12 milles - sol et sous-sol). La lutte contre la pollution marine accidentelle est de compétence Etat (POLMAR).

Par ailleurs, le Territoire est responsable de la police intéressant les animaux et les végétaux (article 9.12 de la loi référendaire), donc de la réglementation en matière de pêche côtière.

Les compétences conférées aux Provinces par la loi, notamment en matière de développement économique et de protection de l'environnement assurent à ces Provinces des responsabilités dans le domaine côtier. Ainsi, les Provinces sont compétentes en matière d'environnement marin tant que ces compétences ne remettent pas en cause le principe de souveraineté de l'Etat. La protection du milieu récifal et lagonaire, par la mise en place d'aires marines protégées, est donc de compétence provinciale.

The public and private maritime domain, which belongs to the State, comprises the zone of the 50 geometric steps (an old French law concept representing approximately 81.2 m inland from the coastline), the internal waters and the expanse of the Territorial sea (12 miles, soil and substratum). The control of accidental marine pollution is the State's jurisdiction (MARPOL).

In addition, the Territory is responsible for animal and plant policy (Article 9.12 of the Referendum Act), hence for the coastal fishing regulations.

The powers conferred upon the Provinces by law, particularly in terms of economic development and protection of the environment, give them responsibilities in the coastal area. Thus the Provinces have powers relating to the marine environment, provided that these powers do not challenge the principle of the State's sovereignty. The protection of the reef and lagoon environment, through the setting up of protected marine areas, is therefore the Province's jurisdiction.

ORGANISMES RESPONSABLES DE LA GESTION DES ZONES CÔTIÈRES

Services d'Etat et du Territoire

ORGANISATIONS RESPONSIBLE FOR COASTAL ZONE MANAGEMENT

State and Territorial Authorities

Service des Affaires Maritimes, de la Marine Marchande et des Pêches Maritimes

Maritime Affairs, Merchant Navy and Sea Fisheries Department

BP 36
98845 Noumea CEDEX

Tel: (687) 272626
Fax: (687) 287286

M. Guillaume Perrin
Directeur/ Director

Missions, politique et textes institutionnels du service

Ce service comprend deux entités: les Affaires Maritimes, qui relèvent de l'Etat, la Marine Marchande et les Pêches Maritimes, qui relèvent du Territoire.

Le Service d'Etat des Affaires Maritimes a pour compétence le statut juridique des bâtiments de mer dont immatriculation, titres de navigation, sécurité ..., l'assistance et le sauvetage, la gestion des marins, les transports maritimes internationaux, la réglementation de la pêche dans la zone économique exclusive.

Functions, policy and legal framework of the department

This Department consists of two units: Maritime Affairs, under the State's authority, and Merchant Navy and Sea Fisheries, under the Territory's authority.

The State Maritime Affairs Department is responsible for the legal status of sea vessels (gross tonnage >10 tons), including registration, navigation certificates, safety, assistance and rescue, the management of seamen, international sea transport and the regulation of fishing in the Exclusive Economic Zone.

Le Service Territorial de la Marine Marchande et des Pêches Maritimes a pour mission d'élaborer et de mettre en application toutes délibérations ou règlements concernant les entreprises d'armement maritime (transport et pêche), notamment en matière fiscale, économique ou sociale.

Textes institutionnels du service

- Service d'Etat des Affaires Maritimes: Arrêté n° 942/HC du 27 septembre 1960
- Service Territorial de la Marine Marchande et les Pêches Maritimes: Arrêté n°68-056 du 1er Février 1968

Organisation du service

Six divisions: administration, gestion des marins, gestion des navires, Formation, Pêches Maritimes et Aquaculture, Formation embarquée.

Effectifs: 19

Responsabilités du service en matière de gestion des zones côtières

Marine Marchande

- Gestion et réglementation de la navigation (plaisance et professionnelle), dont immatriculation des navires, autorisations annuelles de pêche.
- Gestion des marins.
- Circulation maritime (surveillance, manifestations nautiques, épaves, information nautique).
- Sécurité des navires (dont prévention des pollutions marines).
- Formation maritime.

Pêches maritimes

- Statistiques sur les pêches maritimes et sur l'aquaculture.
- Exploitation de la ZEE (pêche industrielle, accords de pêche).
- Utilisation de l'espace maritime et Gestion du Domaine Public Maritime (DPM).
- Relations avec les organismes de recherche et la CPS.

Activités actuelles ou en projet en matière de gestion des zones côtières

- Suivi de la pêche
- Edition annuelle d'un rapport sur les Statistiques des Pêches et de l'Aquaculture

The Territorial Merchant Navy and Sea Fisheries Department is responsible for the formulation and enforcement of all the decisions or regulations concerning vessels (gross tonnage <10 tons), maritime equipment firms (transport and fishing), especially in regard to fiscal, social or economic matters.

Legal framework of the department

- *Service d'Etat des Affaires Maritimes: Order N° 942/HC of 27 September 1960.*
- *Service Territorial de la Marine Marchande et des Pêches Maritimes: Order N° 68-056 of 1 February 1968.*

Organisation of the department

Six divisions: Administration, Management of Seamen, Management of Vessels, Training, Sea Fisheries and Aquaculture, and Training at Sea.

Staff: 19

Responsibilities of the department in terms of coastal zone management

Merchant Navy

- *Management and regulation of navigation (yachting and technical), including vessel registration, annual fishing permits.*
- *Management of seamen.*
- *Maritime traffic (supervision, nautical events, wrecks, nautical information).*
- *Vessel security (including the prevention of marine pollution).*
- *Sea training.*

Sea Fisheries

- *Statistics on sea fisheries and aquaculture.*
- *Exploitation of the EEZ (industrial fishing, fishing agreements).*
- *Utilisation of the sea area and Management of the Public Maritime Domain (DPM).*
- *Relations with research organisations and the SPC.*

Current or planned activities relating to coastal zone management

- *Monitoring of fisheries.*
- *Annual publication of a report on Fishing and Aquaculture Statistics.*

Direction du Service d'Etat de l'Agriculture,
de la Forêt et de l'Environnement

Directorate of the State Department of
Agriculture, Forestry and the Environment

BP 256
98845 Nouméa CEDEX

Tel: (687) 255100
Fax: (687) 255129

M. Jacques Contrant
Directeur par délégation/ *Acting Director*

Missions, politique et textes institutionnels du service

Le Directeur du Service représente les services extérieurs des Ministères de l'Agriculture et de l'Environnement et exerce, sous l'autorité du Haut-Commissaire de la République, les missions relevant de ces Ministères. Il est responsable, à ce titre, de l'application des conventions internationales, notamment de la Convention de Washington sur le commerce international des espèces menacées de la faune et de la flore sauvages, dont les espèces marines.

Textes institutionnels du service

Décision du 5 3 1992 portant création du Service d'Etat de l'Agriculture, de la Forêt et de l'Environnement en Nouvelle-Calédonie.

Organisation du service

La Direction est divisée en 3 services : "Aides de l'Etat"; "Service de la Formation Agricole (SFA)"; "Service Technique d'Assistance aux Communes" (S.T.A.C.).

Effectifs: 12 agents permanents.

Responsabilités du service en matière de gestion des zones côtières

- Gestion de la CITES, dont plusieurs espèces marines sont inscrites sur la liste.
- Aide à la gestion foncière du domaine de l'Etat.

Activités actuelles ou en projet en matière de gestion des zones côtières

Révision de la liste CITES.

Functions, policy and legal framework of the department

The Director of the department represents the external divisions of the Ministries of Agriculture and of the Environment, discharging—under the authority of the High Commissioner of the Republic—the functions pertaining to those ministries. In this capacity he is responsible for the enforcement of international conventions, notably the Washington Convention on the International Trade of Endangered Species of Wild Animals and Plants, including the marine species.

Legal framework of the department

Decision of 5 March 1992 setting up the Service d'Etat de l'Agriculture, de la Forêt et de l'Environnement in New Caledonia.

Organisation of the department

The Directorate is divided into 3 divisions: State Aid, Agricultural Training Service and Assistance to Municipalities (STAC).

Staff: 12 permanent officers.

Responsibilities of the department in terms of coastal zone management

- *Management of CITES, on whose list several marine species appear.*
- *Assistance in land management on state-owned properties.*

Current or planned activities relating to coastal zone management

Review of the CITES list.

Direction de l'Agriculture et de la Forêt (Service Territorial)

Directorate of the Territorial Department of Agriculture and Forestry

BP 256
98845 Nouméa Cedex

Tel: (687) 255100
Fax: (687) 255129

M. R. Costa
Directeur par délégation/ *Acting Director*

Missions, politique et textes institutionnels du service

Ce service territorial assure des missions de réglementation, de contrôle, de statistiques et d'action d'intérêt territorial dans les domaines agricole, rural et vétérinaire.

Textes institutionnels du service

Décision du 5 mars 1992 portant création du Service d'Etat de l'Agriculture, de la Forêt et de l'Environnement en Nouvelle-Calédonie.

Organisation du Service

La Direction est divisée en cinq services:

- le Service d'Administration Générale (SAG),
- le Service Vétérinaire et la Protection des Végétaux (SVPV);
- le Laboratoire Territorial de Diagnostic Vétérinaire (LTDV) et le Laboratoire d'Analyse des Aliments du Bétail (LAAB);
- le Service Economique et des Statistiques Agricoles (SESA),
- le Service de l'Aménagement (SAM).

Seul le Service de l'Aménagement a une responsabilité en matière de gestion des zones côtières.

Effectifs: 74 agents permanents, dont 10 pour le Service de l'Aménagement.

Responsabilités du service en matière de gestion des zones côtières

- Le Service est consulté pour la création d'aménagements dans le lit des cours d'eau et donc pour travaux dans les estuaires.
- Aide à la gestion foncière du domaine territorial.

Functions, policy and legal framework of the department

The Territorial Department carries out regulatory, supervisory, statistical and Territory-oriented functions in the agricultural, rural and veterinary fields.

Legal framework of the department

Decision of 5 March 1992 setting up the Service d'Etat de l'Agriculture, de la Forêt et de l'Environnement in New Caledonia.

Organisation of the department

The Directorate is divided into five divisions:

- *General Administration Service (SAG);*
- *Veterinary and Plant Protection Service (SVPV);*
- *Territorial Veterinary Diagnostic Laboratory (LTDV) and Cattle Food Analysis Laboratory (LAAB);*
- *Economic and Agricultural Statistics Service (SESA) and;*
- *Development Service (SAM).*

Only the Development Service has responsibilities in terms of coastal zone management.

Staff: 74 permanent officers, including 10 in the Development Service.

Responsibilities of the department in terms of coastal zone management

- *The service is consulted regarding developments that affect rivers and watercourses, and for any works that take place in estuaries.*
- *Assistance to land management of state-owned property.*

BP 465
98845 Nouméa Cedex

Tel: (687) 273944
Fax: (687) 272345

M. J. C. Ardin
Directeur/ Director

Missions, politique et textes institutionnels du service

Ce service est sous la triple tutelle des Provinces (installations classées, mines et carrières, de compétence provinciale), l'Etat (mines et carrières pour ce qui concerne les matières stratégiques et la sécurité), et le Territoire pour ce qui concerne l'énergie, les véhicules et la métrologie. Il est par ailleurs le représentant de l'Agence de l'Environnement et de la Maîtrise de l'Énergie (ADEME) sur le Territoire.

Ces attributions et compétences concernent:

- les mines et les carrières—le service est chargé de l'élaboration et de l'application des réglementations minières: gestion du domaine minier et inspection du travail, respect de l'environnement;
- l'énergie—ses missions concernent, entre autre, la participation à la définition et la mise en oeuvre de la politique énergétique du Territoire, la maîtrise de l'énergie, le contrôle des stocks d'hydrocarbures;
- des contrôles techniques divers pour le Territoire (installations de production et de transport d'électricité, véhicules, métrologie), soit pour les Provinces (carrières);
- l'élaboration et l'application de la réglementation des installations classées pour le compte des Provinces.

Textes institutionnels du service

Arrêté du 13 juillet 1966.

Organisation du service

Le service comprend six divisions: Énergie, Carrières et Administration; Géologie/Économie minière; Recherche et Technologie; Industrie/Contrôles techniques et Environnement; Exploitation minière; Laboratoire d'analyses.

Effectifs: 41 agents, dont 37 permanents et 4 contractuels.

Responsabilités du service en matière de gestion des zones côtières

- Suivi de l'exploitation des carrières de granulats, en particulier les carrières d'extraction de sable corallien sur les îlots et l'extraction des sables de plages.

Functions, policy and legal framework of the department

This department is under the triple control of the Provinces (listed facilities, mines and quarries under Provincial jurisdiction), the State (mines and quarries regarding strategic materials and security), and the Territory (regarding energy, vehicles and metrology). It is also the representative of the Agence de l'Environnement et de la Maîtrise de l'Énergie (ADEME) [Environment and Energy Harnessing Agency] in the Territory.

The department's powers and responsibilities involve:

- *mines and quarries—the department is responsible for the formulation and enforcement of mining regulations, management of the mining domain and work supervision, and consideration for the environment;*
- *energy—its tasks include contributing to the formulation and implementation of the Territory's energy policy, the harnessing of energy, the monitoring of hydrocarbon stocks;*
- *various technical inspections for the Territory (power generation and transmission facilities, vehicles, meteorology) or for the Provinces (quarries) and;*
- *the formulation and implementation of regulations on listed facilities, on behalf of the Provinces.*

Legal framework of the department

Order of 13 July 1966.

Organisation of the department

The department consists of six divisions: Energy, Quarries and Administration; Geology/Mining Economy; Research and Technology; Industry/Technical Inspections and Environment; Mining Operations; and Analysis Laboratory.

Staff: 41 officers (37 permanent, 4 contract workers).

Responsibilities of the department in terms of coastal zone management

- *Supervision of the working of aggregate quarries, in particular coral sand extraction quarries on islets and beach sand extraction.*

| | |
|--|---|
| <ul style="list-style-type: none"> ■ Suivi des activités minières (pollutions mécaniques, recherches d'hydrocarbures). <p>Activités actuelles ou en projet en matière de gestion des zones côtières</p> <ul style="list-style-type: none"> ■ Recensement des sites d'extraction. ■ Suivi des exploitations. ■ Statistiques des volumes exploités. ■ Contrôle et réglementations des extractions. | <ul style="list-style-type: none"> ■ <i>Monitoring of mining activities (mechanical pollution, oil prospecting).</i> <p>Current or planned activities relating to coastal zone management</p> <ul style="list-style-type: none"> ■ <i>Inventory of extraction sites.</i> ■ <i>Monitoring of operation.</i> ■ <i>Statistics on volumes worked.</i> ■ <i>Supervision and regulation of extraction operations.</i> |
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Service des Domaines

Department of Lands

BP D2
Noumea Cedex

Tel: (687) 257540
Fax: (687) 257580

Mme. Martine Michel
Chef de Service/ *Head of Department*

Mme. Boyer
Adjointe/ *Assistant*

Missions du service

- Gestion et conservation du patrimoine non affecté de l'Etat et du Territoire.
- Vente des matériels et mobiliers administratifs.
- Gestion des logements administratifs territoriaux.
- Evaluations immobilières.
- Rédaction des actes administratifs et assistance technique aux collectivités locales.

Organisation du service

Divisions/Unités: 5

Effectifs: 14 permanents

Responsabilités du service en matière de gestion des zones côtières

Gestion de la zone des 50 pas géométriques et du rivage de la mer, dépendant tous deux du domaine public maritime de l'Etat.

Services de la Province sud

Functions of the department

- *Management and conservation of unallocated State and Territorial property.*
- *Sale of administrative equipment and furniture.*
- *Management of Territorial administrative premises.*
- *Real estate appraisals.*
- *Drawing-up of administrative deeds and technical assistance to local authorities.*

Organisation of the department

Divisions/Units: 5.

Staff: 14 permanent officers

Responsibilities of the department in terms of coastal zone management

Management of the zone of 50 geometric paces and of the seashore, both part of the State's maritime public domain.

Departments of the Southern Province

Direction des Ressources Naturelles

Directorate of Natural Resources

BP 3718
98846 Noumea Cedex

Tel: (687) 243255
Fax: (687) 243256

M. Thierry Chaverot
Chef de Service/ Head of Department

M. Richard Farman
Directeur Adjoint chargé des questions d'environnement/ Assistant Director for environmental issues

M. François Devinck
Chef du le Service de l'Environnement/ Head of Environment Department

Missions du service

La Direction des Ressources Naturelles est chargée de l'application des missions de la Province Sud dans les domaines de l'aménagement de l'espace terrestre et marin, de la protection de l'environnement terrestre et marin et, d'une manière générale, la gestion, l'exploitation et la préservation des ressources naturelles dont la compétence relève de la Province. Elle fait toutes propositions visant à intégrer les mesures d'exploitation des ressources naturelles, de gestion et de protection de l'environnement dans l'ensemble des activités économiques, sanitaires et sociales de la Province.

Textes institutionnels du service

Arrêté interne nominatif d'organisation de la direction, septembre 1997.

Organisation du service

La Direction des Ressources Naturelles comprend:

- une Cellule de Direction, dont dépendent notamment:
 - le Bureau des Installations Classées (chargé de l'enregistrement des déclarations et des demandes d'autorisation relevant de la réglementation relative aux Installations Classées pour la protection de l'environnement);
 - le Bureau des Pêches et de l'Aquaculture qui est chargé du développement et de l'exploitation des ressources marines et de leur valorisation;
- le Service de l'Environnement. Ce service est spécialement chargé de la protection et de la réhabilitation du patrimoine naturel et des paysages. Il définit les mesures de gestion adaptées à l'utilisation durable des milieux naturels, de la faune et de la flore terrestre et marine, ainsi que des écosystèmes et des paysages;
- le Service de l'Hydraulique et de l'Aménagement et le Service des Parcs et

Functions of the department

The Natural Resources Directorate is responsible for: carrying out the work of the South Province regarding management of terrestrial and marine spaces; protection of the terrestrial and marine environment; and the general management, exploitation and preservation of all natural resources falling within the Province's jurisdiction. It proposes mechanisms to integrate natural resource exploitation, management and environmental protection within the broader economic, health and social development activities of the Province.

Legal framework of the department

Internal nomination order for the organisation of the directorate, September 1997.

Organisation of the department

The Directorate includes:

- a Director's Office, to which are attached:
 - the Office of Classified Installations (responsible for registering declarations and permit requests under the environmental protection regulations relating to Classified Installations (such as historic buildings);
 - the Office of Fisheries and Aquaculture, which is responsible for the development and exploitation of marine resources, and for maximising their value;
- the Environment Service, which has special responsibility for the protection and rehabilitation of the natural heritage and the countryside. It defines management measures appropriate to the sustainable utilisation of the natural milieu, of terrestrial and marine flora and fauna, as well as of ecosystems and countryside; and
- the Water Management Service and the Parks and Reserves Service (not concerned with ICM).

Réserves Terrestres (non concerné par la gestion des zones côtières).

Effectif: 61 agents permanents.

Responsabilités de la direction en matière de gestion des zones côtières

Pêche et Aquaculture

- Aide technique et financière aux communautés de pêcheurs.
- Gestion des espèces (réglementation).
- Suivi de la production.
- Suivi des techniques.
- Mise en place des formations.

Environnement marin

- Gestion des aires marines protégées (aménagement, suivi, surveillance).
- Gestion intégrée des zones côtières.
- Sensibilisation à l'environnement.

Activités actuelles ou en projet en matière de gestion des zones côtières

Pêche et aquaculture

- Étude sur le grossissement en milieu ouvert de pectinidae à partir de captages naturels.
- Évaluation des stocks de crustacés (langoustes et crabes de palétuviers).
- Étude des circuits de distribution des produits de la mer.
- Mise au point d'un modèle de développement de pêche semi-industrielle.
- Pêche expérimentale de l'espadon et étude de marché.
- Mise en place de DCP.
- Mise en place d'une OP de crevettes.
- Étude de faisabilité pisciculture poissons de mer.
- Mise en place d'infrastructures collectives.
- Réalisation d'une plaquette sur la ciguatera et sur la préparation des fruits de mer.

Environnement marin

- Gestion des aires marines protégées et des zones côtières.
- Études: programme d'évaluation des réserves (en particulier des réserves tournantes) ; étude de l'avifaune; programmes de suivi de l'état de l'environnement marin (flore des îlots, faune piscicole); et mise en place d'une observation des récifs coralliens (ORC) dans le cadre du programme "Reefcheck".

Staff: 61 permanent officers.

Responsibilities of the department in terms of coastal zone management

Fisheries and aquaculture

- *Financial and technical assistance to fishing communities.*
- *Species management (regulations).*
- *Monitoring of production.*
- *Monitoring of methods.*
- *Implementation of training programmes.*

Marine environment

- *Management of protected marine areas (improvement, monitoring, surveillance).*
- *Integrated coastal zone management.*
- *Environmental awareness.*

Current or planned activities relating to coastal zone management

Fisheries and aquaculture.

- *Growth trials of scallops in open water using naturally-captured spat.*
- *Assessment of shellfish stocks (lobsters and mangrove crabs).*
- *Survey of distribution circuits for sea products.*
- *Formulation of a development model for semi-industrial fishing.*
- *Experimental swordfish fishing and market survey.*
- *Introduction of Fish Aggregation Devices.*
- *Setting up of Producer Groups for shrimps;*
- *Feasibility study for salt-water fish breeding;*
- *Setting up of a collective infrastructure;*
- *Completion of a booklet on ciguatera and on seafood preparation.*

Marine Environment

- *Management of protected marine areas and coastal zones.*
- *Surveys: programme to evaluate reserves (specially revolving reserves); study of the bird fauna; programmes monitoring the condition of the marine environment (flora of coastal islets and fish fauna); and the establishment of a reef observation system within the framework of the 'Reefcheck' programme.*

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| <ul style="list-style-type: none"> ■ Balisage des aires de protection et installation de corps-morts permettant aux plaisanciers de mouiller sans dégrader les coraux (1993); ■ Aurveillance des réserves (deux bateaux). ■ Aménagement et suivi: programmes de lutte contre l'érosion, suivi de la fréquentation touristique, programmes de nettoyage, de réalisation d'infrastructures légères (farés, barbecues) et approvisionnement en bois de récupération des "coins feu". <p>Sensibilisation</p> <ul style="list-style-type: none"> ■ Campagne télévisée diffusant un spot sur la protection du lagon et jeu-concours portant sur la connaissance de la réglementation des réserves et de la pêche (1992-1993). ■ Réalisation d'une plaquette "guide du mouillage", guide des oiseaux de mer, réglementation de la pêche, réserves marines de la Province sud, végétation des îlots. ■ Réédition et réactualisation du poster réserves marines et de l'autocollant "je protège le lagon". ■ Interventions dans les Projets d'Action Educative des collèges; édition d'un livret de vulgarisation pour l'environnement marin. <p>Description de tout plan d'aménagement effectivement en cours ou en préparation</p> <p>Elaboration des termes de référence pour un schéma d'aménagement et de gestion intégrée des zones maritime côtières du grand Nouméa.</p> | <ul style="list-style-type: none"> ■ <i>Marking out of protection areas and provision of moorings so that yachtsmen can drop anchor without damaging the coral (1993).</i> ■ <i>Monitoring of reserves (two surveillance vessels).</i> ■ <i>Improvement and monitoring programmes to combat coastal erosion, monitoring of visitor numbers, cleaning programmes, establishment of light infrastructure (shelters, barbecues) and provision of firewood in barbecue areas.</i> <p>Public awareness</p> <ul style="list-style-type: none"> ■ <i>Television campaign broadcasting an advertisement on lagoon protection and a knowledge quiz on the regulation of reserves and fisheries (1992-1993).</i> ■ <i>Completion of an "Anchoring Guide" booklet (1993), a guide on sea birds, on the regulation of fisheries, on marine reserves of the Southern Province and on the vegetation of coastal islets.</i> ■ <i>Re-issue and updating of the marine reserves poster and of the "I protect the lagoon" sticker.</i> ■ <i>Involvement in college Education Action Projects; production of a popular book on the marine environment.</i> <p>Description of any development plan in progress or under consideration</p> <p><i>Developing terms of reference for a integrated coastal zone management scheme in the Greater Noumea area.</i></p> |
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Direction de l'Équipement

Division of Industrial Equipment

BP H4
98848 Noumea Cedex

Tel: (687) 272811
Fax: (687) 277737

M. M. G. Tran Ap
Directeur/ Director

Missions, politique et textes institutionnels du service

La Direction de l'Équipement a en charge les missions de la Province Sud dans les domaines de l'aménagement, de l'urbanisme, du logement, des constructions publiques, des transports, des infrastructures et de la distribution d'énergie électrique. Elle est organisée en deux sous-directions (Infrastructures: et Urbanisme, Habitat Social et Constructions Publiques) et un service administratif.

Organisation du service

La sous-direction des Infrastructures se compose:

Functions, policy and legal framework of the department

The Division of Industrial Equipment carries out the work of the South Province in the areas of management, urban development, housing, public works, transport, infrastructure and electrical power distribution. It is organised as two sub-directorates (Infrastructure: and Urban Development, Social Housing and Public Works) and an administrative service.

Organisation of the department

The Sub-Directorate of Infrastructure comprises:

- du service des Etudes;
- de la Subdivision de la Programmation et du Matériel.

Le service des Etudes gère l'ensemble des études d'infrastructure notamment routière et maritime relevant de la Province ou des études qui lui sont confiées par voie conventionnelle notamment par l'Etat, le Territoire, les Communes et les Etablissements Publics.

Responsabilités du service en matière de gestion des zones côtières

- Mise en oeuvre de la politique d'aménagement dans la Province sud, y compris l'aménagement en zone littorale: études de Plans d'Urbanisme Directoire (PUD) pour les communes, dont les communes ayant une façade littorale.
- Construction des routes littorales.
- Application de la réglementation des transports maritimes d'intérêt provincial.
- Étude et suivi des infrastructures maritimes relevant de la Province.
- Protection des routes contre l'érosion littorale, le cas échéant.
- Construction des ouvrages d'art en zone littorale (ports, wharfs, ouvrages de défense de la côte).

Activités actuelles ou en projet en matière de gestion des zones côtières

- Étude du prolongement du wharf de l'îlot Amédée.
- Études de routes en zone littorale.
- Interventions pour des communes dans le domaine de l'assainissement.
- Construction d'un golf en zone littorale (Nouméa).
- Aménagement de l'îlot Signal.

Description de tout plan d'aménagement en cours

Révision ou Elaboration de PUD pour des communes ayant une façade littorale: Révision du PUD de Nouméa et Etudes des PUD de diverses communes littorales: Païta, Dumbéa, Mont-Dore, Bourail.

- *the Design Studies Division; and*
- *the Programme Planning and Materials Sub-division.*

The Design Studies Division oversees all infrastructural design work (especially regarding roads and the sea) within the Province's jurisdiction, as well as studies entrusted to it via conventional means, notably by the State, the Territory, the Municipalities and the various public establishments.

Responsibilities of the department in terms of coastal zone management

- *Implementation of the development policy in the Southern Province, including coastal zone developments: surveys of Plans d'Urbanisme Directoire (PUD) [Executive Town Planning Projects] for municipalities, including those with sea frontage.*
- *Construction of coastal roads.*
- *Enforcement of sea transport regulations relating to the Province.*
- *Survey and monitoring of the maritime infrastructure within the Province's jurisdiction.*
- *Protection of roads against coastal erosion, where applicable.*
- *Building of structures in the coastal zone (ports, wharves, coast protection structures).*

Current or planned activities relating to coastal zone management

- *Extension study of the Amédée Islet wharf.*
- *Road design in the coastal zone;*
- *Draining operations for municipalities.*
- *Construction of a golf course in the coastal zone (Noumea).*
- *Development of Signal Islet.*

Description of any development plan in progress

Review or formulation of Executive Town Planning Projects (PUDs) for municipalities with sea frontage, review of the Noumea PUD and surveys of the PUDs of various coastal municipalities: Païta, Dumbéa, Mont-Dore, Bourail.

Service de l'Environnement et Gestion des Parcs et Réserves
(Direction du Développement Rural)

*Department of the Environment and Management of
Parks and Reserves (Directorate of Rural Development)*

BP 2386
98846 Nouméa Cedex

Tel: (687) 272674/ 270586
Fax: (687) 270577

M. Marcel Boulet
Chef de service/ *Department Head*

Missions du service, politique et textes institutionnels

Préservation du patrimoine naturel de la Province et du respect de l'environnement ; Chasse et pêche en eaux douces: délivrance des permis ; contrôle pour le respect de la réglementation ; Gestion des aires protégées terrestres ; Etude de la faune endémique ; Contrôle des scientifiques étrangers ; Vulgarisation et sensibilisation, surtout auprès des écoles, pour une meilleure protection de l'environnement.

Textes institutionnels du service

Arrêté n° 05-90/PS du 18 janvier 1990 relatif à l'organisation de la Direction du Développement rural de la Province sud ; Arrêté n° 741/91/PS du 10 juillet 1991 relatif à la nomination d'un conseiller technique pour les affaires d'environnement et secrétaire du Comité pour la Protection de l'environnement dans la Province sud.

Organisation du service

Direction à Nouméa (3 personnes); une cellule de vulgarisation et de sensibilisation (1 personne); une cellule de recherche (1 personne); une cellule parc et réserve (Rivière Bleue—6 personnes); une cellule travaux (4 personnes).

Effectifs: 15 personnes.

Responsabilités du service en matière de gestion des zones côtières

Gestion des aires protégées en milieu côtier terrestre (le Service de la Mer ayant la responsabilité pour les aires protégées marines).

Activités actuelles ou en projet en matière de gestion des zones côtières

Secrétariat du Comité pour la Protection de l'environnement dans la Province sud, auquel tout projet de réserve côtière doit être soumis.

Functions, policy and legal framework of the department

Preservation of the Province's natural heritage and of the environment; fresh-water hunting and fishing; issuing of permits; monitoring compliance with the regulations; management of protected areas on dry land; study of the endemic fauna; supervision of foreign scientists; popularisation and public awareness, mainly with schools, for better environment protection.

Legal framework of the department

Order N° 05-90/PS of 18 January 1990 for the organisation of the Directorate of Rural Development of the Southern Province; Order N° 741/91/PS of 10 July 1991 for the appointment of a technical adviser for environmental matters and secretary of the Environment Protection Committee in the Southern Province.

Organisation of the department

Directorate in Noumea (3 staff); one Popularisation and Public Awareness Unit (1 staff); one Research Unit (1 staff); one Parks and Reserves Unit (Rivière Bleue—6 staff); and one Works Unit (4 staff).

Staff: 15 officers.

Responsibilities of the department in terms of coastal zone management

Management of protected areas on dry land in the coastal environment (the Department of the Sea is responsible for the protected marine areas).

Current or planned activities relating to coastal zone management

Secretariat of the Environment Protection Committee in the Southern Province, to which any coastal reserve project must be submitted.

Direction Provinciale du Développement et de la Formation (DDF)

Economic Development and Training Division

BP 50
Wé
98820 Lifou

Tel: (687) 455100/ 455171
Fax: (687) 451440/ 455177
E-mail: ddf@loyalty.nc

M. Jean-Christophe Jammes
Directeur/ *Director*

M. Hervé Bru
Directeur Adjoint à Ouvéa/ *Assistant Director in Ouvéa*

M. Joseph Waikedre
Chef de Service d'Expansion Economique/ *Head of Economic Expansion Service*

M. Ernest UNE
Chef de Service des Affaires Culturelles, Coutumières et de l'Environnement/
Head of Cultural Affairs, Custom and Environment Service

M. Damien BURRUS
Chef de Service de l'Observatoire Statistique/ *Head of Statistical Monitoring Service*

Missions politique et textes institutionnels du service

La direction est chargée d'appliquer la politique de développement économique arrêtée par la Province. Les missions de la Direction ont trait à l'Economie rurale, à l'artisanat et au commerce; au tourisme; à la pêche; à la forêt et l'environnement; à l'aménagement des eaux (AEP, irrigation, protection des nappes, lutte contre les pollutions et les nuisances); à la santé et la protection animales, au développement des productions animales; à la protection des végétaux, des productions végétales et de leur commercialisation; à la formation professionnelle et à l'insertion sociale; aux relations entre coutume et développement économique.

Textes institutionnels du service

Délibération n°96-19/API du 10 mai 1996.

Organisation du service

Le service comprend la Direction, à laquelle sont attachés les services suivants:

- Service d'Expansion Economique. Ce service regroupe toutes les activités économiques, dont la pêche;
- Service des Affaires Culturelles, Coutumières et de l'Environnement;
- Service de la Formation et de l'Insertion Professionnelle;
- Service de l'Observatoire Statistique.

Effectifs: 48 permanents.

Responsabilités du service en matière de gestion des zones côtières

- **Pêche:** appui technique aux promoteurs; orientation et gestion des marchés; sauvegarde de l'environnement marin et

Functions, policy and legal framework of the division

The division is responsible for the implementation of the economic development policy decided by the Province. It discharges its functions in the fields of rural economy, crafts and trade, tourism, fishing, the forest and the environment, stream stabilisation (drinking-water supply, irrigation, protection of the water-table, pollution and nuisance control), animal health and protection, animal production development, protection of plants and plant products and marketing thereof; vocational training and job placement; and the relationship between customary practices and economic development.

Legal framework of the division

Decision N° 92-38/API of 26 June 1992 and Order N° 92-145/PR of 30 September 1992.

Organisation of the division

The division comprises the Directorate and the sections reporting to it, as follows:

- *Economic Expansion Service, which includes all economic activities, including fishing;*
- *Cultural Affairs, Custom and Environment Service;*
- *Training and professional Placement Service; and*
- *Statistical Monitoring Service.*

Staff: 48 permanent officers.

Responsibilities of the division in terms of coastal zone management

- **Fishing:** *technical support to promoters; market strategy and management; preservation of the marine and coastal environment; formulation of Provincial*

côtier; préparation des orientations provinciales en matière de pêche; organisation et suivi de la filière pêche.

- **Tourisme:** développement du tourisme dans les îles, appui aux investisseurs et aux promoteurs.

Activités actuelles ou en projet en matière de gestion des zones côtières

- **Pêche:** installation de DCP; Formation pêche; études et recherche en matière de ressources marines; aides aux groupements et associations professionnelles; introduction de la réglementation des pêches.
- **Tourisme:** développement d'un projet hôtelier sur Ouvéa et études de projets sur Mare et sur Lifou.

fishing strategies; organisation and monitoring of the fishing network.

- **Tourism:** *development of tourism in the islands; support to investors and promoters.*

Current or planned activities relating to coastal zone management

- **Fishing:** *installation of Fish Aggregation Devices; studies and research on marine resources; subsidies to trade groups and associations; introduction of fishing regulations.*
- **Tourism:** *development of a hotel project in Ouvéa and formulation of projects in Maré and Lifou.*

Direction Provinciale de l'Équipement et de l'Aménagement (DEA)

Provincial Industrial Equipment and Development Division

BP 50
Wé, 98820 Lifou

Tel: (687) 455200
Fax: (687) 455211

M. Frédéric Pelladeau
Directeur/ *Director*

M. Pierre Siapo
Chef de Service de l'Habitat et du Patrimoine/ *Head of Habitat and Heritage Service*

M. Laurent Foulonneau
Chef de Service Topographique/ *Head of Topographic Service*

M. Henri Hmakone
Chef de Service des Etudes et Travaux Neufs/ *Head of Design and New Works Service*

Missions, politique et textes institutionnels du service

La direction est chargée de mettre en oeuvre les politiques de la Province en matière d'équipement et d'aménagement. Elle assure la gestion et l'entretien du Patrimoine de la Province.

Textes institutionnels du service

Délibération n°96-19/API du 10 mai 1996.

Organisation du service

La direction comprend 4 services:

- Service de l'Habitat et du Patrimoine;
- Service Topographique;
- Service des Etudes et Travaux Neufs;
- Service Administratif et Financier.

Responsabilités du service en matière de gestion des zones côtières

Le Bureau des Etudes et Travaux Neufs est chargé, entre autre, des études générales en matière d'aménagement et d'urbanisme; des

Functions, policy and legal framework of the division

The division is responsible for the implementation of the Province's equipment and development policies. It manages and maintains the Province's property.

Legal framework of the division

Decision N° 96-19/API of 10 May 1996.

Organisation of the division

The division comprises four sections:

- *Habitat and Heritage Service;*
- *Topographic Service;*
- *Design and New Works Service; and*
- *Administration and Finance Service.*

Responsibilities of the division in terms of coastal zone management

The responsibilities of the Design and New Works Office include general development and town planning surveys, transport (coordination,

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| <p>transports (coordination, organisation et réglementation), notamment des transports maritimes.</p> <p>La Direction émet un avis pour tout projet de déclassement du Domaine Public de l'Etat (zone maritime des 50 pas géométriques). La Direction instruit la partie topographique de la procédure de déclassement (lever, description des limites, enquête foncière, application des servitudes).</p> <p>Activités actuelles ou en projet en matière de gestion des zones côtières</p> <p>Dans le cadre de l'aménagement de la ville de Wé (Baie de Chateaubriand, Wé, Lifou), la Direction participe à la mise en valeur du littoral. La Direction assure la conduite d'opération pour l'aménagement d'un quai sur l'île de Maré et la construction d'un wharf sur l'île de Tiga.</p> | <p><i>organisation and regulation) including sea transport.</i></p> <p><i>The division issues an opinion on any downgrading project of the State's public domain (maritime zone of the 50 geometric paces). The division investigates the topographical component of the downgrading procedure (survey, description of boundaries, property search, enforcement of easements).</i></p> <p>Current or planned activities relating to coastal zone management</p> <p><i>As part of the development of the town of Wé (Baie de Chateaubriand, Wé, Lifou), the Division contributes to the reclamation of the coastline. The division is responsible for a programme to improve a wharf on Maré and the construction of another wharf on Tiga.</i></p> |
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Société de Développement des Iles Loyautés (SODIL)

Loyalty Islands Development Company

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| <p>BP 2217 98000 Noumea Cedex</p> <p>M. J. Dralue Directeur/ <i>Director</i></p> | <p>Tel: (687) 276663 Fax: (687) 276709</p> |
| <p>La SODIL est une société d'économie mixte créée par la Province comme outil de développement dont les activités concernent les secteurs du transport maritime, du transport aérien, de la pêche et du tourisme.</p> | <p><i>SODIL is a semi-public company set up by the Province as a development tool, operating in the sea transport, air transport, fishing and tourism sectors.</i></p> |

Services de la Province nord

Divisions of the Northern Province

Direction de l'Aménagement

Development Division

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| <p>BP 41 98860 Koné</p> <p>M. Richard Maistre Directeur/ <i>Director</i></p> <p>Chef de Service de la Gestion des Terres et du Patrimoine/ <i>Head of Land and Property Management Division</i></p> | <p>Tel: (687) 477200 Fax: (687) 477191</p> <p>Tel: (687) 473273 Fax: (687) 473288</p> |
| <p>Missions politique et textes institutionnels du service</p> <p>Maîtrise d'oeuvre et/ou conduite d'opérations de tous travaux d'aménagement dans la Province (routes, ouvrages d'arts, bâtiments, ports, hydraulique fluviale, littoral, aérodromes).</p> | <p>Functions, policy and legal framework of the division</p> <p><i>Project management and/or supervision of all development works in the Province (roads, structures, buildings, ports, river and coast hydraulics and airfields).</i></p> |

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| <p>Textes institutionnels du service</p> <ul style="list-style-type: none"> ■ Les textes créant la Province et en particulier la loi N° 88-1028 du 9 novembre 1988 ■ Diverses délibérations provinciales créant et organisant les missions de la direction. <p>Organisation du service</p> <p>La direction comprend 4 services: un service administratif, un service Habitat, Aménagement de l'espace et Constructions publiques, un service Etudes, un service Topographique, et 4 subdivisions territoriales.</p> <p>Effectifs: 162 personnes permanentes dont 14 catégories A (tous permanents)</p> <p>Responsabilités du service en matière de gestion des zones côtières</p> <p>Confiée au Service de la Gestion des Terres et du Patrimoine (adresse ci-dessus).</p> <p>Activités actuelles ou en projet en matière de gestion des zones côtières</p> <ul style="list-style-type: none"> ■ Contrôle des autorisations de carrières et/ou des prélèvements de sable, des endigages et des créations de ports. ■ Construction des ouvrages maritimes. <p>Description de tout plan d'aménagement en cours</p> <ul style="list-style-type: none"> ■ Construction de rampes de beachage. ■ Construction de petits abris pour pêcheurs. ■ Construction d'un port-abri à Belep avec rampe de beachage. ■ Étude et construction d'un quai de pêche à Népoui (Poya). | <p>Legal framework of the division</p> <ul style="list-style-type: none"> ■ <i>The legislation setting up the Province, including Act N° 88-1028 of 9 November 1988.</i> ■ <i>Various Provincial Decisions setting up and organising the functions of the division.</i> <p>Organisation of the division</p> <p><i>The division is made up of four sections: Administration; Housing, Site Development and Public Works; Design; Topography; and four Territorial sub-sections.</i></p> <p>Staff: 162 permanent officers including 14 class-A officers (all permanent).</p> <p>Responsibilities of the division in terms of coastal zone management</p> <p><i>These are entrusted to the Land and Property Management Division (address shown above).</i></p> <p>Current or planned activities relating to coastal zone management</p> <ul style="list-style-type: none"> ■ <i>Monitoring of permits for quarrying and/or sand removal, seawalls and new ports.</i> ■ <i>Construction of maritime structures.</i> <p>Description of any development plan in progress</p> <ul style="list-style-type: none"> ■ <i>Construction of beaching ramps.</i> ■ <i>Construction of small shelters for fishermen.</i> ■ <i>Construction of a shelter port at Belep with beaching ramp.</i> ■ <i>Design and construction of a fishing wharf at Népoui (Poya).</i> |
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Direction du Développement rural et de la Pêche (DDRP)

Rural Development and Fishing Division

BP 41
98860 Koné Cedex

Tel: (687) 477239
Fax: (687) 477135

M. Denis Carliez
Directeur/ Director

Missions politique et textes institutionnels du service

La DDRP est chargée de la gestion technique, financière et administrative des opérations concourant au développement économique de la Province Nord, principalement dans les domaines de l'agriculture, de la pêche, l'aquaculture, les forêts, le tourisme et les PME-PMI.

La DDRP est le service instructeur unique des dossiers de subventions du code de développement provincial. Elle est chargée du suivi de l'ensemble

Functions, policy and legal framework of the division

The DDRP is responsible for the technical, financial and administrative management of economic development in the North Province, principally in the sectors of agriculture, fishing, aquaculture, forestry, tourism and small-medium enterprise development.

The DDRP is the only division investigating applications for grants under the Provincial Development Code. It is responsible for monitoring

des programmes de recherche appliquée réalisés par les organismes scientifiques, du lien technique avec les organismes territoriaux et des relations avec les organisations professionnelles économiques.

Textes institutionnels du service

Délibération n°91/90 du 26 Février 1990 portant création de la Direction du Développement Rural et de la Pêche dans la Province Nord.

Organisation du service

La DDRP comprend des services centraux installés au siège de la Province Nord à Koné et des antennes décentralisées à Pouembout, Koumac, Poindimié et Canala.

Les différents services de la DDRP sont au nombre de 6:

- Le Service de l'Agriculture (SA);
- Le Service Forêt-Bois-Environnement (SFBE);
- Le Service des Pêches et des Affaires Maritimes (SPAM);
- Le Service des Affaires Economiques (SAE);
- Le Service du Tourisme et des Petites et Moyennes Entreprises (STPM);
- La Cellule Administration-Gestion (CAG).

Responsabilités du service en matière de gestion des zones côtières

Le Service des Pêches et des Affaires Maritimes est chargé:

- de l'animation et de la vulgarisation auprès des pêcheurs;
- du suivi des organisations professionnelles;
- de l'élaboration et du suivi des opérations de contrat de développement;
- du montage technico-économique, du suivi et de l'évaluation des projets;
- du suivi des programmes de recherche halieutique;
- de la gestion des ressources et des actions liées à l'environnement marin;
- des propositions et de la mise en oeuvre des orientations de la politique provinciale en terme de développement des filières "Pêche" et "Aquaculture";
- de l'instruction des demandes d'autorisation de pêche professionnelle.

Activités actuelles ou en projet en matière de gestion des zones côtières

La Province Nord a financé un important programme d'évaluation des ressources piscicoles

all the applied research programmes carried out by scientific organisations, for technical liaison with the Territorial organisations, and for relations with economic professional bodies.

Legal framework of the division

Decision no 91/90 of 26 February 1990 which created the North Province Rural Development and Fishing Division.

Organisation of the division

The DDRP comprises centralised services based at the headquarters of the North Province in Koné, and decentralised units at Pouembout, Koumac, Poindimier and Canala.

There are six different services in the division, as follows:

- *Agriculture Service;*
- *Forest, Woodlands and Environment Service;*
- *Fisheries and Maritime Affairs Service;*
- *Economic Affairs Service;*
- *Tourism and Small and Medium Businesses/ Industries Service; and*
- *Administration Unit.*

Responsibilities of the division in terms of coastal zone management

The Fisheries and Marine Affairs Service is charged with:

- *demonstration and training for fishermen;*
- *support to professional organisations;*
- *formulation and support to development activities;*
- *technical and economic project design, monitoring and evaluation;*
- *support to marine research programmes;*
- *resource management and actions related to the marine environment;*
- *proposals and activities which give effect to the Province's political orientations regarding the development of fishing and aquaculture; and*
- *management of applications for professional fishing permits.*

Current or planned activities relating to coastal zone management

The North Province financed a major programme to evaluate fish stocks in the northern lagoon. The study, which was a world first in terms of the area covered, was reported on in detail in 1997. The programme has been prolonged in order to allow development of resource monitoring and management.

du lagon Nord. Cette étude, unique au monde compte tenu de la surface inventoriée, a fait l'objet d'une restitution en 1997. Le programme a été prolongé afin de parfaire les techniques de suivi et de gestion de la ressource.

Le Service des Pêches et des Affaires Maritimes a, d'autre part, réalisé plusieurs campagnes de prospection et d'identification des tortues dans les îlots du Nord, de même que des missions ont été organisées dans cette région pour étudier les populations d'oiseaux marins avec les associations écologiques (notamment La Société Calédonienne d'Ornithologie, B.P. 3135, Nouméa, Tel.: 24 14 04).

The Fisheries and Marine Affairs Service has also carried out several missions to locate and identify turtles in the Northern Islands. Similar expeditions have been carried out in the same area to study seabirds in partnership with local ecological organisations, notably the Caledonian Ornithology Society.

Service de la Gestion des Terres et du Patrimoine

Lands and Property Management Division

BP 41
98860 Koné

Tel: (687) 473255
Fax: (687) 473256

Le service est responsable de la gestion du foncier, en particulier en zone littorale

The division is responsible for land management, particularly in the coastal zone.

Société de Financement et d'investissement de la Province Nord (SOFINOR)

Northern Province Finance and Investment Trust

BP 41
98860 Koné

Tel: (687) 473255
Fax: (687) 473256

M. Emmanuel de Guiran
Directeur/ Director

La SOFINOR est une société d'investissement dont les actions peuvent contribuer au développement d'activités en milieu littoral, comme le tourisme ou l'aquaculture.

SOFINOR is an investment trust whose initiatives can contribute to the development of activities in the coastal environment, such as tourism or aquaculture.

**AUTRES SERVICES AYANT
DES ACTIVITÉS DANS LE
DOMAINE LITTORAL**

**OTHER AUTHORITIES
CARRYING OUT ACTIVITIES
IN THE COASTAL DOMAIN**

Agence de Développement Rural et d'Aménagement Foncier (ADRAF)

Rural Development and Land Reclamation Agency

BP 4228
98847 Noumea Cedex

Tel: (687) 284242
Fax: (687) 284322

Dr Gérard Vladyslav
Directeur Général/ *Director*

L'ADRAF est un établissement public d'Etat à caractère industriel et commercial. Elle a pour mission le rééquilibrage foncier global entre les ethnies en facilitant l'acquisition et la mise à disposition des fonds agricoles. L'Agence n'a pas d'activités spécifiques en matière de zones côtières mais peut être associée, en collaboration avec les Service des Domaines, aux questions foncières s'y rapportant.

ADRAF is a state industrial and commercial public entity. Its task is to readjust the global land balance between ethnic groups by facilitating the collection and provision of agricultural funds. Although the agency has no specific activities relating to coastal zones, it can be involved, in conjunction with the Service des Domaines, in any land matter pertaining thereto.

Port Autonome de Nouméa

Autonomous Port of Noumea

BP 14
98845 Noumea Cedex

Tel: (687) 275966
Fax: (687) 275490

M. Philippe Lafleur
Directeur/ *Director*

Texte institutionnel

Délibération n° 121 CP du 16 Mai 1991

Le Port Autonome est un Etablissement Public Territorial chargé d'assurer l'administration, l'entretien et l'exploitation du Port de Nouméa, d'en gérer le domaine et d'y exécuter les travaux d'amélioration et d'extension des installations, pour permettre que s'exercent l'ensemble des activités liées au trafic maritime: importation/exportation de produits et marchandises diverses, cabotage intérieur, tourisme de croisière, auxquelles s'ajoutent les réparations navales et les activités liées à la plaisance. Il peut également intervenir pour le compte de tiers et, à ce titre, bénéficier de concessions du Domaine Public Maritime de l'Etat.

Legal framework

Decision N° 121 CP of 16 May 1991.

The Autonomous Port is a Territorial public entity responsible for the administration, maintenance and operation of the Port of Noumea, the management of its domain, and the completion of improvement and extension work on its facilities. This ensures that all the activities connected with maritime traffic can proceed (import/export of various products and goods, inshore navigation, tourist cruises; shipbuilding repairs and activities connected with yachting). It can also act on behalf of third parties and, in this capacity, qualify for concessions in the State Public Maritime Domain.

Aquarium de Nouméa

Noumea Aquarium

BP 395
98845 Noumea Cedex

Tel: (687) 262731
Fax: (687) 261793

Mme. Pascale Joannot
Directrice/ *Director*

L'aquarium de Nouméa est une structure municipale. L'établissement assure une présentation de la faune et de la flore marines de Nouvelle-Calédonie, essentiellement invertébrés, particulièrement madréporaires, en aquarium (circuit d'eau de mer et lumière naturels) et une information sur la gestion de l'environnement marin. Il permet la sensibilisation du public et des écoles à l'environnement marin côtier de Nouvelle-Calédonie et participe, par ailleurs, aux études du milieu lagunaire et à l'élaboration des réglementations en matière de pêche. L'aquarium comprend 11 agents permanents.

The Noumea Aquarium is a municipal body. The establishment presents the marine fauna and flora of New Caledonia, mostly invertebrates with special attention to madreporas, in an aquarium (natural seawater and lighting circuit), and provides information on marine environment management. It enables the public and schools to be made aware of the coastal marine environment of New Caledonia; it also participates in studies of the lagoon environment and in the formulation of fishing regulations. The aquarium has a staff of 11 permanent officers.

Le Centre d'Initiation à l'Environnement en Nouvelle-Calédonie (CIE)

Centre for Introduction to the Environment in New Caledonia

BP 427
98845 Noumea Cedex

Tel: (687) 261000
Fax: (687) 264326

Mme. Pascale Joannot
Présidente/ *President*

Mme. Anne-Claire Roudaut
Chargée de mission/ *Technical Officer*

Mme. Ellen Degott
Chargée de mission/ *Technical Officer*

Le C.I.E. est une association loi 1901 dont les objectifs sont la diffusion de la connaissance des milieux naturels, la création d'outils pédagogiques, la sensibilisation et la formation des publics aux problèmes d'environnement.

The centre is an association formed under the law of 1901 whose objectives are dissemination of knowledge of the natural milieu, production of teaching aids and training the public about environmental issues.

La Société Calédonienne d'Ornithologie

Caledonian Ornithological Society

BP 3135
Noumea Cedex

Tel: (687) 241404
Fax: (687) 241404
E-mail: ssir@canl.nc

M. Serge Sirgouant
Président/ *President*

La Société Calédonienne d'Ornithologie intervient auprès des pouvoirs publics pour obtenir des mesures vis à vis des espèces d'oiseaux menacées. Elle a effectué des missions à but scientifique, notamment en collaboration avec le Service des Pêches de la Province nord, pour étudier les populations d'oiseaux marins (inventaires

The Caledonian Ornithological Society interacts with public agencies in order to obtain appropriate measures in regard to threatened bird species. It has carried out scientific missions, especially in collaboration with the North Province Fisheries Service, to study populations of marine birds (qualitative inventories of pelagic species which

qualitatifs des espèces pélagiques se reproduisant sur les îles et îlots de la Grande Terre), mais elle participe aussi au baguage des espèces pélagiques pour le compte du Museum d'Auckland, en collaboration avec le CNRS.

reproduce on the islands and islets of the mainland). It also assists in the ring-banding of pelagic species for the Auckland Museum, in collaboration with the CNRS (French National Scientific Research Centre).

Association pour la Sauvegarde de la Nature Néo-calédonienne

Association for the Protection of New Caledonian Nature

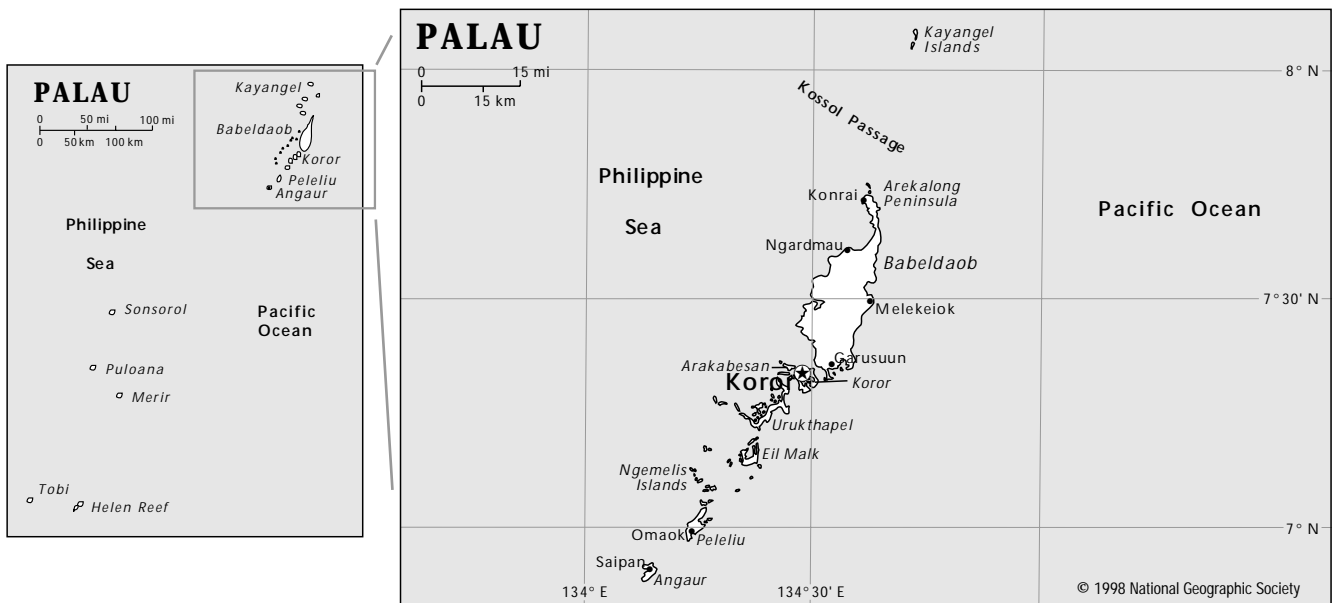
12 bvd. Vauban
Noumea

Tel: (687) 283275
Fax: (687) 283275

L'Association pour la Sauvegarde de la Nature Néo-calédonienne n'intervient pas non plus directement dans la gestion des zones côtières. Mais elle participe à des actions de sauvegarde des zones de mangroves ou des zones humides en général (Plaine des Lacs). Elle remplit aussi une mission d'information et est membre du Wet Land International.

The Association is not directly involved in coastal zone management; however it participates in actions aimed at protecting mangrove areas and wet zones (such as the Plain of Lakes) in general. It also fulfills an information-dissemination role and is a member of Wetlands International.

PALAU



PHYSICAL CHARACTERISTICS

The Republic of Palau is an island chain comprising 200 islands and atolls strung in a northeast to southwest direction in the southwest Pacific Ocean. Only nine islands are inhabited and these are Kayangel, Babeldaob, Koror, Peleliu, Angaur, Hatohobei, Sonsorol, Merir and Puloana. The total land area is 488 sq km and the total population in 1996 was 18 146 with 68% in Koror, the main administrative and government centre.

The climate of Palau is maritime tropical with little seasonal and daily variation. The annual mean temperature is 26°C and the mean annual rainfall is 3800 mm. The largest island is Babeldaob, which has extensive fringing reefs. Dense mangrove forests bound most of the islands. Marine life is abundant with over 1300 species of tropical fish and over 700 different species of hard and soft corals in the lagoons and reefs.

GOVERNMENT STRUCTURE

The newly independent Republic has a Compact of Free Association with the United States. The executive branch of government is headed by a popularly elected president and vice-president serving four-year terms. The President chooses his

Cabinet (made up of ministers) in which the Vice-President automatically serves as a member. The national legislature (or Olbiil Era Kelulau) is bicameral, with a house of delegates consisting of one from each of the 16 states, and a senate consisting of 14 senators representing population districts. Each of the 16 states has a separate constitution, and is headed by a governor, some of whom are elected and some chosen due to their traditional status. There is also a 16 member Council of Chiefs that advises the President of matters of custom, traditional law and their relations to the Constitution and the laws of Palau. The Judiciary branch is headed by an appointed chief justice who presides over disputes in a national court system.

COASTAL ZONE MANAGEMENT ISSUES

The main environmental issue facing Palau is the rapid growth in tourism. This has been increasing at the rate of about 20% annually over the last five years with 1997 seeing over 70 000 visitors mainly from Taiwan, Japan and the USA. Although this has contributed significantly to Palau's economic growth and development, there are also concerns about the impacts to the environment from tourist-related developments and the activities of the tourists themselves. In addition, this highly accelerated growth does not give enough opportunity for coastal management agencies to develop their

capacity to cope with the increasing and often complicated coastal management issues.

In response to this threat many communities are taking the initiative in creating conservation areas to protect those areas or restore depleted reefs. Palau now has a substantial and growing system of locally-managed marine protected areas. The challenge now is to devise a cost-effective means of managing these areas. In those areas where marine-based tourism is substantial, management costs can be covered by fees collected from tourists, with revenue left over serving as a resource rent for local communities. However in Palau's more remote areas the opportunities for revenue generation from protected areas are fewer, making it more difficult to justify both the costs of management and the protected status of the areas.

Opportunities are now being explored for enterprise development and cost-effective enforcement methods, including development of tourist-based catch-and-release sports-fishing, and self-enforcement by local fishermen.

Conservation Areas of Palau

Palau has a number of conservation areas, as shown in table 3.

Ngaremeduu Bay has been designated under the National Master Development Plan as a conservation area. A project is underway by the National Government to provide for community-based recognition and a management system.

Table 3: Conservation areas in Palau.

| Area and Location | Primary Authority | Law | Effective Date | Approx. size (sq km) | Main Restrictions |
|--|---|--------------------------|----------------|----------------------|--|
| Ngerukewid Islands Wildlife Preserve Koror | Republic of Palau | PDC 201 (24 PNCA 30) | 1956 | 12 | No fishing, hunting, or disturbance |
| Ngerumekaol Spawning Area (reef channel) Koror | Republic of Palau | PL 6-2-4 (24 PNCA 31) | 1976 | 0.3 | No fishing 1 April–31 July |
| Nationwide (trochus sanctuaries) Areas in each of 16 states | Individual states | Various state laws | | | No harvesting of trochus |
| Ngaraard Conservation Area (mangroves) Ngaraard | Ngaraard State | NSPL 4-4 | 1994 | 1.8 | Only traditional, subsistence and educational uses allowed |
| Northern reef channels Ngarchelong and Kayangel | Ngarchelong, Kayangel traditional leaders | Traditional bul | 1994 | 90 | No fishing in 8 channels 1 April–31 July |
| Ngemelis (marine area) Koror | Koror State | K4-68-95 | 1995 | 30 | No fishing |
| Ngaruangel Reserve (atoll) Kayangel | Kayangel State | KYPL 7-02-96 | 1996 | 35 | No entry, no fishing (3 years) |
| Ngemai Conservation Area (reef) Ngiwal | Ngiwal State | NSPL 7-004 | 1997 | 1 | No entry, no fishing (5 years) |
| Lake Ngardok Nature Reserve (watershed) Melekeok | Melekeok State | | 1998 | 1 | Protecting the integrity of the lake basin |

Recently the combined traditional and political leadership of Palau has begun to work with representatives from the Governments of Japan and

the United States to develop a plan for establishing an International Coral Reef Centre in Palau.

COASTAL ZONE MANAGEMENT RESPONSIBILITIES

Coastal resource management responsibilities are spread among various national government departments and agencies. States and local communities have recently become more actively involved in the protection of resources within their jurisdiction. At the national level, most coastal management responsibilities dealing with wildlife and natural resources lie within the Bureau of Natural Resources and Development (BRND). The bureau directs the various activities of its divisions including the Division of Conservation and Entomology (DCE), the Division of Marine Resources, and the Division of Agriculture and Mineral Resources. The BRND has the lead responsibility for all planning, coordination and management of Palau's wildlife laws and regulations. As such, BRND is expected to facilitate a consultative process between various government and non-government agencies pertaining to resource management activities, including those related to coastal management.

The Palau Environmental Quality Protection Board (EQPB) is a statutory body responsible for permitting, monitoring and maintaining compliance for all earth-moving works within Palau. Other major responsibilities include water quality monitoring, potable water use, marine monitoring, sewage and solid waste management and disposal as well as controlling pesticide use.

The Bureau of Public Safety's Marine Surveillance Division coordinates all enforcement activities within the coast and the entire EEZ.

The 16 state governments, which own most public lands including all resources within 12 miles of the shore (except highly migratory species), have recently taken a more active role in the management of their coastal areas. Koror state, the most advanced of all, operates the Department of Conservation and Enforcement which has 15 rangers responsible for enforcing the State's conservation regulations and monitoring the Rock Islands. In addition a cadre of Beach Boys are responsible for maintaining the Rock Islands visitor facilities and cleaning of beaches.

ENVIRONMENTAL LEGISLATION

Environmental regulations include those enacted by the National Congress, State legislatures and traditional authorities. Key legislative instruments include:

- Palau Environmental Quality Protection Act, 24 PNCA Chapter 1 (IV) created the EQPB to require any earth-moving activities, whether commercial, residential or governmental, to obtain a permit. It also administers laws that regulate solid waste storage and disposal, toilet and waste water facilities, public water supply systems, marine and freshwater quality, pesticide storage, use and importation and air pollution. EQPB may also require EIS for large-scale development projects.
- Marine Protection Act of 1994 (RPPL 4-18), RPPL 4-35, 24 PNCA, 27 PNCA Chapter 12, RPPL regulates the taking, use and exportation of various marine resources. It also sets the framework for regulating marine organisms collected for research and aquarium trade and bans exportation of corals. Other wildlife protected under 24 PNCA includes birds (chapter 14), turtles (chapter 12-1), sponges (chapter 12-1), mother of pearls (chapter 12-3), dugong (chapter 12-4) and trochus (chapter 12-5). This law also relates to the establishment of national sanctuaries (chapter 30-31), and endangered species (chapter 10).
- Control of the introduction of exotic species and diseases are regulated under 25 PNCA Chapter 1, which establishes a quarantine system.
- Natural Heritage Reserve System Act of 1991 establishes a mechanism for designating, recording and managing conservation areas. To date, however, no area has been designated under this system.
- Key state level legislation includes the Rock Islands Use Act of Koror State, which regulates tourist visits within Koror state. The Fishing Act of Koror State set fishing regulations within Koror state and prohibits fishing within major dive sites.

MAIN ICM ORGANISATIONS

Bureau of Natural Resources and Development (BNRD)

PO Box 100
Koror 96940

| | |
|--|--|
| Mr Demei O. Otobed Director | Tel: (680) 488-1475 Fax: (680) 488-1475 |
| Mr Herman Francisco, Chief, Division of Agriculture and Mineral Resources | Tel: (690) 488- 2504 |
| Mr Marcello Brell Forestry Officer | Tel: (680) 488-2504 |
| Mr Theofanes Isamu Chief, Division of Marine Resources | Tel: (680) 488-3125 Fax: (680) 488-1725/ 1475 |
| Mr Kammen Taktai Chief, Division of Conservation and Entomology | Tel: (680) 488-2487 |
| Mr Alma Ridep-Morris CASO, Ngaremeduu Bay Conservation Area | Tel: (680) 488-2487 |

BNRD is headed by a director who is responsible for the promotion, development and conservation of the natural resources of the Republic including marine and fisheries, agriculture, forestry, mineral and other land-based and ocean resources. He is also responsible for the performance of the duties and functions of the Division of Agriculture and Mineral Resources, Division of Conservation and Entomology and the Division of Marine Resources.

As the primary government department responsible for natural resources, BNRD is responsible for planning, coordination and promulgation of Palau's regulations relating to development and management of natural resources.

Environmental Quality Protection Board

PO Box 100
Koror 96940

Tel: (680) 488-1639/3600
Fax: (680) 488-2963

- Paula Holm
Chairperson
- Mr Lucio Abraham
Executive Officer
- Mr Portia Franz
Lab Supervisor
- Mr Pearl Lynn Marumoto
Environmental Education Officer
- Mr Bob Marick
Environmental Engineer
- Ms Kate Fuller
Legal Council

The EQPB is a statutory body created by law to ensure the following national policies are followed:

- fulfill the responsibility of each generation as trustee of the environment for succeeding generations;
- assure for all Palauans safe, healthful, productive and aesthetically and culturally pleasing surroundings;
- attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences; and
- preserve important historical, cultural and natural aspects of Palauan heritage, and maintain, whenever possible, an environment which supports diversity and variety of individual choice.

EQPB is responsible for regulating and monitoring all earth-moving activities, water quality, potable water use, marine monitoring, sewage and solid waste management and disposal, pesticide use and EIA and EIS. ■

OTHER ICM ORGANISATIONS

Palau Community College

PO Box 9
Koror 96940

Tel: (680) 488-2471
Fax: (680) 488-2447

Mr Mario Katosang
President

Ms Anita Suta,
Vice President
Cooperative Research and Extension (CRE)

Tel: (680) 488-4983

Mr Yimnang Golbuu
Aquaculture Specialist

Tel: (680) 488-2746

Mr Kevin Polloi
Extension Agent

Tel: (680) 488-2746

Ms Carol Emaurois
Director, Science Centre

Tel: (680) 488-1037

The Palau Community College, through its CRE programme, is involved in various research and education activities that relate to the protection of the environment. The Science Centre conducts year-round introductory courses on Palau's natural history and coral taxonomy as well the popular annual science fair. ■

Palau Conservation Society

PO Box 1811
Koror 96940

Tel: (680) 488-3993
Fax: (680) 488-3990
E-mail: pcs@palaunet.com

Dr Minoru F. Ueki
Chairman, Board of Directors

Mr Noah Idechong
Executive Director

Mr Noe Yalap
Community Programme Officer

Mr Tom Graham
Scientific Officer

Ms Charlene Mersai
Rock Islands Programme Coordinator

Mr Flemming Umiich Sengebau
Conservation Officer

The Palau Conservation Society (PCS) is a non-profit non-government environmental organisation devoted to protecting Palau's natural resources. Its mission is to work with the community to preserve the nation's unique natural environment and perpetuate its conservation ethic for the economic and social benefit of present and future generations of all Palauans and for the enjoyment and education of all that visit the islands.

PCS uses a non-confrontational approach and has strong partnerships with local communities, government agencies and the international scientific community. The organisation's goals are:

- to preserve the unique natural environment of Palau;
- to build local community support and public awareness about the benefits derived from protecting Palau's natural systems and environment; and
- to develop and promote desirable economic development.

PCS is directed by an 11-member Board of Directors and operated by a staff of eight who are supported by the services of numerous volunteers, interns and trainees. It is engaged in four activity areas: public awareness, research, resource management and policy development. PCS's successes in these areas and in promoting sustainable development can be traced to its strong partnerships with local communities. PCS is supported by a membership of about 200, numerous partners from Palau's business community and private and governmental overseas sources.

Current activities relating to coastal management include:

- sportfishing development project in the northern reefs and channels (incorporates catch-and-release, reserve areas and legislation);
- rock islands and southern lagoon projects (with Koror and Peleliu states);
- Babeldaob forest and watershed conservation project;
- technical assistance available to states and communities' conservation initiatives;
- dugong protection campaign;
- environmental information packaging and community outreach programme; and
- policy research and advisory roles.

Key publications include *Ngerel a Biib* (Newsletter of the Palau Conservation Society) and various technical reports. ■

Koror State Marine Rangers

PO Box 116
Koror, Palau 96940

Tel: (680) 488-2150
Fax: (680) 488-2862

Mr Adalbert Eledui
Director, Department of Conservation and Law Enforcement

The office of the Koror State Rangers is responsible for ensuring compliance for all Koror State regulations dealing with fishing, boating, recreation and the use of the Rock Islands' zone. Fifteen rangers monitor activities within the Rock Islands on a 24-hour basis. In addition, a group of young people, called Beach Boys, conduct regular cleaning and maintenance of visitor facilities at the Rock Islands. ■

Coral Reef Research Foundation

PO Box 1765
Koror 96940

Tel: (680) 488-5255
Fax: (680) 488-5513

Pat and Lori Colin
Directors

CRRF is a non-profit organisation whose primary objective is to collect marine organisms for chemical screening. Locally available facilities and expertise at the foundation are used also for research that supports and enhances the understanding of natural resources found within Palau. Training and internship arrangements are also available for students in environmental science programmes. ■

The Nature Conservancy—Palau Field Office

PO Box 1738
Koror 96940

Tel: (680) 488-2017
Fax: (680) 488-4550

Dr Andrew Smith
Coastal/Marine Management Specialist
Coastal Marine Programme
Asia/Pacific Region

E-mail: andrew_smith@tnc.org
or: 103732.3465@compuserve.com

The Palau Field Office provides support and services to its local partner NGO, Palau Conservation Society, and state and community groups with the development of coastal and marine management plans, rapid ecological assessments, endangered species surveys (dugongs, turtles, crocodiles), mooring buoys and related conservation activities.

The Palau Field Office also provides coastal/marine management assistance to the other Pacific field offices, and coordinates TNC's Pacific live reef fish trade strategy through the Coastal Marine Programme. ■

SELECTED DOCUMENTS ON ICM

- Canfield, J. E. 1981, 'Palau: Diversity and status of the native vegetation of a unique Pacific island ecosystem', *Newsletter of the Hawaiian Botanical Society*, 20:14-21.
- CoPopChi 1997, *Population and Development; Toward a Palau National Policy for Sustainable Human Development*, Palau National Committee on Population and Children, 87pp.
- Dept. of the Army 1997, *Draft Environmental Impact Statement for Construction of the Palau Compact Road Babeldaob Island, Republic of Palau*, prepared by the US Department of the Army for the US Department of the Interior.
- Elliot, S. 1993, *The Ngerikiil Watershed Inventory and Management Plan*, Palau Environmental Quality Protection Board and University of Oregon Micronesia Program.
- Endress, B. A. 1997, *Upland Landscape Dynamics of Ngeremeduu Bay Drainage Area, Republic of Palau*, MS Thesis, University of Illinois.
- Honigman, L. and DCE 1997, *A Management Plan for Proposed Lake Ngardok Watershed Reserve Melekeok State*, Division of Conservation and Entomology, Republic of Palau, 22pp.
- KenCairn, K. 1992, *Land Use Inventory of Babeldaob*, Palau Division of Agriculture and Mineral Resources and University of Oregon Micronesia Program.
- Maiava, I. and Republic of Palau 1994, *Republic of Palau National Environmental Management Strategy*, SPREP, Apia, Samoa, 108pp.
- Maragos, J. E., Birkeland, C., Cook, C., Des Rochers, K., Di Rosa, R., Donaldson, T. J., Geermans, S. H., Guilbeaux, M., Hirsh, H., Honigman, L., Idechong, N., Lobel, P. S., Matthews, E., McDermid, K. J., Meier, K. Z., Myers, R., Otobed, D., Richmond, R. H., Smith, B., Smith, R. 1994, *Marine and Coastal Areas Survey of the Main Palau Islands: Part 2 Rapid Ecological Assessment Synthesis Report*, CORIAL, Honolulu and The Nature Conservancy Pacific Region.
- Office of Planning and Statistics 1987, *1986 Census of Population and Housing of the Republic of Palau, Koror*.
- SAGRIC 1996, *Palau 2020: National Master Development Plan, The Foundation for Development*, SAGRIC International Pty Ltd, Adelaide, Australia.
- Van Ess, M. 1997, *GIS Land Records Database*, Palau Bureau of Lands and Survey and University of Oregon Micronesia and South Pacific Program.

PAPUA NEW GUINEA



PHYSICAL CHARACTERISTICS

Papua New Guinea (PNG) comprises the eastern half of the island of New Guinea and lies in the southwest Pacific Ocean between 141–163°E and 2–12°S. It is a geomorphologically diverse country comprising the mainland, four large islands (Manus, New Ireland, New Britain and Bougainville) and over 600 smaller islands. The total land area is 459 854 sq km with enormous social, cultural, physical and biological diversity.

The main island is characterised by block-faulted, folded and mountainous interiors with the highest peak, Mt Wilhelm, rising to 4510 m above sea level. The main island's mountainous terrain divides the country north and south and has resulted in the formation of extensive deltaic flood plains (the Sepik/Ramu and the Fly/ Purari), especially along the south coast where fresh-water swamps are common. The total length of the coastline is 17 000 km, of which deltaic flood plains and inshore lagoons account for 4250 km and atolls contribute an additional 5440 km. The extent of the coastal zone is diverse, comprising deltaic flood plains, estuaries, tidal flats and mangrove habitat, beach, near-shore environments such as bays, lagoons, sea-grass beds, coral reefs and

the offshore environment. The PNG Exclusive Economic Zone is 2.4 million sq km.

Almost 97% of PNG is customary land, owned either by individuals or under some form of clan ownership. In the coastal areas, Section 5 of the Customs Recognition Act of the Constitution bestows ownership rights over water, reefs, seabed and fish species to traditional owners. The section states:

- 5b) the ownership by custom of rights in, over and in connection with the sea or a reef, or in or on the bed of the sea or of a river or lake, including rights of fishing; or
- 5c) the ownership by custom of water, or of rights in, over or to water.

In addition to the Customs Recognition Act, various National Acts on Fisheries (1994), Mining and Petroleum (1980), Lands (1980) and the Environment provide the State with the mandate to manage the environment on behalf of the people.

Administratively PNG is divided into 20 provinces. The capital city of Port Moresby, with a population of 350 000, is in the National Capital District. The rest of the country consists of the southern provinces (Western, Gulf, Central, Milne Bay and Oro), the

highland provinces (Southern Highlands, Enga, Western Highlands, Simbu and Eastern Highlands), the northern New Guinea provinces (Morobe, Madang, East Sepik and Sandaun) and the Islands Region (Manus, New Ireland, East New Britain, West New Britain and North Solomons).

Each region is unique in its geomorphology and coastal habitats. The diversity is further enhanced by having 700 different languages amongst a total population of four million people. When applied in the coastal areas of PNG, the Customs Recognition Act produces a wide variety of ways in which coastal zone management can be approached. An approach that may work for a specific coastal community may not apply or be feasible in a nearby community because of different cultural and other characteristics.

Further, each province has its own legislation relating to development and resource management so that, for maritime provinces, coastal zone issues differ according to the kinds of development occurring in the province.

GOVERNMENT STRUCTURE

Papua New Guinea became an independent nation on 16 September 1975 and is governed by a constitutional democracy with executive, legislative and judicial organs. All legislative powers at the national level are vested in the unicameral parliament of 109 elected members with five-year terms. Executive authority is controlled and exercised by the Prime Minister and the appointed cabinet which comprises the National Executive Council. The Prime Minister is elected by parliament and is normally a member who can command an absolute majority.

At the provincial level, the authority of governance is through a provincial cabinet comprising the Governor (who is the elected member to the National Parliament for the province concerned) and the elected Members of the Provincial Assembly (MPAs). The number of MPAs is determined by the area and the population size of the province. MPAs are normally elected for a term of three years to represent a Local Level Council area in the Provincial Assembly. Local level councillors are elected by local communities to control and manage the affairs of the communities.

A major constitutional change in 1995 has led to a large component of the National Budget being re-allocated to the rural areas, hence Local Government Councils or community governments are funded to implement development projects at the local level. This measure is intended to ensure that goods and

services are reaching all areas and communities, as well as non-government organisations such as local church, youth and women's groups.

COASTAL ZONE MANAGEMENT ISSUES

Environmental impact on the coastal zone in Papua New Guinea is principally from land-based activities. These include: copper and gold mining; petroleum (oil and gas) production; forestry; agriculture schemes for oil palm, coconut, cocoa and coffee; fish canning waste disposal; urban waste disposal; and local depletion of mangrove forests for firewood and building timber.

Mining results in increased sediment loads into the major rivers draining the sea (Ok Tedi copper mine in the Western Province and Porgera gold mine in Enga Province) as well as direct mine waste disposal into the ocean (Misima Island and Lihir Island gold mines). New mine leases for submarine and land-based nickel deposits have been taken out by mining companies and these will pose new environmental issues in coastal areas, especially in the case of submarine nickel mining. The current lease is for the Bismarck Sea, a lucrative fishing area for PNG's tuna fishery. The coastal zone management issues arising from mineral resource development over large tracts of ocean in the Bismarck Sea will be of national importance.

Chevron Niugini has rapidly developed the petroleum industry in PNG, and a large number of oil and gas fields have been in production for some time in the Southern Highlands Province. The current pipeline for petroleum and gas runs from the Gobi/ Moran and Kutubu fields in the Southern Highlands into the Gulf of Papua where the Kumul Platform provides a depot for large petroleum vessels to load and ship the petroleum overseas. The Kumul Platform sits in the middle of PNG's small but valuable Gulf of Papua prawn fishery. The most recent development is the proposed gas pipeline from the Gulf of Papua to Gladstone in North Queensland, Australia. The draft Environmental Impact Assessment has been completed from the Queensland perspective, and the submarine pipeline is scheduled to be laid in 1999.

Under government law, the mining companies themselves monitor the extent and magnitude of impact from the mining and petroleum sector. Ok Tedi mining waste into the Fly River system has killed some 200 km of the river and has resulted in the shallowing of coastal deltas. Certain commercial fisheries, such as that for barramundi which depended on the Fly River for annual breeding migrations, could not be sustained and the

commercial fishery has collapsed. The Australian Government is now initiating a ICM project with the PNG Government to put in place a ICM plan for the Western Province.

Opportunities for oil spills and gas leaks causing fires is a real issue. In response to this potential risk area, the Department of Transport, Marine Division has an Oil Spill Unit to respond to any future oil spills.

Agriculture and forestry contribute to increased soil erosion and increased sediment loads into rivers draining the sea. Oil palm factory waste has been dumped into coastal areas (West New Britain) causing the smothering and death of nearby reefs. Large tracts of coastal land were developed as coconut and oil palm estates at the turn of the century, with unknown impacts on adjacent marine areas.

Urban waste such as raw sewage (urban centres) and untreated cannery waste (Morobe Province) have degraded the quality of the coastal zone in some areas. Coastal communities also use the sea directly for human waste disposal. On the Papuan coast (Central Province) the Motuan lifestyle of living in houses built over the water has led to direct output of raw sewage into coastal waters. This is especially an issue for Port Moresby where high loads of raw sewage go directly into the sea. As a result Port Moresby's Ela Beach is polluted with high levels of *Escherichia coli* and is now a health hazard that cannot be used for swimming.

Most of PNG's coastal wetlands are intact and there has not been much land-filling. In certain coastal communities localised seashore degradation has resulted from the use of mangroves for house posts and firewood. In Port Moresby, the National Capital District Interim Council has an ongoing mangrove reforestation programme with villagers on the Motuan coast.

In the near-shore reef areas, impacts on reef communities result from the use of derris root and dynamite fishing. The National Fisheries Authority (NFA) has the mandate to prosecute these offences, and some local people have been jailed for the use of dynamite. The NFA has also banned live reef fishing using cyanide by Chinese operators in coastal communities as localised damage to reefs and non-target species of fish was occurring. In addition, the NFA has control over impacts by large-scale commercial fishing boats (prawn trawlers and tuna longliners), although dumping of by-catch may be occurring.

For coastal and international shipping, the Department of Transport is responsible for implementing international and national legislation concerning waste dumping at sea.

Issues facing coastal zone management for Papua New Guinea may be summarised as:

- oil and gas spills;
- coral reef, coastal lagoons and deep sea sedimentation, eutrophication and pollution;
- loss of soil fertility;
- extinction of certain fisheries;
- coastal pollution from human waste;
- over-harvesting;
- destruction of coastline resulting from the removal of mangroves; and
- pollution of coastal areas from urban development and deep sea mining.

In implementing PNG's fourth national goal, to conserve natural resources and environment, the Department of Environment and Conservation has declared various marine parks throughout the country:

- Nanuk Island Provincial Park, Rabaul in East New Britain Province;
- Maza Wildlife Management Area, Maza/ Fly delta, Western Province;
- Ndrolowa Wildlife Management Area, Manus Province;
- Talele Island Provincial Park and Nature Reserve, Rabaul, East New Britain Province;
- Long and Crown Island Wildlife Management Area, Madang Province;
- Bagiai Wildlife Management Area, West New Britain Province; and
- Horseshoe Reef Marine Park, Central Province.

PNG has also undertaken a Conservation Needs Assessment that identified 30 priority areas for conservation of critical marine habitats. Although recommended sites are yet to be investigated or declared as conservation areas, a number of marine protected areas are currently being proposed in Milne Bay Province, with funding being sought from the Global Environment Facility. The other on-going proposed coastal zone protection activity is the Western Province Coastal Zone Management Project. Funded by AusAID, this was implemented towards the end of 1998.

ENVIRONMENTAL LEGISLATION

The Department of Environment and Conservation administers eight pieces of environmental legislation:

- Environmental Planning Act 1978 (Chapter No. 370);
- Environmental Contaminants Act 1978 (Chapter No. 368);
- Conservation Areas Act 1978 (Chapter No. 362);
- National Parks Act 1982 (Chapter No. 157);
- International Trade (Fauna and Flora) Act 1980 (Chapter No. 391);
- Fauna Protection and Control Act 1974 (Chapter No. 154);
- Crocodile Trade (Protection) Act 1982 (Chapter No. 213); and
- Water Resources Act 1982 (Chapter No. 206).

The Department also administers certain parts of the following:

- Dumping of Wastes at Sea Act (Chapter 369, Sections 6 and 7) that deals with permits to dump wastes in emergency circumstances and procedure for representations to the Minister on actions of prescribed officers; and
- Mining Act (Chapter 363), the Ok Tedi Agreement and the Supplementary Agreement (in relation to environmental matters).

Other national legislative instruments relevant to ICM are:

- Fisheries Act of 1994 (implemented by the National Fisheries Authority);
- National Seas Act;
- Land Act of 1980 (implemented by the Lands Department); and
- Mining and Petroleum Act (1980).

In 1993, Greenpeace International and the DEC organised a Coastal Zone Management Workshop in Port Moresby which brought together all government line departments, private sector representatives and 60 village resource owners from the provinces. The workshop aimed to formulate the background to a submission by DEC for a comprehensive coastal zone management legislation for PNG. However a lack of internal support for this work within DEC has delayed the establishment of such legislation. Currently government organisations, NGOs and other groups working in the coastal areas operate on their own initiative and mandate with no formal requirement to work together.

COASTAL ZONE MANAGEMENT RESPONSIBILITIES

The Department of Environment and Conservation, acting as the overall environmental protection agency, controls all coastal management responsibilities at the national level.

Under this umbrella organisation, all the other pieces of national legislation regulating the use of natural resources and development have specific clauses to implement the fourth National Goal of Papua New Guinea, which is:

“... for Papua New Guinea’s natural resources and environment to be conserved and used for the collective benefit of future generations.”

Under the DEC, the other responsible agencies for coastal zone management are:

- Department of Agriculture and Livestock;
- National Forest Authority;
- National Fisheries Authority;
- Department of Mining and Petroleum;
- Department of Lands;
- Department of Commerce and Industry;
- Department of Foreign Affairs; and
- Provincial Authorities for the 20 Provinces of Papua New Guinea.

Irrespective of sector, all major development projects or proposals worth K 250 000 or more must meet the requirements of all national and provincial legislation before the National Executive Council approves them. Projects must also be approved by the DEC, which requires Initial Environmental Assessments and an Environmental Impact Statement (EIS) detailing all the potential impacts of the project including socioeconomic impacts, waste disposal methods, and mitigating and monitoring measures.

To administer the process, the administrative heads of National Government organisations (Secretaries, Executive Directors or Managing Directors) sit on a Government Major Projects Committee to assess any major project before it is considered by the National Executive Council. Thus, while there is no overall coastal zone management legislation that integrates all national and provincial legislation, NGOs and resource owners into a unified approach towards coastal zone management, the current legislation and the structures of the various government bodies are

sufficient to allow appropriate coastal zone management arrangements to be put in place.

International matters relating to offshore or coastal waters are handled by the Department of Foreign Affairs, which takes the lead role in organising bilateral or multilateral arrangements with foreign states. PNG's 200 mile EEZ has boundaries with Indonesia, Australia, Solomon Islands and the Federated States of Micronesia. PNG has a treaty with Australia, the Torres Straits Treaty, to jointly manage coastal resources in PNG's Western Province and Australia's North Queensland area of the Torres Straits. The treaty defines management arrangements for the use of coastal resources in the area. Where commercial fisheries occur on either side of the treaty border, single stock management arrangements have been put in place to manage those resources. Papua New Guinea is also a signatory to various other international conventions relating to the protection and management of coastal resources.

In relation to the fisheries sector, the 1994 Fisheries Act requires that all major fisheries have a management plan which tries to meet the needs of all stakeholders in the coastal areas (resource owners, resource users, government, NGOs and so on). Five Fishery Management Plans (FMPs) have been approved and gazzetted: bêche-de-mer FMPs for Manus, New Ireland and Western Province, and prawn FMPs for the Gulf of Papua and the Orangerie Bay area of Milne Bay Province. There are about 20

draft FMPs for other coastal fisheries as well as for the tuna fishery.

The legislated mandate of the National Fisheries Authority is to manage fish resources and to ensure that all stakeholders are informed of any proposed projects. Whilst mechanisms for gathering information and managing the major commercial or industrial fisheries are in place, near-shore coastal management presents an ongoing dilemma due to the Customs Recognition Act, which requires harmonisation of current management practices with traditional practices. Although the coastal environment and resources belong to customary land and sea owners, national and provincial legislation is in place to allow the State to act as manager of the coastal zone under the different Acts mentioned previously.

Awareness of environmental issues at the community level is being promoted by a number of non-government organisations, including private non-profit organisations with an interest in conservation and development. These organisations include Conservation Melanesia Inc., the World Wide Fund for Nature, Conservation International, The Nature Conservancy, Greenpeace, the Foundation for the Peoples of the South Pacific, and a number of churches and women's groups. Most environmental awareness-raising activities are targeted towards the forestry sector, as industrial logging has become a major issue in PNG. It is only in the last few years (since 1993) that coastal zone management has been raised as a national issue.

MAIN ICM ORGANISATIONS

Department of Environment and Conservation

| | |
|--|---|
| PO Box 6601 Boroko, NCD. | Tel: (675) 327-7391/7393 Fax: (675) 301-1689/1691/1694 |
| Dr Wari Iamo Secretary | Tel: (675) 301-1606 Fax: (675) 301-1691 |
| Mr Vagi Renagi Genorupa Senior Conservation Planner | Tel: (675) 301-1625 Fax: (675) 301-1694 |
| Mr Navu Kwapena Director, Nature Conservation | Tel: (675) 301-1631 Fax: (675) 301-1694 |
| Mr Mick Naimegi Raga Assistant Director | Tel: (675) 301-1632 Fax: (675) 301-1694 |

The DEC's mission is to ensure that PNG's natural and physical resources are managed to sustain environmental quality and well-being. The objectives of this government agency are:

- to develop and implement appropriate policies for the effective management of natural resources for the benefit of the people in a sustainable manner;
- to ensure that people are actively involved in the development of policies and projects and are well

informed about the activities of the department;

- to conserve the diverse natural, physical and cultural resources of Papua New Guinea; and
- to be a competent and professional department with a reputation of being effective.

The Department of Environment and Conservation has a total workforce of 233 staff (128 permanent, 102 temporary and 3 expatriate contract officers) organised in the following sections: Minister's Office; Secretary's Office; Policy and Planning Section; Finance and Administrative Division; Environment Division; Environment Planning and Assessment Section; Mine Monitoring Section; Environment Protection Section; Nature Conservation Division; Species Management Section; Resource Inventory Section; Crocodile Monitoring Unit; and National Parks Section.

Currently there is only one Coastal Management Officer who, together with the department, is charged with:

- developing coastal management policy and advice to the Government;
- undertaking coastal environmental and social impact assessment of development projects including forestry, mining and fisheries proposals;
- control and regulation of pollution and hazardous substances;
- establishment, protection and conservation of flora and fauna and management of national marine protected areas; and
- provision of environmental information and advocating environmental policies relating to coastal areas.

The department recognises the need to develop a Coastal Zone Management Strategy that will address many of the environmental concerns at both the national, provincial and community levels. No such strategy has yet been developed although two Integrated Coastal Zone Management projects have been completed by consultants with funding from the Asian Development Bank. ■

National Fisheries Authority

PO Box 2016
Port Moresby

Tel: (675) 321-2643
Fax: (675) 320-2074/ 2061

Mr Dennis Renton
Executive Director

Mr Joel Opnai
Executive Manager, Management and Industry Support Division

Ms Ursula Kolkolo
Manager, Research and Management Branch

The National Fisheries Authority is responsible for managing the fisheries resources of Papua New Guinea. Its mandate is to develop fisheries resources in such a manner so as to conserve fisheries resources for succeeding generations. The authority has about 300 staff, organised into three divisions; Licensing and Surveillance, Fisheries Management and Industry Support and Corporate Services. The authority licenses and regulates all fishing and aquaculture activities. The management of fisheries resources is governed by fishery management plans that detail how much can be taken out, what gears may be used, fishing seasons, allowable catches, licensing periods and so on. The authority also implements regional fishing arrangements with other South Pacific island countries, especially in relation to the tuna fishery. ■

Provincial Governments

PNG's 19 provincial governments are all involved in resource and land development and management activities that may impact on the coastal zone. Even land-locked provinces may affect the coastal zone through the far-reaching impacts of major development activities such as mining and forestry.

Each provincial government is structured individually, with different departments fulfilling various functions depending on the priorities of each province. The contact details for the local government offices in each province are shown below. Where possible the address given is for the department of the province in question, since this is the location of provincial technical agencies and officers.

| | |
|---|--|
| Central Province (Department of) Free Mail Bag Service, Konedobu | Tel: (675) 321-2676 Fax: (675) 321-3895 |
| East New Britain Province (Department of) PO Box 714, Rabaul | Tel: (675) 983-7876 Fax: (675) 983-7877 |
| East Sepik Province (Department of) BMS Free Mail Bag, Wewak | Tel: (675) 856-2962 Fax: (675) 856-2220 |
| Eastern Highlands Province (Department of) PO Box 1310, Goroka | Tel: (675) 732-2644 Fax: (675) 732-2914 |
| Enga Province (Department of) PO Box 109, Wabag | Tel: (675) 547-1268 Fax: (675) 547-1269 |
| Fly River Provincial Government PO Box 51, Daru | Tel: (675) 645-9042 Fax: (675) 645-9042 |
| Gulf Province (Department of) PO Box 87, Kerema | Tel: (675) 648-1068 Fax: (675) 648-1119 |
| Madang Province (Department of) PO Box 2108, Madang | Tel: (675) 852-1183 Fax: (675) 852-3237 |
| Manus Province (Department of) PO Box 37, Lorengau | Tel: (675) 470-9212 Fax: (675) 470-9214 |
| Milne Bay Province (Department of) PO Box 104, Alotau | Tel: (675) 641-1256 Fax: (675) 641-1486 |
| Morobe Province (Department of) PO Box 572, Lae | Tel: (675) 472-1600/ 1700 Fax: (675) 42-2347 |
| New Ireland Province (Department of) PO Box 130, Kavieng | Tel: (675) 984-2175 Fax: (675) 984-2346 |
| North Solomons Province (Department of) PO Box 322, Buka Province | Tel: (675) 983-9797/ 9809 Fax: (675) 983-9798 |
| Oro Province (Department of) PO Box 132, Popondetta | Tel: (675) 329-7345 Fax: (675) 329-7525 |
| Sandaun Province (Department of) PO Box 126, Vanimo | Tel: (675) 857-1324 Fax: (675) 857-1322 |
| Simbu Province (Department of) PO Box 192, Kundiawa | Tel: (675) 735-1044/155/ 1350 Fax: (675) 735-1024 |
| Southern Highlands Province (Department of) PO Box 249, Mendi Province | Tel: (675) 549-1199 Fax: (675) 549-1364 |
| West New Britain Province (Department of) PO Box 287, Kimbe | Tel: (675) 983-5432 Fax: (675) 983-5298 |
| Western Highlands Province (Department of) PO Box 419, Mount Hagen | Tel: (675) 542-2296 Fax: (675) 542-2316 |
| Western Province (Department of) PO Box 24, Daru | Tel: (675) 645-9170 Fax: (675) 645-9236 |

SELECTED DOCUMENTS ON ICM

University of Papua New Guinea

| | |
|---|--|
| PO Box 320, University PO Waigani, NCD | Tel: (675) 326-7181 Fax: (675) 326-7187/ 0369 |
|---|--|

| | |
|---|---------------------------|
| Dr David Mowbray Associate Professor and Coordinator, Environmental Science | Tel: (675) 326-7392/ 7659 |
|---|---------------------------|

Prof. Lance Hill
Head, Department of Biology

| | |
|---|---------------------------|
| Dr Ricardo Federizon Head, Fisheries Section | Tel: (675) 326-7210/ 7183 |
|---|---------------------------|

The University of Papua New Guinea is an academic institution that provides PNG with a qualified source of scientists in physics, chemistry, biology and geology. The Biological Sciences programme is a general programme established to provide biology students with a broad biological knowledge of the functions and integrity of terrestrial and marine ecosystems. Various streams (biochemistry, microbiology) are available in the biological sciences, including fisheries and environmental science. The fisheries section also provides specific training in fisheries science and fishing gear technology. ■

Department of Lands and Physical Planning

| | |
|-----------------------|--|
| PO Box 5665 Boroko | Tel: (675) 301-3123 Fax: (675) 301-3139 |
|-----------------------|--|

| | |
|---|--|
| Mr Maurice Alaluku Secretary/ Head of Department | Tel: (675) 301-3116 Fax: (675) 301-3299 |
|---|--|

The Lands Department is responsible for surveying and registering all land (government, local land and business land) within Papua New Guinea. ■

Land Titles Commission

| | |
|----------------------------|--|
| PO Box 815 Port Moresby | Tel: (675) 323-0138 (temporary) Moving to new office. |
|----------------------------|--|

Mrs Joespha Kanawi
Chief Lands Title Commissioner

The Lands Title Commission is responsible for all customary land that is sold to the Government or is used by mining, forestry and petroleum industries. ■

National Lands Commission

| | |
|-----------------------------|---------------------|
| PO Box 1825 Port Moresby | Tel: (675) 323-0138 |
|-----------------------------|---------------------|

Mr Nathanael Marum
Commissioner

The Lands Commission is directly responsible for organising land compensation to landowners as, prior to colonisation, all land was locally-owned. ■

Department of Transport and Works

| | |
|-----------------------|--|
| PO Box 1108 Boroko | Tel: (675) 300-2303 Fax: (675) 300-2304 |
|-----------------------|--|

Mr Henry Veratau
Secretary

Mr Lister Heni
Director for Transport

| | |
|---|--|
| Mr Chris Rupen First Assistant Director, Maritime Division | Tel: (675) 321-1866 Fax: (675) 321-4968 |
|---|--|

This is a government department that is responsible for public transport, roads, bridges, buildings and shipping in PNG. The Maritime Division is directly responsible for implementing the Merchant Shipping Act and any international conventions on marine pollution to which PNG is a signatory. The division controls and manages shipping, deployment and maintenance of navigation aids, registration and surveys of all sea-going vessels and certification of seaman. It has offices in all major seaports in PNG: Port Moresby, Lae, Rabaul, Madang and Wewak. A large part of the marine responsibilities is to produce marine charts for PNG. The division also has an Oil Spills section that was set up to manage oil spills and fires. ■

National Parks Service

| | |
|-----------------------|--|
| PO Box 5749 Boroko | Tel: (675) 301-1630 Fax: (675) 325-4372 |
|-----------------------|--|

| | |
|------------------------------------|---------------------------|
| Mr Mick Raga Assistant Director | Tel: (675) 301-7210/ 7183 |
|------------------------------------|---------------------------|

The National Parks Service is under the Department of Environment and Conservation. The mandate is to establish national parks, both terrestrial and marine parks for conserving biodiversity and providing a balanced approach to resource use. ■

Tourism Promotion Authority

| | |
|-----------------------|--|
| PO Box 7144 Boroko | Tel: (675) 320-0211 Fax: (675) 320-0233 |
|-----------------------|--|

| | |
|-----------------------------------|---------------------|
| Mr Kevin Burns Chief Executive | Tel: (675) 327-6560 |
|-----------------------------------|---------------------|

The authority's mandate is to promote PNG as a tourist destination through advertising and roadshows. ■

Department of Mining

| | |
|--|--|
| Private Mail Bag Port Moresby Post Office | Tel: (675) 321-4011/ 322-7600 Fax: (675) 321-7958 |
|--|--|

| | |
|-------------------------------|---------------------|
| Mr Akoka Akoitai Secretary | Tel: (675) 327-6560 |
|-------------------------------|---------------------|

The department approves all mining leases in PNG, including those for submarine mining of nickel deposits. ■

Department of Petroleum and Energy

PO Box 1993
Port Moresby

Tel: (675) 320-1199
Fax: (675) 320-1141

Mr Joseph Gabut
Secretary

Tel: (675) 327-6560

The department is responsible for regulating and licensing all oil and gas development within PNG. In line with the sustainable development requirements of the Constitution, all petroleum industries are complying with the environmental monitoring requirements of the Petroleum Act. Any development of submarine sources of petroleum products will also be subject to environmental requirements. The department is also responsible for all geological surveys and for assessing the energy requirements for PNG. ■

Christensen Research Institute

PO Box 305
Madang

Tel: (675) 852-3011
Fax: (675) 852-3011

The Christensen Research Institute was initially established to document PNG's use of plants and register insect species in tropical rainforests in Madang. More recently, the institute has become engaged in marine ecosystem studies and providing fellowships for international postgraduate students doing tropical marine research. The centre has housing facilities, a wet and dry laboratory and diving equipment, and actively provides a facility for international researchers interested in tropical ecosystems ■

Melanesian Environment Foundation Inc.

PO Box 4830
Boroko

Tel: (675) 325-8063
Fax: (675) 325-2917

Lester Seri
Chairman, Board of Directors

The focus of this organisation is environment awareness, education and information dissemination on the environment, specifically terrestrial ecosystems. The foundation also operates an environmental resource centre. ■

Foundation for the Peoples of the South Pacific

PO Box 1119
Boroko, NCD

Tel: (675) 325-8470
Fax: (675) 325-2670

Mr Yati Bun
Executive Director

Mr Navu Pala
First Secretary

The organisation has five main programmes, largely on community development.

- **Awareness community theatre.** This programme uses theatre as a vehicle to educate people on health and nutrition issues.
- **Literacy education awareness development programme (LEAD).** LEAD provides training and education for illiterate people in urban settlements and rural areas. Educational material is translated as books, pamphlets or other literature into a language that is commonly spoken in those community settings. The languages used are pidgin or motu.

- **Helping grassroots people with opportunities for work.** This programme deals with issues related to health, nutrition and agriculture. The main emphasis is on agriculture, where people at 'grassroots' level are trained and encouraged to become self-reliant by engaging in small-scale agricultural projects, especially in the production of peanut butter.
- **Eco-forestry programme.** This involves the provision of information, advice and training to resource owners, so that the resource can be properly surveyed and managed on a sustainable basis. It also includes programmes on reforestation and a seedling nursery. The foundation is involved in collaborating with international NGO groups such as "Forest Stewardship Conservation" (FSC) in standardising and formulating guidelines, procedures and so on, for effective management and sustainability of natural resources;
- **Integrated Conservation and Development (ICAD).** This project involves eco-tourism and conservation activities essentially for the preservation of resources for educational and tourism purposes. Currently the project is based in the Lake Kamu Basin (Gulf of Papua). ■

The Nature Conservancy

c/o Research Conservation Foundation of PNG
 PO Box 2750
 Boroko, NCD
 Tel: (675) 323-0699
 Fax: (675) 323-0397

Mr Wep Kanawi
 PNG Projects Manager
 E-mail: wkanawi@tnc.org

Mr Shannon Seeto
 Marine Project Coordinator, Kimbe Bay, West New Britain
 Tel: (675) 983-4241
 Fax: (675) 983-4241
 E-mail: 104471.3713@compuserve.com

TNC's PNG programme has a marine branch in Kimbe Bay, West New Britain, where it has established the Mahonia na Dari (Guardians of the Sea) Research Station, completed a rapid ecological assessment, and is currently involved with community awareness and management. The PNG programme has assisted the National Government with the development of a live reef fish management plan and the establishment of a conservation trust fund with seed money from the Japanese Government. ■

Village Development Trust

PO Box 2397
 Lae, Morobe Province
 Tel: (675) 472-4824
 Fax: (675) 472-4824
 E-mail: vdt@pactok.peg.apc.org

Mr Zibe Sasa
 Director

This NGO is based in Lae, Morobe Province and was initially established to promote sustainable forest development by setting up what is commonly known in PNG as 'wokabout somil'. That is, instead of large forestry projects, local people can log timber and process the timber themselves. This NGO is now moving into marine conservation. They have a training centre and a guest house in Salamaua District, Morobe Province. ■

Conservation International

PO Box 106
 Waigani, NCD
 Tel: (675) 325-4234
 Fax: (675) 325-4234
 E-mail: 100357.3125@compuserve.com

Mr Gaikovina R. Kula
 Country Director

Ms Maureen Ewai
 Assistant Director

This NGO is involved in sustainable resource management largely on terrestrial ecosystems; however, over the last four years it has moved into marine conservation programmes. The organisation has completed a rapid resource survey of reefs in Milne Bay Province and is currently working on an integrated marine resource development and management project expected to be funded by the Global Environment Facility. This project will involve government and non-government organisations. The organisation also has another marine programme in Madang Province, and is documenting medicinal plant uses in PNG. ■

Conservation Melanesia Inc.

PO Box 735
Boroko, NCD

Tel: (675) 323-2758
Fax: (675) 325-2773

Ms Carroll Poyep
Executive Director

Ms Anita van Breda
Advisor

Mr Willie Asigau
Programme Director

The focus of this NGO is on community resource conservation and development programmes, and capacity building of community organisations for conservation and management. The organisation runs leadership and business development training courses, promotes participatory rural action planning, and carries out conservation needs assessment and biodiversity surveys.

The organisation is mostly involved in conducting and carrying out marine biodiversity surveys in the coastal waters of PNG, with the main emphasis on marine conservation. Its programme involves studying corals, reefs, sea-grasses and so on. The organisation is planning a survey in the Collinwood Bay (Popondetta). ■

World Wide Fund for Nature (WWF)

PO Box 8280
Boroko, NCD

Tel: (675) 323-9855
Fax: (675) 320-3431

Mr Kelly Kalit
National Coordinator

The WWF branch in Port Moresby is managed from the regional South Pacific office based in Fiji, which coordinates programmes in PNG and other South Pacific island countries. Its mandate is to promote sustainable resource use. Although the regional programme includes a range of coastal management activities, the PNG programme focuses on forest management and other terrestrial issues. ■

United Nations Development Programme

PO Box 1041
Port Moresby

Tel: (675) 321-2877
Fax: (675) 321-1224

Ms Elizabeth Reid
Resident Representative, Port Moresby

The Resident Representative will be appointed in July 1998. The mandate of the United Nation's Development Programme is to promote sustainable human development, focusing on governance, environment and natural resource management, and sustainable rural livelihood. The programme administers various projects funded through the Global Environment Facility. See also UNDP regional office entry under 'Regional' section. ■

Papua New Guinea University of Technology

| | |
|--------------------------------|--|
| PO Box Private Mail Bag Lae | Tel: (675) 473-4551 Fax: (675) 475-7667 |
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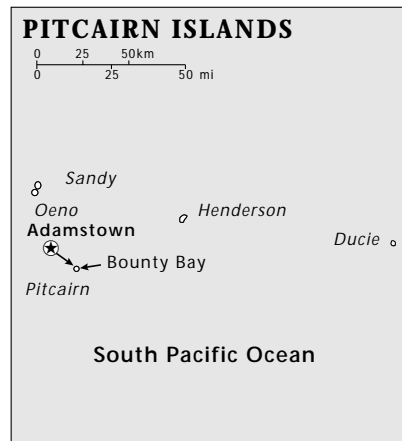
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|--|--|
| Prof. M. R. Khan Head, Department of Applied Sciences | Tel: (675) 473-4550 Fax: (675) 475-7505 |
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Relevant programmes under the Applied Sciences Department include Applied Chemistry and Food Technology. These are organised into a four-year degree programme. Graduating students often find employment with mining companies and government organisations such as the National Fisheries Authority and the Health Department (which implements the Pure Foods Act as well as the National Quarantine Inspection Authority). ■

SELECTED DOCUMENTS ON ICM

- Agrodev Canada 1990, *Inception Report*, Department of Fisheries. Fisheries and Coastal Resources Management and Development Project—Papua New Guinea, Asian Development Bank Technical Assistance No. 1306-PNG. Agrodev Canada Inc.
- Agrodev 1991, *Brief on Proposed Programme*, Fisheries and Coastal Resources Management and Development Project—Papua New Guinea, Asian Development Bank Technical Assistance., No. 1306-PNG. Agrodev Canada Inc. 78 pp.
- Asian Development Bank 1994, *Institutional Strengthening of the Department of Fisheries and Marine Resources*. TA. Number 2022-PNG, Report 4.
- Asian Development Bank (1995). Fisheries Management Project, Marine Fisheries Sector Plan and Provincial Fisheries Profiles. TA. Number 2258-PNG.
- Kailola, P. J. 1995 *Fisheries Resources Profiles: Papua New Guinea*, FFA Report No. 95/45.
- McGregor, K. 1993, *Proceedings of the Papua New Guinea Coastal Resources Management Workshop*.
- Papua New Guinea Biodiversity Country Study: The Costs and Benefits of Conserving PNG's Biodiversity*, Dept. of Environment and Conservation Resource Centre, PNG.
- Schug, M. D. 1994, *Customary and Aquatic Tenure In Papua New Guinea: A Bibliography with Extracts*, East-West Centre, Honolulu, Hawaii, 22 pp.
- Stockwell, A. B. and Turnbull, A. D. 1991, *A Report on Coastal Resource Utilization and Management*, Fisheries and Coastal Resources Management and Development Project-Papua New Guinea, Asian Development Bank Technical Assistance. No. 1306-PNG.. Agrodev Canada Inc. p78.

PITCAIRN ISLANDS



PHYSICAL CHARACTERISTICS

Pitcairn Islands, a British Dependent Territory, includes Pitcairn itself as well as the three uninhabited islands of Oeno, Ducie and Henderson.

Pitcairn is only 3 km long by 1.5 km wide and has a land area of about 450 ha. It is situated at 25.04°S latitude and 130.06°W longitude, about 2160 km southeast of Tahiti. Oeno, which lies about 120 km northwest of Pitcairn, is a low atoll some 3.5 km in diameter. Henderson, about 168 km east-northeast of Pitcairn, is roughly rectangular in shape, about 7 km by 5 km, and is formed of upraised coral limestone about 30 m high. Ducie, an atoll, is the most easterly of the group, lying about 470 km east of Pitcairn. Oeno and Henderson are visited occasionally by Pitcairners who gather wood for carving, seashells and other items.

The Pitcairn Islands are extremely remote, being visited only about four times a year by scheduled supply ships. In addition, passing cargo vessels and cruising yachts make about 100 visits per year. The population is only about 65 persons, all of whom live on Pitcairn itself.

GOVERNMENT STRUCTURE

The 1940 Constitution provides for a Governor of Pitcairn, Henderson, Ducie and Oeno Islands, representing the British Monarch. Since 1970 the Governor has concurrently held the post of British

High Commissioner in New Zealand. An island magistrate is elected every three years to preside over the Island Court (which has limited jurisdiction) and the Island Council. The Local Government Ordinance of 1964 constituted an Island Council of ten members. In addition to the Island Magistrate, five members are elected annually, three are nominated for terms of one year (the Governor appoints two of these members at his own discretion), and the Island Secretary is an ex-officio member. Liaison between the Governor and the Island Council is conducted by a Commissioner, usually based in the Office of the British Consulate-General in Auckland, New Zealand.

COASTAL ZONE MANAGEMENT ISSUES

Given the remoteness of the islands, lack of development or any real potential for such, limited communications and greatly reduced population, there are now few if any major environmental or coastal management concerns. Illegal fishing within the EEZ is a concern but not one that the administration is currently able to do much about.

ENVIRONMENTAL LEGISLATION

On 9 November 1992, Britain declared an Exclusive Economic Zone around the islands, but there is no specific legislation relating to management of the coastal zone. In 1988 Henderson Island was added to UNESCO's World Heritage list.

MAIN ICM ORGANISATIONS

Pitcairn Island Council

The Square, Adamstown
Pitcairn Island

Tel: (872) 144-5372
Fax: (872) 144-5373

Jay Warren
Island Magistrate and Chairman of the Island Council

The Island Council's mandate is to manage the islands, including the coastal zone. ■

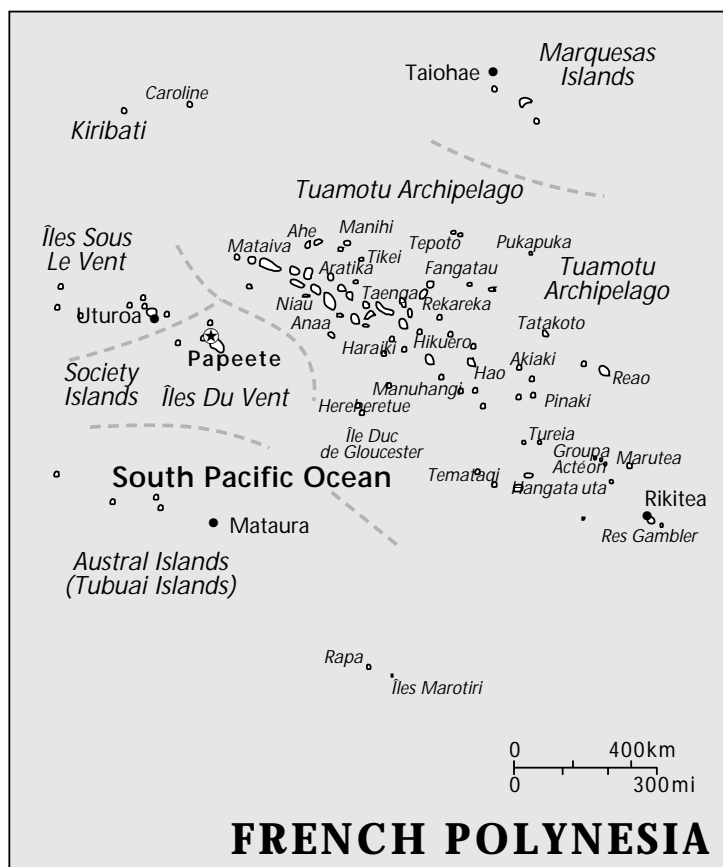
Office of the Governor of Pitcairn, Henderson, Ducie and Oeno Islands

c/o British Consulate-General Tel: (64) 9-366-0186
Private Bag 92014, Auckland, New Zealand Fax: (64) 9-303 1836

Mr Leon Salt
Commissioner for Pitcairn

The Commissioner oversees the government of the islands. This is an alternative contact for the Pitcairn Island Council. ■

POLYNÉSIE FRANÇAISE/ FRENCH POLYNESIA



ORGANISATION DU TERRITOIRE

La loi organique n° 96-312 du 12 avril 1996 modifiée portant statut d'autonomie de la Polynésie française, avec la loi n° 96-313 du 12 avril 1996 complétant le statut d'autonomie interne de la Polynésie française. Les collectivités sont l'Etat, le Territoire et les communes.

L'ETAT

L'Etat a pour compétences principales la sécurité du Territoire, la défense, le droit et la justice, la monnaie, les relations extérieures, l'enseignement supérieur et l'administration des communes. Il est représenté par le Haut-Commissaire qui veille à la légalité des actes des autorités du Territoire et exerce un contrôle à posteriori auprès du Tribunal administratif.

ORGANISATION OF THE TERRITORY

The modified organic law No 96-312 and law No 96-313 of 12 April 1996 together confer a status of internal autonomy (within the French Republic) upon French Polynesia. The administrative units are the State, the Territory and the Municipalities.

THE STATE

The State's main areas of responsibility are Territorial security, defence, law and justice, currency, external relations, higher education and the administration of the municipalities. It is represented by the High Commissioner who ensures that the actions of the Territorial authorities are within the law, and carries out a posteriori checks with the Administrative Tribunal.

LE TERRITOIRE

Toutes les compétences, dans les matières non réservées à l'Etat, sont données au Territoire, et en particulier les compétences en matière d'environnement. Les institutions territoriales comprennent l'Assemblée de la Polynésie française, le Gouvernement de la Polynésie française et le Conseil Economique, Social et Culturel.

L'Assemblée de la Polynésie française qui détient le pouvoir législatif, est composée de 41 conseillers élus au suffrage universel pour cinq ans. Elle exerce un contrôle politique sur le gouvernement et vote le budget.

Le Gouvernement est responsable devant l'Assemblée. Il comprend un Président élu par l'Assemblée de la Polynésie française parmi ses membres et des ministres désignés par lui. Le Président du Gouvernement est le chef de l'exécutif et à ce titre représente la Polynésie française. Il est le chef de l'administration de la Polynésie française et l'ordonnateur du budget. Le Conseil des Ministres est chargé collégalement et solidairement des affaires de sa compétence.

Compétences en matière de gestion des zones côtières

Les compétences en matière de gestion des zones côtières incombent essentiellement au Territoire. Le seul service d'Etat impliqué dans la gestion des zones côtières est le Service de la Navigation et des Affaires Maritimes.

THE TERRITORY

In areas that are not the State's preserve, all powers are given to the Territory, in particular those powers relating to the environment. The Territorial institutions include the Assembly of French Polynesia, the Government of French Polynesia and the Economic, Social and Cultural Council.

The Assembly of French Polynesia, holding the legislative power, consists of 41 Councillors elected by universal suffrage for five years. It exercises political control over the Government and passes the budget.

The Government is responsible to the Assembly. It consists of a President elected by the Assembly of French Polynesia from within its members, and ministers appointed by him. The President of the Government is the head of the executive and, in this capacity, represents French Polynesia. He is the head of the administration of French Polynesia and has authority to pass the budget. The Council of Ministers is collectively and jointly responsible for the matters within its jurisdiction.

Powers relating to coastal zone management

The powers relating to coastal zone management are in essence the Territory's responsibility. The only national government department involved in coastal zone management is the Navigation and Maritime Affairs Department.

ORGANISMES RESPONSABLES DE LA GESTION DES ZONES CÔTIÈRES

ORGANISATIONS RESPONSIBLE FOR COASTAL ZONE MANAGEMENT

Délégation à l'Environnement

Environment Delegation

BP 4562
Papeete

Tel: (689) 432409
Fax: (687) 419252

Mme Annie Aubanel
Déléguée à l'Environnement/ *Environment Delegate*

Missions et politique du service

La Délégation à l'Environnement a pour mission, sous l'autorité du Ministère de l'Environnement, d'assurer et de veiller à la gestion de l'environnement naturel et humain ainsi que de proposer et définir les composantes nécessaires à la mise en oeuvre d'une politique cohérente de

Functions and policy of the department

The task of the Environment Delegation, under the authority of the Ministry of the Environment, is to supervise the management of the natural and human environment, and to recommend and define the necessary components for the implementation of a consistent environmental policy. The unit

l'environnement. Le service assure la coordination de toute action en matière d'environnement. La délégation est plus particulièrement chargée de développer et de veiller à :

- la protection, la sauvegarde et la réhabilitation de l'environnement;
- la prévention, la réduction ou la suppression des pollutions, nuisances et risques que peuvent entraîner pour l'environnement les équipements, aménagements et activités humaines de toute nature;
- la formation et l'information relative à l'environnement;
- l'établissement de relations de coopération avec les associations et organismes dont l'objet intéresse l'environnement.

Textes institutionnels du service

Création par Délibération n°85-1040/AT du 30 mai 1985; attribution et organisation par arrêté n°0518/CM du 15 mai 1996.

Organisation du service

La Délégation à l'Environnement comprend cinq unités: le Bureau de la Prévention des Pollutions et des Nuisances ; le Bureau de l'Eau ; le Bureau de la Nature, des Paysages et de l'Aménagement ; le Bureau des Affaires juridiques et de la Coopération Régionale ; le Bureau de l'Information, de l'Education et de la Formation.

Effectifs: actuellement 14 permanents plus un volontaire à l'assistance technique

Responsabilités du service en matière de gestion des zones côtières

Dans le cadre de ses missions, la délégation intervient pour tout ce qui concerne la protection et la sauvegarde de l'environnement côtier et, en collaboration avec le Service de la Mer et de l'Aquaculture, de l'environnement lagunaire.

- Elle assure la surveillance de l'environnement lagunaire grâce au Réseau Territorial d'Observation du milieu lagunaire (RTO) qu'elle anime et auquel elle participe, en collaboration avec des organismes scientifiques et d'autres services territoriaux.
- Elle a un rôle consultatif sur certains dossiers (extractions de matériaux en zone littorale, avis sur les rejets d'émissaires en mer) et participe à diverses commissions instruisant des dossiers ayant trait à l'environnement côtier, en particulier la Commission d'Occupation du Domaine Public.
- Elle est maître d'oeuvre de diverses études pour la protection ou la réhabilitation des milieux côtiers et lagunaires.

coordinates all environmental measures. The delegation is more specifically responsible for the development and supervision of:

- *the protection, preservation and rehabilitation of the environment;*
- *the prevention, reduction or elimination of any pollution, nuisances and hazards that may be caused to the environment by installations, facilities and human activities of any nature;*
- *environmental education and information; and*
- *establishing two-way relationships with bodies and organisations with environment-oriented aims.*

Legal framework of the department

Set up by Decision N° 85-1040/AT of 30 May 1985; powers and organisation according to Order N° 0518/CM of 15 May 1996.

Organisation of the department

The Environment Delegation comprises five divisions: the Office for the Prevention of Pollution and Nuisances; the Water Office; the Nature, Landscapes and Developments Office; the Legal Affairs and Regional Co-Operation Office; and the Information, Education and Training Office.

Staff: *at present 14 permanent officers, plus a technical assistance volunteer.*

Responsibilities of the department in terms of coastal zone management

In the course of its duties, the delegation intervenes in all matters concerning the protection and preservation of the coastal environment and, together with the Sea and Aquaculture Department, of the lagoon environment.

- *Together with scientific organisations and other Territorial departments, it monitors the lagoon environment through the Territorial Lagoon Environment Observation Network of which it is a member and a driving force.*
- *It has a consultative role on some issues (extraction of materials in coastal areas, advice on the discharge of effluents at sea) and attends various commissions investigating coastal environment issues, in particular the Public Domain Occupation Commission.*
- *It is the project manager of various studies for the protection or rehabilitation of the coastal and lagoon environments.*
- *It takes part in discussions on the management of reserves (Scilly and Bellinghausen, Tetiaroa, Taiaroa, etc).*

- Elle participe aux réflexions sur la gestion des réserves (Silly et Bellinghausen, Tetiaroa, Taiaro, etc.).

Activités actuelles en matière de gestion des zones côtières

La délégation réalise la synthèse du RTO depuis sa création (5 ans). Elle a fait engager, par divers organismes scientifiques ou privés, plusieurs études concernant l'environnement côtier ou lagunaire: restauration d'une zone récifale dégradée, étude d'un indicateur biologique pour l'étude des pollutions du milieu marin; étude d'un parc marin sur l'île de Bora-Bora; étude relative à l'érosion côtière (Bora-Bora); étude des bungalows sur pilotis.

Description de tout plan d'aménagement en cours

La délégation joue un rôle important, en collaboration avec le Service de la Mer et de l'Aquaculture, dans la définition du cahier des charges des Plans de Gestion des Espaces Maritimes (PGEM) ; Une étude de faisabilité relative au Schéma Général d'Aménagement et de Gestion des Espaces Maritimes de Polynésie Française a été proposée.

Informations complémentaires

La Délégation à l'Environnement est le service technique nommé, avec le Centre de Recherches Insulaires et Observatoire de l'Environnement (CRIOBE) pour être les interlocuteurs du Global Coral Reef Monitoring Network (GCRMN).

Current activities relating to coastal zone management

The delegation has been consolidating the work of the RTOs since it was set up five years ago. Through various scientific or private organisations, it has commissioned several studies on the coastal or lagoon environment: rehabilitation of a damaged reef area; study of a biological indicator for a survey of marine pollution; study of a marine park on the island of Bora-Bora; coastal erosion study (Bora-Bora); and a study of bungalows on piles.

Description of any development plan in progress

The delegation plays an important part, together with the Sea and Aquaculture Department, in defining the terms of reference of the Management Plans for Maritime Areas (PGEM). A feasibility study for the General Development and Management Plan for the Maritime Areas of French Polynesia has been proposed.

Additional information

The Environment Delegation is the technical service nominated, with the Centre for Insular Research and Environmental Monitoring, to be the official contact point for the Global Coral Reef Monitoring Network.

Service Territorial des Transports Maritimes Interinsulaires

Territorial Interisland Sea Transport Division

BP 1408
Papeete

Tel: (689) 430050/ 431739
Fax: (689) 419241

M. Michel Bonnard
Chef de Service/ Head of Department

Missions et politique du service

Ce Service est sous l'autorité du Ministère de l'Economie et des Transports. Ses missions concernent les points suivants:

- économie et droit des transports territoriaux maritimes et aériens;
- études, enquêtes, propositions micro-économiques en matière de transport aériens et maritimes;
- encadrement des transports aériens et maritimes;
- prospective en liaison avec les services compétents;

Functions and policy of the department

This division is under the authority of the Ministry of the Economy and Transport. Its functions focus on the following points:

- *economic and legal aspects of territorial transport by sea and by air;*
- *studies, surveys, microeconomic proposals for air and sea transport;*
- *supervision of air and sea transport;*
- *future prospects, in conjunction with the competent services;*
- *participation in the programming of air and sea infrastructure operations; and*

- participation à la programmation des opérations d'infrastructure aériennes et maritimes;
- gestion du personnel affecté aux aérodromes territoriaux.

Textes institutionnels du service

Délibération n°92-232/AT du 30.12.92 et Arrêté n° 354/CM du 26.4.93.

Organisation du service

Le service possède, outre la Direction, 4 divisions: Logistique; Contrôle maritime; Contrôle aérien; Administratif juridique.

Effectifs: 59 personnes.

Responsabilités du service en matière de gestion des zones côtières

Le service a la responsabilité de la gestion des transports maritimes interinsulaires:

- définition, proposition et mise en oeuvre du régime et des schémas d'organisation de la desserte maritime interinsulaire;
- instruction des projets de desserte (license, investissement, remplacement...);
- tarification du transport maritime interinsulaire (fret et passage);
- contrôle des navires (contrôle des connaissements, passagers, et destinations);
- réglementation en matière de navigation interinsulaire;
- Secrétariat du Comité Consultatif de la Navigation Maritime Interinsulaire;
- constitution d'une banque d'informations fiables sur la desserte maritime interinsulaire.

Activités actuelles en matière de gestion des zones côtières

- Renforcement de la rigueur dans les contrôles des navires;
- Gestion des protocoles d'accord signés avec les syndicats des gens de la mer et des armateurs;
- Gestion administrative de la flotille privée;
- Participation aux commissions consultatives (commission régionale de sécurité);
- Modification de certaines réglementations.

Description de tout plan d'aménagement en cours

Schéma directeur des transports maritimes interinsulaires.

- *management of the staff assigned to the airfields of the territory.*

Legal framework of the department

Decision N° 92-232/AT of 30.12.92 and Order N° 354/CM of 26.4.93.

Organisation of the department

In addition to the Directorate, it has four divisions: Logistics, Sea Control, Air Control, Administrative and Legal Affairs.

Staff: *59 officers.*

Responsibilities of the department in terms of coastal zone management

The division is responsible for the management of inter-island sea transport:

- *definition, recommendation and implementation of the organisational system and plans for inter-island shipping services;*
- *investigation of applications for shipowner licences;*
- *fixing of price scales for inter-island shipping (freight and passage);*
- *vessel control (checking of bills of lading, passengers and destinations);*
- *regulation of inter-island navigation;*
- *Secretariat of the Consultative Committee on Inter-island Shipping; and*
- *setting-up of a reliable databank on inter-island shipping services.*

Current activities relating to coastal zone management

- *More stringent vessel inspections;*
- *Management of the draft agreements signed with seafarers' and shipowners' unions;*
- *Administrative management of the private fleet;*
- *Participation in consultative commissions (Regional Security Commission); and*
- *Amendment of some regulations.*

Description of any development plan in progress

Guidelines for inter-island shipping.

Service de la Navigation et des Affaires Maritimes (SNAM)

Navigation and Maritime Affairs Department

BP 495
Papeete

Tel: (689) 420252
Fax: (689) 434390

M. Philippe Vinot
Chef de Service/ Head of Department

Missions et politique du service

Le service est chargé de la gestion administrative des marins de la marine marchande et de l'application des règles de la sécurité de la navigation pour l'ensemble de la flotte marchande, de pêche et de plaisance.

Service de la Navigation

- Tutelle et gestion des marins professionnels, réglementation de l'exercice de leur profession et leur formation professionnelle.
- Immatriculation des navires.
- Suivi de la construction navale.
- Réglementation et contrôle des normes de sécurité de la navigation.
- Délivrance des permis de navigation et préparation des licences de la navigation charter.
- Autorisation et contrôle des exploitations commerciales de navires.
- Tutelle de l'activité de Pilotage maritime.
- Le transport maritime interinsulaire

Service des Affaires Maritimes

Le Service des Affaires Maritimes est un service extérieur du Secrétariat d'Etat à la Mer qui exerce les attributions relevant de la compétence de l'Etat, en application de la loi n° 84-820 du 6 septembre 1984, portant statut du territoire de la Polynésie française et concernant:

- le régime de protection sociale des marins;
- la recherche et le sauvetage en mer;
- l'application du régime disciplinaire et pénal de la marine marchande;
- la Police des Pêches dans la Zone Economique Exclusive (ZEE);
- la Police de la Navigation.

Politique actuelle

Mieux assurer la prise en compte des impératifs de sécurité du transport maritime dans la desserte maritime interinsulaire, Proposer une réglementation du travail spécifique aux marins et notamment un statut du marin-pêcheur.

Organisation du service

Outre la Direction et le Secrétariat, le Service comprend l'Inspection de la Navigation et quatre

Functions and policy of the department

The department is responsible for the administrative management of merchant navy seamen and for enforcing navigation safety rules for the entire merchant, fishing and yachting fleet.

Navigation Division

- *Supervision and management of professional seamen, regulation of their trade and their vocational training.*
- *Registration of vessels.*
- *Monitoring of shipbuilding.*
- *Regulation and control of navigation safety standards.*
- *Issuing of navigation permits and drawing up of charter navigation licences.*
- *Authorisation and control of vessels' commercial operations.*
- *Supervision of marine pilotage.*
- *Maritime inter-island transport.*

Maritime Affairs Division

The Maritime Affairs Division is an external division of the Secrétariat d'Etat à la Mer (Office of the Secretary of State for the Sea) which exercises the powers of the State pursuant to the Status of the Territory of French Polynesia Act N° 84-820 of 6 September 1984 regarding:

- *the seamen's welfare protection system;*
- *search and rescue at sea;*
- *the enforcement of the merchant navy's disciplinary and penal system;*
- *policing of fishing in the Exclusive Economic Zone; and*
- *policing of navigation.*

Current policy

Taking better account of the safety requirements of sea transport in inter-island maritime services, implementing a system of labour regulation for seafaring work, and particularly a grade of professional fisherman.

Organisation of the department

In addition to the Directorate and the Secretariat, the division consists of the Navigation Inspectorate

sections administratives: Gestion, Plaisance/Examens, Navigation, et ENIM-CRM/CGP.

Effectifs: 15 personnes.

Responsabilités du service en matière de gestion des zones côtières

Outre les responsabilités relevant des missions intrinsèques du service (voir plus haut), le service participe aux travaux du Comité consultatif de la navigation maritime interinsulaire, de la Commission technique chargée de l'attribution des aides au développement des activités marines, à la Commission d'attribution des licences de pêche, et au Conseil d'Administration de l'Ecole de Formation et d'Apprentissage Maritime.

Activités actuelles en matière de gestion des zones côtières

- Gestion et réglementation de la navigation charter.
- Suivi des accords de pêche avec la Corée.
- Participation aux travaux des divers comités et commissions.
- Contrôle de navires, pour l'application des règles de sécurité.
- Réglementation en matière de sécurité des activités nautique lagonaires (jet-ski).
- Réflexions sur les problèmes d'immersion en mer.

and four administrative sections: Management, Yachting/ Examinations, Navigation and ENIM-CRM/CGP.

Staff: 15 officers.

Responsibilities of the department in terms of coastal zone management

In addition to the responsibilities inherent to its functions (see above), the division takes part in the proceedings of the Consultative Committee on Inter-island Maritime Navigation, of the Technical Commission Responsible for the Allocation of Development Aid to Marine Activities, of the Fishing Licences Allocation Commission, and of the Administrative Council of the Maritime Training and Apprenticeship School.

Current activities relating to coastal zone management

- *Management and regulation of charter navigation.*
- *Monitoring fishing agreements with Korea.*
- *Taking part in the proceedings of the various committees and commissions.*
- *Inspection of vessels for compliance with safety rules.*
- *Regulations governing lagoon activities (jet ski).*
- *Discussion of the problems caused by dumping at sea.*

Direction des Affaires Foncières—Division du Domaine

Department of Lands

BP 114
Papeete

Tel: (689) 544500
Fax: (689) 428040

M. Théodore Ceran-Jerusalem
Chef de Service/ *Head of Department*

Missions et politique du service

Section des Domaines

- Gestion et conservation des domaines du Territoire (public et privé), autre que les biens affectés à un service public.
- Recouvrement des produits et revenus domaniaux et des ventes diverses (mobilier et immobilier).

Cellule du Conservatoire du littoral

Elle est chargée de proposer au Gouvernement une politique foncière de sauvegarde de l'espace littoral, de respect des sites naturels, de protection des équilibres écologiques et

Functions and policy of the department

Division of Lands

- *Management and conservation of Territorial lands (public and private) other than those assigned to a public authority.*
- *Collection of the proceeds and income from public lands and various sales (movables and real estate).*

Coast Conservation Unit

Its task is to recommend to the Government a land policy that will preserve the coastline, respect natural sites and protect the balance between ecology and sector-based development.

d'aménagement sectoriel.

Politique actuelle

Section des Domaines

- Constitution d'un fichier immobilier informatisé.
- Aménagement des Domaines Territoriaux en vue de leur exploitation agricole notamment.

Cellule du Conservatoire du littoral

Lister l'ensemble des accès publics à la mer existant sur le Territoire, les aménager et les entretenir, acquérir de nouveaux accès dans les zones où la demande est forte.

Textes institutionnels du service

Le Service des Domaines et de l'Enregistrement a été créé par le Décret du 15 octobre 1851; ses compétences ont à nouveau été énoncées par l'arrêté n°310/CM du 9 avril 1985. Au sein de ce service, la Cellule du Conservatoire du Littoral a été créée par arrêté n°3 /CM du 9 janvier 1989.

Organisation du service

Le Service comprend quatre divisions: Section des Domaines; Section de l'Enregistrement; Conservation des Hypothèques; Cellule du Conservatoire du Littoral (3 personnes).

Effectif: permanent, contractuel, temporaire: 40 agents permanents (Direction: 7, Domaines: 12, Enregistrement: 8, Hypothèques: 13).

Responsabilités du service en matière de gestion des zones côtières

Section des Domaines

- Gestion du Domaine Public Maritime.
- Régementation en matière d'occupation du domaine public maritime.

Cellule du Conservatoire du littoral

- Acquisition de terrain, en vue de les protéger et/ou de les aménager.
- Aménagements d'accès publics à la mer.

Activités actuelles en matière de gestion des zones côtières

Section des Domaines

- Instruction des dossiers de demande d'occupation du domaine public: participation à la commission consultative des demandes d'occupation du domaine public pour la pêche, la perliculture ou l'aquaculture et à la commission consultative des demandes d'occupation du domaine public maritime pour les autres ouvrages (remblais);

Current policy

Division of Lands

- *Establishing a computerised real estate file.*
- *Developing territorial lands for farming, among other things.*

Coast Conservation Unit

This unit is responsible for listing all public means of access to the sea in the territory, developing and maintaining them, and providing further access in areas where demand is strong.

Legal framework of the department

The Lands and Registry Division was set up by the Order of 15 October 1851. Its powers have again been defined by Order N° 310/CM of 9 April 1985. Within this Division, the Coast Conservation Unit was set up by Order N° 3/CM of 9 January 1989.

Organisation of the department

The department consists of four divisions: Division of Lands, Registration Division, Land Registry, Coast Conservation Unit (3 officers).

Staff: 40 permanent officers (Directorate: 7; Lands: 12; Registration: 8; Land Registry: 13) and other contract and temporary staff members.

Responsibilities of the department in terms of coastal zone management

Division of Lands

- *Management of the Public Maritime Domain.*
- *Regulations governing the occupation of the public maritime domain.*

Coast Conservation Unit

- *Acquisition of land, for protection and/or development purposes.*
- *Provision of public means of access to the sea.*

Current activities relating to coastal zone management

Division of Lands

- *Investigation of applications for occupation of the public domain: attending the Consultative Commission on Applications for Occupation of the Public Domain for Fishing, Pearl Farming or Aquaculture and the Consultative Commission on Applications for Occupation of the Public Maritime Domain for Other Structures (reclamations).*
- *Formulation of a draft decision laying down new rules for occupation of the public maritime domain.*

- Elaboration d'un projet de délibération définissant de nouvelles règles en matière d'occupation du domaine public maritime.

Cellule du Conservatoire du littoral

En 1989–1990, la Cellule du Conservatoire du Littoral a acquis 5 terrains (4 sur Tahiti d'une surface totale d'environ 28.000 m² et 1 sur Huahine de 85.220 m²) et aménagé un accès public à la mer. En 1991 et 1992, aucune opération n'a été engagée. En 1993, des réunions de réflexion ont été conduites sur:

- la création d'accès publics à la mer;
- la relance du Conservatoire du littoral sous une nouvelle forme à définir;
- l'aménagement de certains sites littoraux.

Un recensement des accès publics à la mer sur l'île de Tahiti a été réalisé. En 1994, 1995 et 1997 de nouvelles acquisitions de terres ont été effectuées par la Cellule de Conservation du Littoral. Elles se sont poursuivies en 1998.

En 1996, une aire de loisirs a été aménagée et ouverte au public sur le domaine territorial PAPEHUE sis à cheval sur les communes de Punaauia et Paea.

Description de tout plan d'aménagement en cours

Participation de la cellule à l'élaboration des divers plans d'aménagement en cours:

- Plan d'aménagement de la zone touristique d'Outumaoro—Commune de Punaauia
- Plans Générales d'Aménagement des communes de Hitiaa O Te Ra (Tahiti), 'Arue (Tahiti), Taiarapu-Est (Tahiti), Punaauia (Tahiti), Paea (Tahiti), Uturoa (Raiatea), Taputapuatea (Raiatea), Tumarāa (Raiatea), Bora-Bora et Rangiroa.

Informations complémentaires

Le Service des Domaines et de l'Enregistrement est appelé à disparaître au cours de l'année 1998. Une Direction des Affaires Foncières regroupant le Service des Domaines et de l'Enregistrement et 3 autres services a été en effet instituée par délibération n°97-87 APF du 29 mai 1996. Un arrêté n°1518/CM du 31 décembre fixe son organisation. Sa mise en place est à priori imminente. Cette nouvelle direction reprend toutes les attributions précédemment exercées par le Service des Domaines et de l'Enregistrement.

Coast Conservation Unit

In 1989–1990 the Cellule du Conservatoire du Littoral purchased five sections (four in Tahiti with a total area of approximately 28 000 sq m, and one of 85 220 square metres in Huahine) and built one public access to the sea. In 1991 and 1992 no project was initiated. In 1993 discussion meetings were organised on:

- *the provision of public means of access to the sea;*
- *the revitalisation of the Coastal Conservatory in a new format to be determined; and*
- *the development of selected coastal sites.*

An inventory of public means of access to the sea in the island of Tahiti has been carried out. In 1994, 1995 and 1997 new land acquisitions were carried out by the Coast Conservation Unit. These are being continued in 1998.

In 1996 a leisure area was developed and opened to the public at the territorial estate of Papehūe, situated halfway between Punaauia and Paea.

Description of any development plan in progress

Participation of the unit in the formulation of the various current development plans.

- *Development plan for the Outumaoro tourist area—municipality of Punaauia.*
- *General Development Plans for the municipalities of Hitiaa O Te Ra (Tahiti), 'Arue (Tahiti), Taiarapu-Est (Tahiti), Punaauia (Tahiti), Paea (Tahiti), Uturoa (Raiatea), Taputapuatea (Raiatea), Tumarāa (Raiatea), Bora-Bora and Rangiroa.*

Additional information

The Lands and Registration Service is expected to disappear during the course of 1998. A Directorate of Land Affairs which will take over the Lands and Registration Service as well as three other services has been instituted by deliberation No. 97-87 APF of 29 May 1996. Order No. 1518/CM of 31 December set out its organisation, the establishment of which is imminent. The new directorate will take over all the functions previously exercised by the Lands and Registration Service.

Service Territorial du Tourisme

Territorial Tourism Department

BP 4527
Papeete

Tel: (689) 505700
Fax: (689) 481275

M. Gérard Vanizette
Chef de Service/ Head of Department

Missions et politique du service

Ce service, qui dépend du Ministère du Tourisme, a pour missions de: formuler toute proposition de développement touristique; Collecter et diffuser les statistiques touristiques; mener des études et enquêtes dans le domaine touristique; informer et assister les investisseurs potentiels dans leur démarches; procéder au suivi administratif et technique des investissements touristiques; instruire et gérer les dossiers touristiques au Code des Investissements; Elaborer les réglementations concernant le secteur touristique; contrôler la qualité du produit touristique et effectuer les visites d'inspection régulière des infrastructures; proposer des actions d'aménagement et de formation dans le domaine touristique.

Divisions/ Unités/ Départements:

Coordination des Moyens; Statistiques; Investissements; Direction.

Effectif: 15 personnes à contrat à durée indéterminée; 4 personnes à contrat à durée déterminée; 2 volontaires à l'aide technique (VAT).

Responsabilités du service en matière de gestion des zones côtières

Ce service a la responsabilité du développement du tourisme qui, en Polynésie, est essentiellement localisé en milieu littoral.

Activités actuelles en matière de gestion des zones côtières

- Participation aux réflexions en matière de zones protégées en milieu littoral et lagunaire, et en particulier de création de parcs marins.
- Propositions d'un axe de développement touristique orienté sur la découverte de la nature, en particulier de la vie sous-marine dans le lagon.
- Proposition d'une délibération complétant le code de l'Aménagement de la Polynésie française et instituant des zones touristiques protégées (Délibération n°95-6 AT du 19 janvier 1995).

Description de tout plan d'aménagement en cours

- Elaboration d'un Plan de développement stratégique du Tourisme en Polynésie française;
- Identification d'un réseau de zones touristiques protégées sur l'ensemble des îles touristiques, dont plusieurs zones littorales.

Functions and policy of the department

This department, which reports to the Ministry of Tourism, has the tasks of: formulating any tourism development proposal; collating and circulating tourism statistics; conducting studies and surveys relating to tourism; advising and assisting potential investors with formalities; administrative and technical monitoring of tourism investments; investigation and management of tourism projects under the Investment Code; formulation of regulations for the tourism industry; quality control of tourism products and regular inspection of the infrastructure; and recommendation of development and training policies in tourism.

Divisions/ Units/ Departments: Resource Coordination; Statistics; Investments; Directorate.

Staff: 15 persons on open-ended contracts; 4 persons on fixed-term contracts; 2 technical assistance volunteers.

Responsibilities of the department in terms of coastal zone management

This department is responsible for the development of tourism which, in Polynesia, takes place chiefly in the coastal environment.

Current activities relating to coastal zone management

- *Taking part in debates on protected areas in the coastal and lagoon environment, and on the establishment of marine parks in particular.*
- *Recommendation of a tourism development avenue focusing on the discovery of nature, in particular underwater life in the lagoon.*
- *Recommendation of a draft decision expanding the Development Code of French Polynesia and setting up protected tourism areas (deliberation No. 95-6 of 19 January 1995).*

Description of any development plan in progress

- *Formulation of a strategic development plan for tourism in French Polynesia.*
- *Identification of a network of protected tourism areas in all the tourist islands, including several coastal areas.*

Arrondissement Maritime (Direction de l'Équipement)

Maritime Authority (Directorate of Industrial Equipment)

BP 9025, Motu Uta
Papeete

Tel: (689) 424492
Fax: (689) 421341

M. Patrice Chamaillard
Chef de l'arrondissement/ *Head of Authority*

Missions et politique du service

L'arrondissement maritime, sous l'autorité du Ministère de l'Équipement (Direction de l'Équipement) a pour missions essentielles:

- l'entretien, la construction et la gestion des infrastructures portuaires territoriales à l'exclusion de celles relevant du Port autonome de PAPEETE. Il émet par ailleurs son avis sur les projets de constructions maritimes privées effectuées sur le littoral de Polynésie;
- la participation à la tutelle économique de la navigation. Il représente la direction à la Commission de navigation maritime interinsulaire;
- la supervision des activités de la subdivision des Phares et Balises dans ses études, constructions et entretiens des ouvrages de signalisation maritime

Textes institutionnels du service

Arrêté n°0069/CM du 17 Janvier 1992 portant organisation interne du service dénommé Direction de l'Équipement.

Organisation du service

L'Arrondissement comprend 7 unités: la comptabilité; le secrétariat; la subdivision des travaux maritimes; la subdivision des phares et balises; le bureau d'études; le bureau des expéditions; le bureau de l'armement. Il existe en outre 4 subdivisions dans les îles (Îles Sous-le-Vent, Australes, Tuamotu-Gambier et Marqueses).

Effectif: 100 personnes dans les services techniques et 128 gens de mer.

Responsabilités du service en matière de gestion des zones côtières

L'Arrondissement est chargé de:

- la programmation, la conception et la réalisation des ouvrages maritimes et portuaires territoriaux;
- la gestion et l'exploitation des ouvrages portuaires;
- l'exécution, la réalisation et l'entretien de la signalisation maritime;
- a gestion de la flottille administrative du Territoire;

Functions and policy of the department

The Maritime Authority, under the authority of the Industrial Equipment Directorate, is chiefly responsible for:

- *the maintenance, construction and management of the Territory's port infrastructure, excluding the infrastructure under the control of the autonomous port of PAPEETE. It also puts forward its views on the private maritime construction projects carried out along the coastline of Polynesia;*
- *participating in the economic supervision of navigation. It represents the Directorate at the Inter-island Sea Navigation Commission; and*
- *supervising the activities of the Lighthouses and Beacons Sub-Division in its studies; construction and maintenance of maritime signaling devices.*

Legal framework of the department

Order N° 0069/CM of 17 January 1992 for the internal organisation of the entity named Direction de l'Équipement.

Organisation of the department

The authority consists of seven units: Accounts; Secretariat; Maritime Works Sub-Division; Lighthouses and Beacons Sub-Division; Research Department; Dispatch Office; and the Equipment Office. There are also four sub-divisions in the islands (Leeward, Austral, Tuamotu-Gambier and Marquesas).

Staff: 100 officers in the technical divisions and 128 seamen.

Responsibilities of the department in terms of coastal zone management

The authority is responsible for:

- *programming, designing and building of Territorial sea and port structures;*
- *management and operation of port structures;*
- *manufacture and maintenance of sea beacons;*
- *management of the Territory's administrative fleet; and*
- *organisation of sea transport and the dispatch of equipment and materials to the islands.*

- l'organisation des transports maritimes et des expéditions des matériels et matériaux dans les îles.

Description de tout plan d'aménagement en cours

L'Arrondissement Maritime aura un rôle consultatif dans le cadre de l'élaboration des Plans de Gestion des Espaces Maritimes.

Description of any development plan in progress

The Maritime Authority will have a consultative role in the formulation of the Management Plans for Maritime Areas (PGEM).

Groupement Etudes et Gestion du Domaine Public (GEGDP - Direction de l'Equipement)

Public Domain Research and Management Group (Directorate of Industrial Equipment)

BP 85
Papeete

Tel: (689) 542853
Fax: (689) 542858

M. René Villot
Chef de Groupement/ *Head of Group*

Missions et politique du service

Le GEGDP, sous l'autorité du Ministère de l'Equipement, a pour mission de gérer et de conserver le domaine public territorial (maritime, terrestre et fluvial). A ce titre, il instruit les demandes d'autorisation d'extraction; il instruit les demandes d'occupation temporaire du domaine public maritime et fluvial; il surveille l'intégrité du domaine public territorial; il représente la Direction de l'Equipement à la commission territoriale d'occupation du domaine public et en assure le secrétariat; il représente la Direction de l'Equipement à la commission des sites et des monuments naturels; il représente la Direction lors de l'élaboration des plans généraux d'aménagement.

Il a également pour mission de participer à l'adaptation de la réglementation sur les extractions du domaine public et de réaliser des études prospectives dans son domaine de compétences, ainsi que de gérer et d'entretenir au sein de la cellule hydrologie, le réseau territorial d'observations hydrologiques.

Textes institutionnels du service

Arrêté n°0069/CM du 17 Janvier 1992 portant organisation interne du service dénommé Direction de l'Equipement.

Organisation du service

Le Service comprend trois unités: la cellule hydrologique; la cellule extraction et la cellule Domaine Public.

Effectif: 13 personnes.

Functions and policy of the department

Under the authority of the Directorate of Industrial Equipment, the GEGDP is responsible for the management and conservation of the Territory's Public Domain (sea, land and rivers). In this capacity it investigates applications for extraction permits and for temporary occupation of the public domain (sea and rivers). It also monitors the integrity of the Territorial public domain, represents the Directorate of Industrial Equipment before the Territorial Public Domain Occupation Commission and provides its secretariat. It represents the Directorate of Industrial Equipment before the Natural Sites and Monuments Commission and the Directorate at the formulation phase of the General Development Plans.

Its task is also to contribute to the adaptation of the regulations on extraction activities in the public domain, to carry out prospective studies in its area of competence, and to manage and maintain the Territorial hydrology observation network within the Hydrology Unit.

Legal framework of the department

Order N° 0069/CM of 17 January 1992 on the internal organisation of the entity named Direction de l'Equipement.

Organisation of the department

The group consists of three units: the Hydrology Unit, the Extraction Unit and the Public Domain Unit.

Staff: 13 officers.

Responsabilités du service en matière de gestion des zones côtières

Le GEGDP assure la gestion du domaine public territorial comportant notamment le domaine public maritime (occupation des plages et lagons par des constructions matérielles) et en assure la conservation (surveillance, interventions, procès-verbaux de contravention de grande voirie). La cellule extraction est chargée de l'instruction des demandes d'extractions en sites côtier et lagonaire (extractions de soupe de corail). La cellule du Domaine public est chargée de l'instruction des demandes de concessions du domaine public, notamment à charge de remblais (sur le lagon).

Activités actuelles en matière de gestion des zones côtières

Contrôle des extractions de matériaux en milieu littoral (plages et cocoteraie) et en milieu marin (récifs coralliens): autorisations d'extraction, statistiques, suivi des extractions (410 dossiers traités en 1996).

Responsibilities of the department in terms of coastal zone management

The GEGDP manages the Territory's public domain, in particular the maritime public domain (siting of physical structures on beaches and lagoons) and sees to its conservation (supervision, intervention and traffic infringement reports). The Extraction Unit is responsible for investigating applications for extraction permits on coastal and lagoon sites (extraction of coral soup). The Public Domain Unit is responsible for investigating applications for concessions in the public domain, particularly for bund walls (in the lagoon).

Current activities relating to coastal zone management

Supervision of the extraction of materials in the coastal environment (beaches and coconut groves) and in the marine environment (coral reefs), including extraction permits, statistics and monitoring of extraction operations (410 cases handled in 1996).

Service de l'Urbanisme (Direction de l'Équipement)

Town Planning Department (Directorate of Industrial Equipment)

BP 866
Papeete

Tel: (689) 468023
Fax: (689) 434983

M. Paul Dantu
Chef de Service/ Head of Department

Missions et politique du service

- Participation à l'aménagement du Territoire en ce qui concerne notamment le schéma d'Aménagement Général (SAGE) des Plans généraux d'aménagement (P.G.A.) et des plans de gestion des espaces maritimes (P.G.E.M.).
- Réalisation d'études, plans et règlements nécessaires à la mise en oeuvre des compétences ci-dessus mentionnées, ainsi que celles liées à l'habitat urbain ou dispersé.
- La préparation et l'exécution des projets cartographiques et topographiques nécessaires aux opérations d'aménagement et d'urbanisme.

Textes institutionnels du service

Délibération n°88-18/AT du 11 février 1988.

Organisation du service

Le Service comprend 3 sections: la section Etudes et Plans; la section Urbanisme Opérationnel et Construction et la section Topographie.

Effectifs: 42 agents permanents à Tahiti, 1 représentant du Service aux Marquises et 8 agents aux Iles Sous-le-Vent.

Functions and policy of the department

- *Taking part in town and country planning, especially regarding the General Development Project, Specific Development Plans and plans for the management of marine spaces.*
- *Implementation of the surveys, plans and regulations required for the exercising of the powers mentioned earlier and of those relating to the urban or scattered habitat.*
- *Formulation and completion of the mapping and topography projects required for development and town planning operations.*

Legal framework of the department

Decision N° 88-18/AT of 11 February 1988.

Organisation of the department

The department consists of three sections: the Design and Plans Section, the Operational Town Planning and Construction Section, and the Topography Section.

Staff: 42 permanent officers in Tahiti, 1 representative in the Marquesas and 8 officers in the Leeward Islands.

Responsabilités du service en matière de gestion des zones côtières

Aménagement en milieu littoral; Propositions de réglementation en matière d'aménagement littoral.

Activités actuelles en matière de gestion des zones côtières

- Elaboration ou participation à l'élaboration de Plans Généraux d'Aménagement (PGA), qui couvrent la partie terrestre d'une commune, dont la zone littorale.
- Réalisation ou participation à diverses études d'aménagement de secteurs littoraux: schéma d'aménagement du front de mer de PAPEETE, proposition d'aménagement du littoral d'Outumaoro (Tahiti), schéma d'aménagement de la baie de Port-Phaëton.
- Elaboration des Plans de Gestion des Espaces Maritimes, qui couvrent la partie lagonaire d'une commune.

Description de tout plan d'aménagement en cours

- Schéma Général d'Aménagement et d'Equipement de la Polynésie française.
- Plans de Gestion des Espaces Maritimes: Mise en place des P.G.E.M. sur l'île de Moorea.

Responsibilities of the department in terms of coastal zone management

Development planning in the coastal environment; proposed regulations for coastal developments.

Current activities relating to coastal zone management

- *Formulation or contribution to the formulation of the General Development Plans (PGA) covering the land area of a municipality, including the coastal area;*
- *Completion of or contribution to various development studies of coastal areas, including a sea-front development project in PAPEETE, the proposed development of the Outumaoro coastline (Tahiti), and a development project for the Bay of Port-Phaëton; and*
- *Contribution to the formulation of the Management Plans for Coastal Areas covering the lagoon area of a municipality.*

Description of any development plan in progress

- *General Development and Equipment Plan for French Polynesia.*
- *Management Plans for Maritime Areas: contribution to the introduction of the Management Plans for Coastal Areas in the island of Moorea.*

AUTRES SERVICES AYANT DES ACTIVITÉS DANS LE DOMAINE LITTORAL

OTHER DEPARTMENTS CARRYING OUT ACTIVITIES IN THE COASTAL AREA

Service de la Mer et de l'Aquaculture (SMA)

Sea and Aquaculture Department

BP 20
Papeete

Tel: (689) 439314/ 430574
Fax: (689) 438159

M. Pierre a Teriitehau
Chef de Service/ Head of Department

Missions et politique du service

Le Service de la Mer et de l'Aquaculture n'intervient qu'indirectement dans la gestion des zones côtières (cas des Plans de Gestion des espaces Maritimes PGEM) avec les autres services tels que le Service de l'Urbanisme et la Délégation à l'Environnement. Sa compétence réside dans l'encadrement des activités d'exploration et d'exploitation des ressources naturelles biologiques de la mer et d'eau douce et des sols de ces milieux.

Functions and policy of the department

The Sea and Aquaculture Department is only indirectly involved in coastal zone management (in the case of Management Plans for Marine Spaces) along with other government services such as the Town Planning Department and the Environment Delegation. The department's area of competence lies in overseeing the exploration and exploitation of living natural resources of marine and fresh waters, as well as of the floors of these zones.

Le SMA, sous l'autorité du Ministère de la Mer, est investi d'une compétence générale d'intervention et d'organisation dans les domaines touchant la mer et l'aquaculture. Il est chargé de proposer et de suivre l'exécution de la politique générale menée par le Territoire en matière de recherche, de protection et d'exploitation des ressources de la mer, des rivières et de l'aquaculture; d'assurer la réglementation et le contrôle de ces activités; d'apporter une assistance technique aux pêcheurs et aquaculteurs et de promouvoir la formation des professionnels; d'assurer la gestion des fonds territoriaux d'aide au développement de ces secteurs et d'apporter une assistance technique et administrative aux organismes ou établissements ayant pour vocation complémentaire le développement et la valorisation des apports économiques tirés de ces activités.

Textes institutionnels du service

Délibération n°83-65 du 31 mars 1983.

Organisation du service

Le service est localisé à Papeete et Moorea, Iles du Vent - aux Iles Sous le Vent: Raiatea, Huahine - aux Tuamotu-Gambiers: Rangiroa, Takapoto, Rikitea - aux Marqueses: Nuku-Hiva.

Effectifs: 100 agents.

Responsabilités du service en matière de gestion des zones côtières

Le Service est chargé d'élaborer les propositions de politiques générales et les plans de développement et de protection des ressources marines et de proposer et de suivre l'exécution des programmes de recherches touchant à ces domaines.

Il réunit et traite toute information relative aux activités de la mer et de l'aquaculture. Il élabore les projets de réglementation et assure la surveillance des activités réglementées.

Le service est chargé de l'instruction des dossiers de concessions maritimes à vocation perlicole et de pêche et de les transmettre au Service des Domaines et de l'Enregistrement chargé de la présentation au Conseil des Ministres; Il suit, avec ce service, le règlement des questions intéressant le Domaine Public Maritime. En particulier, il participe à l'établissement des Plans de Gestion des Espaces Maritimes (PGEM) en collaboration avec les services de l'Urbanisme (maître d'oeuvre) et de l'Environnement.

Activités actuelles en matière de gestion des zones côtières

Gestion de la perliculture

- Recensement des concessions maritimes.
- Gestion informatisée des concessions.

Under the authority of the Ministry of the Sea, the SMA has a general power of intervention and organisation in areas relating to the sea and to aquaculture. It is responsible for recommending and monitoring the general policy carried out by the Territory in terms of research, protection and exploitation of the resources of the sea, of rivers and of aquaculture; for regulating and supervising these activities; for providing technical assistance to fishermen and aquaculturists; for promoting vocational training; and for managing Territorial development-aid funds for these activities and providing technical and administrative assistance to the organisations or institutions whose subsidiary aim is the development and enhancement of the economic benefits derived from these activities.

Legal framework of the department

Decision N° 83-65 of 31 March 1983.

Organisation of the department

The department has bases at Papeete and Moorea (Windward Islands), Raiatea and Huahine (Leeward Islands), Rangiroa, Takapoto and Rikitea (Tuamotu-Gambiers) and Nuku-Hiva (Marquesas).

Staff: 100 officers.

Responsibilities of the department in terms of coastal zone management

The department is responsible for drawing up general policy proposals as well as plans for the development and protection of marine resources, and for recommending and monitoring research programmes relating to those fields.

It is responsible for collecting and processing any information concerning marine and aquaculture activities. The department is responsible for the formulation of draft regulations and for monitoring the regulated activities.

The department is also responsible for investigating applications for maritime concessions relating to fisheries and pearl farming and for transmitting these to the Department of Lands, which is responsible for submitting them to the Council of Government. In conjunction with this department, it monitors the settlement of matters involving the Public Maritime Domain. It is specifically responsible, together with other Departments, for the formulation of the Plans de Gestion des Espaces Maritimes (PGEM) [Management Plans for Maritime Areas].

Current activities relating to coastal zone management

Pearl farming management

- Survey of maritime concessions.
- Computer-based management of concessions.

Gestion de la pêche

- Instruction des demandes de licence de pêche.
- Statistiques de pêche (hauturière, lagonaire et côtière).
- Suivi des accords de pêche internationaux (flotte de palangriers coréens dans la ZEE).
- Estimation des stocks de trocas et de burgaux.
- Suivi des pêcheries (effort de pêche).
- Suivi des fonds d'investissements.
- Suivi statistiques (exploitation, production).
- Collecte des données du secteur et sortie du bulletin statistique.

Description de tout plan d'aménagement en cours

- Délimitation réglementaire des zones de pêche et fixation des engins autorisés.
- La mise en oeuvre des Plans de Gestion des Espaces Maritimes (PGEM) est en cours pour l'île de Moorea et sera étendue aux îles de Rangiroa et de Bora Bora dont les Plans Généraux d'Aménagement (PGA) sont en cours d'élaboration.

Informations complémentaires

Depuis le 1/9/1997, le Service de la Mer et de l'Aquaculture a repris les activités de l'Etablissement pour la Valorisation des Activités Aquacoles et Maritimes (E.V.A.A.M.), dissout par délibération n° 97-149/APF du 13 août 1997.

Fisheries management

- *Processing of requests for fishing licences.*
- *Fishery statistics (high seas, lagoon and inshore).*
- *Monitoring of international fishing agreements (Korean longline fleet in the EEZ).*
- *Assessment of trochus and green snail stocks.*
- *Fishery monitoring (fishing effort)*
- *Monitoring of investment funds.*
- *Statistical monitoring (exploitation, production).*
- *Gathering information on the sector and publication of a statistical bulletin.*

Description of any development plan in progress

- *Statutory demarcation of fishing areas and definition of authorised gears.*
- *The establishment of a Management Plan for Maritime Areas (PGEM) for the island of Moorea is underway and will be extended to the islands of Rangiroa and Bora Bora, where General Development Plans are currently being formulated.*

Additional information

Since 9 January 1997 the Sea and Aquaculture Service has taken over the activities of the Establishment for the Valorisation of Marine and Aquaculture Activities (EVAAM) which was dissolved as a result of Deliberation No. 97-149/APF of 13 August 1997.

Arrondissement Infrastructures (Direction de l'Équipement)

Infrastructure Authority (Directorate of Industrial Equipment)

BP 85
98713 Papeete

Tel: (689) 542802/ 542803
Fax: (689) 421487

M. Patrice Segonne
Chef de l'arrondissement/ *Head of Authority*

Missions et politique du service

Le service, dont les missions concernent l'étude, la construction et l'entretien des domaines publics territoriaux routier et aéroportuaire pour l'ensemble du Territoire, est également chargé de l'aménagement des rivières et la protection des berges et du littoral. Il participe à l'aménagement de sites littoraux d'intérêt touristique (plages et terrains littoraux).

Functions and policy of the department

The authority, whose tasks focus on the design, construction and maintenance of public property such as roads and airports throughout the Territory, is also responsible for the development of rivers and the protection of river banks and the coastline. It takes part in the development of coastal sites with tourism potential (beaches and coastal lands).

| | |
|---|---|
| <p>Textes institutionnels du service Arrêté n°0069/CM du 17 Janvier 1992 portant organisation interne du service dénommé "Direction de l'Équipement", modifié par arrêté n°635/CM du 30 juin 1994 et arrêté n°1434/CM du 22.12.1997.</p> | <p>Legal framework of the department <i>Order N° 0069/CM of 17 January 1992 on the internal organisation of the entity named Direction de l'Équipement, modified by Order No 635/CM of 30 June 1994 and Order No. 1434/CM of 22 December 1997.</i></p> |
|---|---|

Direction de la Santé Publique: Service d'Hygiène et de Salubrité Publique (SHSP)

Directorate of Public Health: Public Hygiene and Health Division

BP 611
Papeete

Tel: (689) 454153
Fax: (689) 454127

Dr François Laudon
Directeur de la Santé Publique/ *Director of Public Health*

Dr Pierre Delebecque
Chef du Service d'Hygiène et de Salubrité/ *Head of Public Hygiene and Health Division*

Le Service d'Hygiène et de Salubrité Publique (S.H.S.P.), qui dépend de la Direction de la Santé, assure le suivi de la qualité des eaux de baignade en mer sur les îles de Tahiti, Moorea, Bora-Bora, Raiatea et Huahine: prélèvement, analyse de la qualité bactériologique des eaux de baignade et publication annuelle des résultats.

The Public Hygiene and Health Division, which reports to the Directorate of Public Health, monitors the quality of swimming sea waters in the islands of Tahiti, Moorea, Bora-Bora, Raiatea and Huahine. This involves sampling and testing the bacteriological quality of swimming waters and annual publication of results.

Port Autonome de Papeete

Autonomous Port of Papeete

BP 9164, Motu-Uta
98715 Papeete

Tel: (689) 505454
Fax: (689) 421950

Mme Béatrice Chansin
Directeur/ *Director*

Missions et politique du service

Le Port Autonome de PAPEETE est chargé, à l'intérieur de sa circonscription:

- des travaux d'extension, d'amélioration, de renouvellement, de reconstruction, d'aménagement des zones industrielles portuaires et de plaisance;
- de l'exploitation, de l'entretien et de la police du Port et de ses dépendances;
- de la gestion du domaine immobilier propre et affecté.

Organisation du service

Le Port Autonome compte trois divisions: Division Financière et Commerciale; Division Technique et Programmation; Division Navigation.

Effectifs: 151 employés.

Functions and policy of the department

Within its ward the Autonomous Port of Papeete is responsible for:

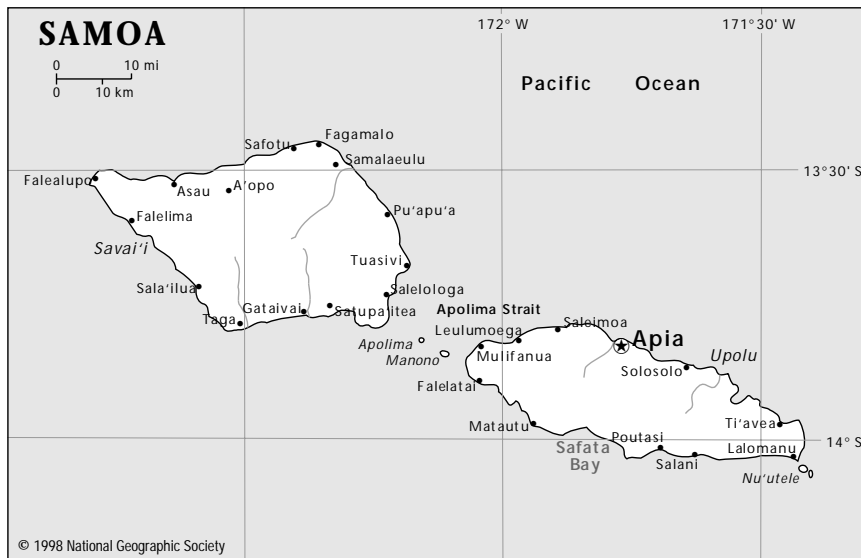
- *extension, improvement, replacement, rebuilding and development work on the port's industrial and yachting areas;*
- *the operation, maintenance and policing of the port and its outbuildings; and*
- *the management of its own properties and those assigned to it.*

Organisation of the department

The port consists of three divisions: Finance and Commercial Division, Technical and Planning Division and the Navigation Division.

Staff: 151 officers.

SAMOA



PHYSICAL CHARACTERISTICS

Samoa is an oceanic volcanic archipelago in the southwest Pacific between latitudes 13°25'–14°05' S latitude and 171°23'–172°48' W longitude. There are two main islands, Upolu and Savaii, seven smaller islands (two of which are inhabited), and several islets and rock outcrops. Upolu and Savaii have coastal plains four to five km wide, rising to central mountains, and most of the islands are surrounded by fringing reefs and barrier reefs enclosing shallow lagoons.

The country has a total land area of 2839 sq km and an Exclusive Economic Zone (EEZ) of 120 000 sq km, one of the smallest in the Pacific area. Volcanic activity is persistent and frequent earth tremors are experienced. The last eruption occurred in 1911, on Savaii. The climate is generally hot and wet. The average annual temperature is 26.5°C and the average annual rainfall is 3000 mm, with 75% of the precipitation occurring during the distinct wet season from November to April. Vegetation can be divided into five broad categories: littoral, wetland, rainforest, volcanic and disturbed vegetation (Whistler, 1992).

The 1991 census reported a total national population of 161 298 with 34 126 individuals living in the urban area of the national capital, Apia.

GOVERNMENT STRUCTURE

The constitution of Samoa provides for a Head of State to be elected by the Legislative Assembly for a term of five years. The present Head of State, however, holds the office for life. The Legislative Assembly is composed of 49 members, all of whom are elected by universal suffrage. A total of 47 members are elected from among the holders of matai titles and two from non-Samoan candidates. Members hold office for five years. Executive power is held by the Cabinet, comprising the Prime Minister and eight other members of the Assembly. The Prime Minister is appointed by the Head of State with the necessary approval of the Assembly.

COASTAL ZONE MANAGEMENT ISSUES

Direct and indirect impacts of human activities on the coastal zone in Samoa include:

- **Soil Erosion:** Poor land management (agricultural and forestry practices, land clearing, housing and road construction activities) has resulted in excessive soil and nutrients washing into lagoons and smothering corals. Destruction of reef communities and deterioration of fisheries in some districts has been reported by Bell (1985) and Zann (1991). Light inhibition due to heavy silt loads is also

reported to be a factor in coral death. Although a regional International Board for Soil Research and Management (IBSRAM) project on the effects of agriculture on slopes is currently taking place, the monitoring of silt loads in rivers and lagoons is not presently undertaken due to lack of laboratory facilities.

- **Solid and Liquid Waste Management:** Public solid waste collection only covers the Apia urban area, and excludes rural areas. Consequently, many households must dispose of rubbish by burning, burial or composting. Indiscriminate dumping of rubbish occurs on banks, into streams and on beaches. A National Beautification Committee, including representatives from the Pulenuu (government-appointed village representative) and the Department of Lands, Surveys and Environment (DSLE), currently operates a programme to encourage and promote clean environments. The local brewery recycles glass, with cash incentives provided for returning empty bottles, while private enterprise manages the recycling of aluminium cans, other metals and the retreading of old tyres.

Pesticide residues in shellfish were reported to be below recommended safe consumption levels by Taule'alo (1993). However, there are concerns about the level of contamination of shellfish in Vaiusu Bay because of continued leaching from currently unused timber milling sites in the area. The storage, use and disposal of hazardous agricultural pesticides and herbicides thus continues to have the potential to threaten the environment. Relevant issues are addressed by the Pesticide Technical Committee (comprising representatives from the DSLE and the Department of Health). A SPREP-funded Persistent Organic Pollutants (POPs) project is currently assessing the extent and quantities of waste chemicals in Samoa as part of a regional programme. The long-term goal of the project, which includes government training and raising of public awareness components, is to remove all POPs and to remediate contaminated areas.

A draft report funded by Japan International Cooperation Agency, JICA (1998) suggests that rivers and streams within urban Apia contain unacceptably high nitrogen, ammonia, turbidity and faecal indicator bacteria levels, underscoring the fact that sewage disposal is an increasing problem for Samoa. There is currently no public sewerage system. However, an Asian Development Bank (ADB) Integrated Urban Development Project for the Apia urban area is being discussed, which proposes to set up an urban planning authority. The project is currently on hold awaiting the preparation of a

zoning plan. Both DLSE and the Public Works Department (PWD) have been suggested as candidates for the role of urban planning authority but neither is thought to have the institutional capacity to fulfil the role (Crood & Westlake, 1998). The project includes a proposal to discharge Apia's sewerage off Mulinuu at a point some 800 m out from the reef, in 40 m of water; however a full EIA, including monitoring of currents and tidal flow in the area, is still required.

The existing poorly planned septic system is prone to flooding. Overflow from household septic tanks, and waste from pig and chicken farms results in discharge directly to surface waters, encouraging the breeding of worms, mosquitoes and pathogens. Additionally there is concern that, with time, the build-up of pollution in near-shore water has the potential to contaminate traditional seafoods. Indicators of increased pollution, such as accelerated algal and seagrass growth, has been observed in densely populated coastal areas (Taule'alo, 1993). Large commercial and public institutions in the urban area currently operate their own wastewater treatments. However, many of the current systems require upgrading to cope with increased demand. Additionally the lack of regular or routine equipment maintenance may also have long-term deleterious effects.

- **Sand mining.** Sand, coral and gravel aggregates are taken from beaches and lagoonal sea bed and river beds for the construction industry and landscaping purposes. Uncontrolled mining activities along the coastal areas of Upolu and Savaii have exposed shorelines to serious erosion as well as increased the silt levels and decreased depths of lagoons (Gauss, 1981; Solomon, 1994). PWD and the DSLE currently assess all applications for authorised permits and provide guidance for the planning phase before commencement of mining operations. However complete effectiveness is restricted because of limited personnel to monitor and police illegal activity. Controls on sand mining imposed by village communities are an alternative approach, and information sheets produced by the Fisheries Division promote community involvement.
- **Foreshore development.** Reclamation of land for construction is monitored by the PWD and DSLE. Donor agencies involved with seawall construction are required to build to appropriate standards.
- **Over-harvesting of marine resources.** Catches of fish and shellfish have been declining in the lagoons and inshore reefs of Samoa for many years (Horsman & Mulipola,

1995). Reasons for this include overexploitation, the use of destructive fishing methods (including the use of dynamite and bleach) and natural environmental disturbances (including cyclones Ofa in 1990 and Valelia in 1991). A contrary trend is shown in the catches of offshore pelagic fish that are being exploited by a rapidly increasing number of small longline vessels. The export of tuna has now become one of Samoa's most important foreign exchange earners (See later paragraph on offshore fishing).

Fisheries and marine environment management strategies

The Fisheries Division, with AusAID support, has developed a highly successful community-based extension programme through which coastal villages are encouraged to manage their own fisheries resources and the marine environment (King & Faasili, 1998). Community groups are involved in meetings which run over several weeks, culminating in a community-owned Village Fisheries Management Plan. Each plan sets out the resource management and conservation undertakings of the community together with the servicing and technical support required from the Fisheries Division. Undertakings have ranged from enforcing laws banning destructive fishing methods to protecting critical habitats such as mangrove areas. Some communities have made their village laws into by-laws which, after government approval, can be enforced under national law and applied to people from other villages (Faasili, 1997). Within the first two years of the programme (to April 1998), the extension process was commenced in 70 villages of which 47 villages have produced Village Management Plans so far. The Fisheries Division has produced a video ("Who cares about the fish?" 1998) which describes the community-based fisheries management programme.

The Fisheries Division supports villages with Fisheries Management Plans by providing assistance with the restocking of giant clams (*Tridacna* species), the farming of tilapia and in facilitating the purchase of medium-sized boats to allow community members to fish outside lagoon areas.

Marine Protected Areas (MPAs)

The DSLE Division of Environment and Conservation (DEC) currently supervises two protected areas: Palolo Deep Marine Reserve and Sa'anapu/ Sataoa Conservation Area. Additional reserves are proposed for Falealupo, Tafua Peninsula and Nu'utele Islands. Surveys of the biodiversity of species in protected areas are being undertaken by the division and the community-based monitoring programme, Reef Check, is being discussed as a suitable protocol for Samoa. Currently community conservation measures

include the organised collection of crown of thorns starfish (*Acanthaster planci*), bans on the removal of beach sand and dumping rubbish, bans on collecting sea cucumbers (Holothuridae) for export and on collecting live corals for the overseas aquarium trade.

Small community-owned fish reserves have been established by 41 villages involved in the Fisheries Division Extension Programme. All fishing is banned in these areas. It is believed that the resulting network of individual, highly-protected MPAs across the country, often with small separating distances, maximises linking of larval sources and suitable settlement areas, thus facilitating replenishment through reproduction and larval migration.

There has also been a recent IUCN proposal to collaborate with DEC and the Fisheries Division to create two large MPAs in Samoa in 1998/99. The proposal would result in several small existing village fish reserves being subsumed within the larger MPAs in the districts of Aleipata and Safata (King & Faasili, 1998).

Effects of the 1997/98 El Nino event

The El Nino event of 1997/1998 caused above average water temperatures and extraordinarily low tides. Coral bleaching has been observed, and anecdotal evidence suggests that as much as 70% of corals have been destroyed in some shallow-water areas. There is a need to monitor effects more closely and to link them to changes induced by other natural phenomena.

Offshore fishing

The development of the offshore fishery was initiated as a FAO/DANIDA project in the 1970s and resulted in the local production of a 28 ft 'alia' catamaran powered by a 40 hp outboard engine. Cyclone damage in 1990 and 1991 greatly reduced the number of operating vessels but there are currently more than 250 alia fishing boats actively longline fishing, with 70 boats based in Apia. Simple longline gear, consisting of a mainline of up to 8 km with up to 350 hooks, is used and the average catch recorded is 6 fish per 100 hooks. Yellowfin and bigeye tuna are exported for the fresh fish market, and albacore is exported to canneries in Pago Pago.

The 1996/1997 estimate of domestic fish catches, inclusive of subsistence and commercial fisheries was 6543 metric tons valued at approximately WSS 31.64 million (Annual Report 1996/97, Fisheries Division). Official figures published by the Central Bank of Samoa showed that fish exports increased enormously in the period 1992 to 1996. The longline fishery is expected to continue as one of the top foreign exchange earners for Samoa and an economic review of the tuna fisheries is provided by Stanley

and Toloa (1998). Although Samoa's tuna fishery is locally important, its size relative to the total Pacific fishery is small and presents minimal risk of resource depletion. Increased fish processing and handling, on the other hand, has the potential for causing harbour and nearby lagoon pollution and will thus require careful monitoring.

ENVIRONMENTAL LEGISLATION

Traditional law (*fa'a Samoa*) is still widely used and can be the most effective way of conserving and managing coasts. The village-based council (*fono*) has the principal control over the majority of coastal lands. However traditional resource management authority has weakened, causing problems to become acute and necessitating more formal legislation processes (Peteru, 1993).

The Lands and Environment Act (1989) encompasses natural resource protection, environmental management and pollution control. It has since been amended to become the Lands, Surveys and Environment Act. The Act has been recently reviewed along with related Acts pertaining to coastal management. Environmental guidelines are being produced for DSLE under an NZODA project and are due for completion shortly. Under the same project a draft Environmental Impact Assessment (EIA) regulation document has been prepared which is under consideration by Cabinet. The draft regulations give a higher prominence to DEC for environmental control and make EIA's mandatory for public and private sector projects. Additionally, the draft regulations set limitations on projects with unacceptable environmental effects, address customary rights to a limited extent and include measures of biodiversity protection.

The National Parks and Reservations Acts (1974) applies only to public land and does not cover

customary title land. An attempt to deal with this issue has been the signing of agreements between overseas donor organisations and local villages. For example, conservation agreements have been signed by the villages of Fale'alupo, Tafua, Faala and Salelologa where given areas of rainforest are to be preserved for a period of 50 years in return for development assistance.

The Taking of Lands Act (1964) facilitates the acquisition of customary land for conservation purposes and incorporates compensation for owners, but Peteru (1993) suggests that this has been an unrealistic option.

The Water Authority Act (1992/1993) establishes an independent authority responsible for water resource management which protects the quality and sources of fresh water and which integrates the protection of water resources into environmental planning and assessment.

The Fisheries Act (1988) and the Local Fisheries Regulations (1995) facilitate the conservation and protection of marine breeding and feeding areas as well as integrating the sustainable development of marine resources into environmental planning and assessment. Minimum size limits on fish, shell fish, crustaceans and turtles and the protection of breeding females of certain species are imposed. In addition the use of destructive fishing methods are banned. Village fisheries by-laws are also being established to protect the marine environment and fish stocks (Faasili, 1997).

With respect to marine pollution, a comprehensive Shipping Bill is to be tabled in Parliament shortly which incorporates all international conventions. Additionally, a new Fisheries Bill, Ports Authority Bill and Maritime Zones Bill are in progress. The Fisheries Bill will repeal the 1988 Fisheries Act and the Ports Authority Act will control ship borne pollution.

MAIN ICM ORGANISATIONS ¹

Ministry of Agriculture, Forests, Fisheries, Transport and Civil Aviation (MAFFM)

PO Box 206
Apia

Tel: (685) 22561
Fax: (685) 24576

Tuisugaletau A.S. Aveau
Director of Agriculture

The ministry contains a number of divisions with ICM responsibilities, as described below. ■

¹ Note: italicised prefixes to the names of individuals in Samoan organisations are Matai titles.

Fisheries Division, (MAFFM)

| | |
|---------------------|---|
| PO Box 1874 Apia | Tel: (685) 22047/ 22624 Fax: (685) 24292 |
|---------------------|---|

| | |
|--|------------------|
| Mr Ueta Fa'asili Assistant Director (Fisheries) | Tel: (685) 23863 |
|--|------------------|

| | |
|---|---|
| Dr Michael King Team Leader, Fisheries Extension and Training Project | Tel: (685) 21097 Fax: (685) 20037 E-mail: mking@samoa.net |
|---|---|

This division is responsible for the sustainable development of commercial and subsistence fisheries resources. It is currently running the Fisheries Extension and Training Project, a major aim of which is to promote community-based management of inshore fishery resources. It was also involved with NGOs and DEC in the SPREP-supported 1997 Pacific Year of the Coral Reef Campaign. ■

Meteorology Division (MAFFM)—formerly Apia Observatory

| | |
|-------------------|--------------------------------------|
| PO Box 32 Apia | Tel: (685) 20855 Fax: (685) 23176 |
|-------------------|--------------------------------------|

Mr Ausetalia Titimaea
Assistant Director

The MAFFM is involved in geological, geophysical, hydrological and meteorological studies of coastal morphology, profile mapping and coastal erosion surveying in consultation with the South Pacific Applied Geoscience Commission. ■

Department of Lands, Surveys and Environment (DLSE)

| | |
|---------------------|---|
| Private Bag Apia | Tel: (685) 22481/ 22485 Fax: (685) 23176 E-mail: manumea@pactok.peg.apc.org |
|---------------------|---|

Luafasaga Tu'u'u leti Taule'alo
Director, Department of Lands, Surveys and Environment

| | |
|--|------------------|
| <i>Sailimalo</i> Pati Liu Assistant Director, Division of Environment and Conservation (DEC) | Tel: (685) 25670 |
|--|------------------|

| | |
|---|------------------|
| Mr Laavasa Malua Senior Environmental Planning Officer | Tel: (685) 23800 |
|---|------------------|

Mrs Fetoloai Yandall-Lai
Environmental Planning and Education Officer

Mr Tony Tipama'a
Biodiversity Officer

The Lands Surveys and Environment Act (1989) encompasses natural resource protection, environmental management and pollution control. Administration of this act is the responsibility of the DEC. The division consists of two sections: Environmental Management, Planning and Education; and Biodiversity, National Parks and Reserves. DEC supervises environmental management activities of other departments, monitors and controls coastal pollution and the effects of climate change on key coastal ecosystems (including coral reefs and mangroves) and oversees natural resource management such as sand mining. It also has principal responsibility for the management of parks and reserves (including the Palolo Deep Marine Reserve and the Sa'anapu/ Sataoa Conservation Area). In 1997 it was involved with NGOs and the Fisheries Division in the Year of the Coral Reef campaign. Currently, it is working with PWD, overseas and local consulting companies on a large five-year coastal hazards analysis project funded by the World Bank, termed the Infrastructure Asset Management Project. The project includes plans to assess aspects of coastal vulnerability vital to the country's economy. ■

Ministry of Public Works

Private Bag
Apia

Tel: (685) 21611/ 26688/ 24241
Fax: (685) 20054/ 26780

Leiatua Isikuki Punivalu
Director

The ministry is working on the World Bank-funded Infrastructure Asset Management Project building roads, bridges and seawalls. It is also collaborating with DEC (DLSE) on environmental aspects. PWD is emerging as a non-regulatory body responsible for the development, management and maintenance of infrastructure assets. ■

South Pacific Regional Environment Programme (SPREP)

PO Box 240
Apia

Tel: (685) 21929
Fax: (685) 20231
E-mail: sprep@sprep.org.ws

Mr Tamarai Tutangata
Director

E-mail: tamariit@sprep.org.ws

Mr James Aston
Coastal Management Officer

E-mail: jaston@sprep.org.ws

Ms Lucille Apis-Overhoff
Wetlands and Mangroves Officer

E-mail: lucille@sprep.org.ws

The SPREP-funded Persistent Organic Pollutants (POPs) project assesses the extent and quantity of waste chemicals in Samoa, with a long-term goal of removal and remediation of contaminated areas. The project includes components related to government training and raising public awareness. For additional information on SPREP, see the entry in the 'Regional' chapter. ■

OTHER ICM ORGANISATIONS

Education Department

PO Box 1869
Apia

Tel: (685) 21911
Fax: (685) 21917

Tupae Esera
Director

Mr Peter Varghese
Curriculum Development Unit

Tel: (685) 24614

In 1997 two teaching texts entitled 'Population Studies' and 'The Natural World Around Us' were produced with Peace Corps assistance to introduce environmental topics into the Senior School curriculum. ■

Health Department

Private Bag
Apia

Tel: (685) 21212
Fax: (685) 21440

Lolofiatele Taulealeausumai Dr Eti Enosa
Director General

The Health Department monitors National Waste Management strategies, population growth, family planning and community health education via the National Hospital, District Hospitals and rural Health Centres across the two islands ■

Faasao Savaii Samoa Society

PO Box 5002
Saleologa, Savai'i

Tel: (685) 51271
Fax: (685) 51271

Vaasili F. Moelagi
President

Ms Eteise Christine Schmidt
Treasurer

This is a non-government organisation that promotes public awareness on issues affecting the environment, including the impacts of human activities on the coastal zone. ■

Food and Agriculture Organization of the United Nations— Sub-Regional Office for the Pacific Islands (FAO-SAPA)

FAO Private Mail Bag
Apia

Tel: (685) 20710/ 22127
Fax: (685) 22126
E-mail: FAO-SAP@field.fao.org

Dr Vili Fuavao
Sub-Regional Representative

E-mail: ViliA.Fuavao@field.fao.org

Mr Masanami Izumi
Fisheries Officer

E-mail: Masanami.Izumi@field.fao.org

Mr Gilles Hosch
Associate Professional Officer

FAO is a worldwide organisation involved in integrated natural resources projects, watershed management and other related projects with impact on ICM at the national level. The newly appointed APO is commencing a resource base appraisal of fisheries in the region and intends to compile catch data and other statistics. For more information see the FAO-SAPA entry in the 'Regional' chapter.

Ministry of Women's Affairs

POBox 872
Apia

Tel: (685) 22421
Fax: (685) 22539

Luagalau Foisaga Eteuati Shon
Secretary

Lemalu Nele Leilua
Programme and Training Manager

The ministry promotes the vital role of women in environmental management and development and ensures their full participation in all aspects of sustainable development. ■

O le Si'osi'omaga Society Inc.

PO Box 5774
Apia

Tel: (685) 21993
Fax: (685) 21993

Dr Walter J. Vermeulen
Director

Mr Dion Ale
Project Officer

O le Si'osi'omaga Society Inc. is a non-government organisation that promotes public awareness, education and dissemination of information regarding environmental issues. In 1997, the society was involved in the year of the Coral Reef Campaign and had input into curriculum units developed by CDU. It is currently involved in the SPREP-funded Uafato Conservation Area project and plans to extend the project to include the Tiavi area. ■

Samoa Water Authority

PO Box 245
Apia

Tel: (685) 20409
Fax: (685) 21298

Latu Toga Kupa
General Manager

The authority is currently concerned with improving drinking water quality. It includes an environment section. ■

United Nations Development Programme

UNDP Private Mail Bag
Apia

Tel: (685) 23670
Fax: (685) 23555
E-mail sam.fo@undp.org.wf

Mr Richard B. Olver
Officer in charge

Mr Sealii Sesega
Head of Programme Section 1 (includes environment projects)

Regional programmes current at national level include International Waters Project, Pacific Islands Climate Change Assistance Programme and South Pacific Biodiversity and Conservation Programme. See also UNDP regional office entry under 'Regional' section. ■

United Nations Educational, Scientific and Cultural Organization (UNESCO)

PO Box 5766
Apia

Tel: (685) 24276
Fax: (685) 22253
E-mail uhab@unesco.org

Mr Trevor Sankey
Science Advisor

UNESCO is funding six national workshops entitled the Pacific Environment Information Network for journalists and environment officials. See entry under 'Regional' section for additional information. ■

University of the South Pacific (USP)

| | |
|-----------------------|--|
| Alafua Campus Apia | Tel: (685) 21671 Fax: (685) 22933 E-mail usp@samoa.net |
|-----------------------|--|

Dr Lafita'i Fuata'i
Acting Pro-Vice-Chancellor

| | |
|--|------------------|
| Mr Mohammed Umar Institute for Research, Extension and Training in Agriculture (IRETA). | Tel: (685) 21882 |
|--|------------------|

This is a campus of the Fiji-based USP, comprising the School of Agriculture. It is involved in an International Board for Soil Research and Management (IBSRAM) project on the effects of agriculture on slopes. See the USP entry in the 'Regional' chapter for additional information. ■

Western Samoa Women's Committees Development Organization

| | |
|---------------------|------------------|
| PO Box 1638 Apia | Tel: (685) 23158 |
|---------------------|------------------|

Ms Faatonu Faletose
President

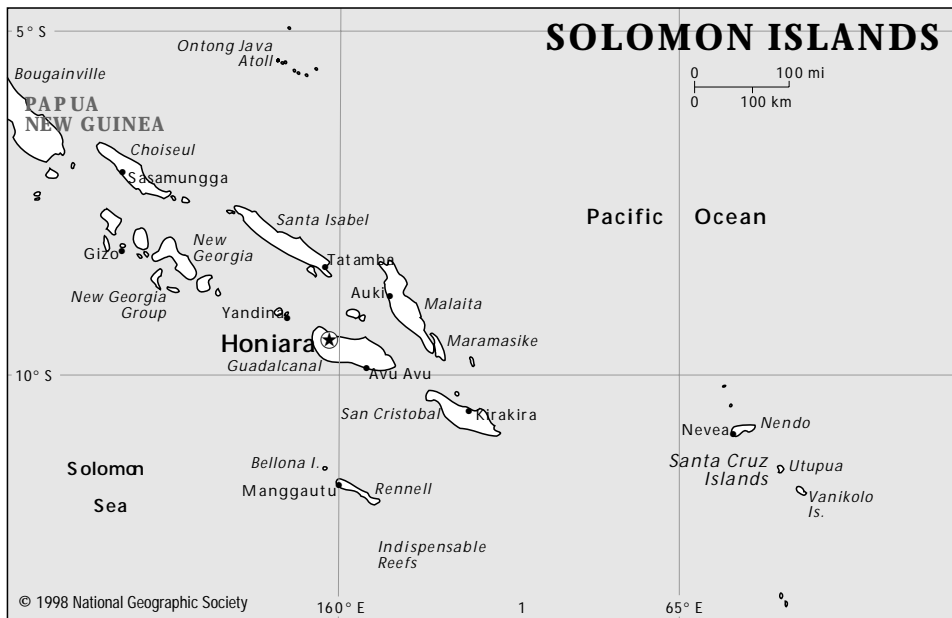
This is a non-government organisation currently involved in community recycling of paper and plastic wastes, in national disaster programmes and in a 'Clean Samoa' campaign. The president has recently organised a Samoa Umbrella Network for NGO's (SUNGO) in an attempt to coordinate activities. ■

SELECTED DOCUMENTS ON ICM

- Amos, M. 1996, *Feasibility study of green snail (Turbo marmoratus) and trochus (Niloticus) transplantation to Western Samoa*, FAO South Pacific Aquaculture Development Project, Suva, Fiji.
- Annual Report for 1996/97 1998, Fisheries Division, Ministry of Agriculture, Forests, Fisheries and Meteorology, Apia, Samoa.
- Bell, L. A. J. 1990 *Environmental Problems in Western Samoa*, Fisheries Division, Apia, Samoa.
- Chase, R. and Veitayaki, J. 1992, *Implications of Climate Change and Sea Level Rise for Western Samoa*, SPREP, Apia, Samoa.
- Cornforth, R. 1994, 'Integrated Coastal Zone Management: The Pacific Way', *Marine Pollution Bulletin*, 29(1-3), 10-13.
- Croad, R. N. and Westlake, S. J. 1998, *Draft report Proposed IDA Infrastructure Asset Management Project*, Coastal component, Opus, Wellington Office, New Zealand.
- Department of Economic Development 1982, *Western Samoa's Fifth Development Plan*, Government of Western Samoa, Apia, Samoa.
- Division of Environment and Conservation 1991, *National Report for UNCED: Western Samoa*, Department of Economic Development (DEC), Apia, Samoa.
- Faasili, U. 1997, 'The use of village by-laws in marine conservation and fisheries management', *Pacific Science Association Intercongress*, Suva, Fiji.
- Faasili, U. and King, M. G. 1997, 'Community-based marine protected areas', *6th South Pacific Conference on Nature Conservation & Protected Areas*, 29 Sept-3 Oct, Pohnpei, Federated States of Micronesia.
- Faasili, U. and Time, S. 1997, 'Alia Longline Fisheries' in *Samoa Conference on Building Sustainable Tuna Industry in Pacific Islands*, 3-8 November, Maui Centre, Hawaii, United States.
- Gauss, G. A. 1981, *Apia Harbour Survey*, Samoa. CCOP/SOPAC Cruise Report 55.
- Hewson, C. A. Y., Malele, F. and Muller, I. D. 1982, 'Coastal area management in Western Samoa', in *Proceedings of the Workshop on Coastal Area Development and Management in Asia and the Pacific*, ed M. Valencia., East-West Center, Honolulu, Hawaii.

- King, M. G. and Faasili, U. 1998, 'Community-based management of subsistence fisheries in Samoa', *Fisheries Ecology & Management*, UK.
- King, M. G. and Faasili, U. 1998, 'Village fisheries management and community-owned Marine Protected Areas, Naga,' *ICLARM Quarterly*, International Centre for Living Marine Resource Management, Manila, Philippines.
- King, M. G. and Faasili, U. 1998, 'A network of small, community-owned fish reserves in Samoa', *PARKS* 8 (2).
- King, M. G. and King, S. A. 1996, *The Oceans and Coastal Areas and their Resources*, UNESCO-UNEP International Environmental Education Programme UNESCO, Paris. 99 pp.
- Mulipola A. 1997, *Report on the Introduction of New Aquatic Species in Samoa*, Report of the Fisheries Division, Apia, Samoa.
- Nunn, P. D., Ravuvu, A. D., Balogh, E., Mimura, N. and Yamada, K. 1994, *Assessment of Coastal Vulnerability and Resilience to Sea-Level Rise and Climate Change. Case Study: Savai'i Island, Western Samoa. Phase 2: Development of Methodology*, SPREP, Apia, Samoa, 109 pp.
- Peturu, C. 1993, *Western Samoa Environmental Legislation Review*, SPREP, Apia, Samoa.
- Soloman, S. M. 1994, *A Review of Coastal Processes and Analysis of Historical Coastal Change in the vicinity of Apia, Western Samoa*.
- Stanley, J. and Toloa, F. 1998, *Review of the Samoa Longline Fishing Industry*, Prepared for the Government of Samoa and Forum Fisheries Agency, Honiara, Solomon Islands.
- Taule'alo, T. I. 1993, *Western Samoa National Environmental Management Strategies*, SPREP, Apia, Samoa.
- Taule'alo, T. I. 1993, *Western Samoa State of the Environment Report*, SPREP, Apia, Samoa.
- Who cares about the fish?* 1998, Public information video, Fisheries Division, Apia, Samoa.
- Zann, L. 1994, 'The status of coral reefs in South Western Pacific Islands', *Marine Pollution Bulletin*, 29(1-3), 55-61.
- Zann, L. 1995, *The Inshore Resources of Upolu, Samoa*, Report of the Fisheries Division, Apia, Samoa.
- Zann, L. 1998, *The Inshore Resources of Savaii, Samoa*, Report of the Fisheries Division, Apia, Samoa.

SOLOMON ISLANDS



PHYSICAL CHARACTERISTICS

The Solomon Islands lie in the southwest Pacific, to the east and south of Papua New Guinea. The country consists of two roughly parallel island chains with six major island groups: Choiseul, Isabel and Malaita are found in the northern group and New Georgia, Guadalcanal and Makira in the south. Rennell and Bellona, and the Temotu Province lie to the south and east respectively of these main island groupings, while the Shortlands lie in the north adjacent to the island of Bougainville (Papua New Guinea). The central archipelago lies 5–12°S and 152–163°E.

In total there are some 992 islands, atolls and reefs that collectively have a land area of nearly 30 000 sq km distributed over 1280 000 sq km of sea. The Solomon Islands is the third largest archipelago in the South Pacific. The main islands vary in length from 140–200 km and in width from 30–50 km. They range from rugged, large mountainous islands with the highest peak at Mt Makarakombou (Guadalcanal) to small, bare sand and coralline atolls. Guadalcanal is the largest island (5340 sq km), while the others range down to a size of less than 1 ha.

The climate is tropical with relatively high and uniform temperature, high humidity and abundant

rainfall. The mean annual rainfall ranges from 3000–5000 mm, with annual temperature ranging from 22–31°C.

The population of the Solomon Islands in 1994 was 385 000. While the majority of these people are Melanesian (94%), there are also Polynesians and Micronesians (5%) as well as Chinese and Caucasians (1%). The population growth rate is one of the highest in the world at 3.5% per annum. The life expectancy at birth is 59.9 years for men and 61.4 years for women.

Although the Honiara urban centre has the highest density with 1702 persons/sq km, most people live in the province of Malaita. The average size of settlement or village is about 44 people and most of these are situated along the coast. Solomon Islanders speak approximately 86 distinct languages. Education is not compulsory, and the illiteracy rate is estimated at 85%.

The Solomon Islands economy is based primarily upon the utilisation of natural resources. Exports provide the main source of income, with timber and fish in the lead, followed by palm oil, cacao and copra. Most people (84%) rely upon subsistence agriculture for income, and the majority live off garden produce and by fishing and hunting. One-third of formally employed people work in government-related services.

Social status in the Solomon Islands is based upon land ownership. Land tenure remains in the traditional system and is spread among village members. Approximately 87% of the land is held according to local traditional or customary land tenure systems, and remains within family ownership through inheritance.

GOVERNMENT STRUCTURE

The Solomon Islands has been an independent nation since 1978 and is a member of the British Commonwealth. The country is a constitutional monarchy with the British monarch as head of state, represented by the Governor-General. The National Government consists of members of parliament elected in 50 constituencies, headed by the Prime Minister. The cabinet has 18 members.

The Solomon Islands is divided into 10 administrative areas of which nine are provinces administered by locally elected councils and the other, Honiara, administered by the Honiara Municipal Authority. Members of Provincial Governments are elected by wards, with each province being sub-divided into local development bodies called area assemblies. The land and marine tenure system dictates that family groups or clans legally have strong rights to ownership of, and decision-making for, their forest and nearshore marine resources.

COASTAL ZONE MANAGEMENT ISSUES

The Solomon Islands coastal zone contains some of the most biologically diverse ecosystems in the world. Its estuaries, beaches, mangroves, coral reefs, sea grasses, algal beds and many small island ecosystems support a wealth of marine resources. Many economically important marine fish, invertebrates and seaweed are found within these ecosystems. Traditionally, Solomon Islanders have derived about 90% of their protein from the sea. Today, many continue to do so. Fishing and gleaning of coral reefs provide important sources of animal protein.

The increasing pressure on the use of marine resources has resulted in more and more of the coastal area being subjected to damage by human activities. Human dependence on reefs for food, materials and income (tourism or export), the problem of ever-increasing population, unsustainable exploitation and increasing discharge of contaminants are serious and growing.

Much of the Solomon Islands is still covered in tropical rainforest. In the last two decades a major timber export industry has developed and some islands have been extensively logged. Export of hardwood logs now provides one third of the national export income. Logging is regarded by some as an important source of income for development-deprived villages. It is estimated that, at present rates of logging, all accessible forests of the Solomon Islands will have been logged within 15 years. Few timber plantations have been established.

Pollution in the Solomon Islands stems mainly from land-based activities. Domestic and industrial sources, logging and agriculture activities constitute the main source of concern. In Honiara alone 75% of sewage flows through a piped collection system directly into marine nearshore waters.

Due to the diversity of the society and cultural landscape, implementation of both traditional and western technologies and social conventions is needed. Integration of customary land use with pollution prevention and mitigation measures is most suitable for the rural areas, on a location specific basis. In the urban centres, a joint environmental/engineering and educational approach is most appropriate.

In conformance with traditional and customary practices, a land use system for the protection of coastal land and ocean resources should be designed and phased into the current land governance system. As yet there has not been a plan developed for Integrated Coastal Zone Management. If and when this takes place, some of the issues it will need to cover are as follows:

- **Soil erosion** from poor land management and logging activities, which results in erosion and sedimentation along the coastline, is becoming a major concern for ICM. Some of the critical habitats such as mangroves, seagrass beds and coral reefs are in danger of being smothered. Watersheds are destroyed in the process of development.
- **Infrastructure development** along the foreshores and land reclamation are taking place around the major urban centres. The Ports Authority in Noro Township, Western Province, is an example of such development. Poorly planned reclamation not only creates shore erosion but also adds to sedimentation of the surrounding environment.
- **Over-exploitation of marine resources** has resulted in severe depletion of several important food and commercial species. These include the giant clams, black and gold lip pearl oysters, green snails, coconut crabs and

some types of beche-de-mer. Other important species now under some form of protection include lobster/ crayfish, turtles and trochus. The Fisheries Act plays an important role in the regulation of these species. The live reef fish food trade also has the potential to deplete valuable reef fish if not properly managed.

- **Liquid and solid waste management** is a problem yet to be solved. Currently most urban sewage is pumped directly into the sea while the rest goes into septic tanks. In rural areas beaches and mangroves are used as toilets creating not only health but also environmental problems.

Marine protected areas (MPAs) have specific roles within coastal zone management. The importance of protecting these habitats is reflected in the Directory of Wetlands (produced by SPREP in conjunction with a number of international organisations involved with the Ramsar Convention) that listed ten types of wetlands in Solomon Islands. IUCN listed six priority areas for conservation and protection: Are'Are Lagoon and Maramasike Passage, Arnavon Islands, Indispensable Reef, Marovo Lagoon, Ortega Passage and Rennell Island. With the exception of Rennell Island, all are representative of the marine environment. Despite these recommendations very little scientific work has been carried out in these areas.

The Arnavon Marine Conservation Area (AMCA), which comprises three slightly raised coral reef islands and the surrounding marine area, is situated at the northwestern peninsula of Isabel Island. In 1975, the Ministry of Natural Resources designated the Arnavon Islands as off-limits under a trespass law, and in 1979 these islands were included within a provincial Protected Lands By-law. In April 1980 a wildlife sanctuary of 1000 ha was established in the Arnavon Islands under a Local Government Ordinance, principally to protect the nesting grounds of Hawksbill and Green Turtles. However the reserve was subsequently abandoned because of disputes over ownership of the islands. In 1992 renewed interest by

the Government and landowners in reviving a protected area for the Arnavon Islands and surrounding marine areas resulted in the Environment and Conservation Division and the Fisheries Division establishing the AMCA. The Nature Conservancy, an international NGO, supports a community-based committee that oversees management of this MPA. AMCA is the first successfully established community-managed MPA in the South Pacific region.

ENVIRONMENTAL LEGISLATION

Since 1993, the Ministry of Forest, Environment and Conservation has been attempting to place the Environment Act before Parliament. The proposed Act includes provisions for environmental impact assessments, integrated coastal zone planning and other ways of integrating environmental legislation into the development planning process. However due to the perceived impact on current land and marine use practices, the Government has not yet approved it.

Some of the existing legislation relating to ICM includes:

- Fisheries Act 1972, and subsequent amendments;
- Ports Act Cap 99 (1956) which controls specified zones along the coastline around national ports;
- Forestry Act (1969) and subsequent amendments, which provide the main vehicle for managing the harvesting of forests and related impacts;
- Environmental Health Act 1980;
- Lands and Title Act; and
- Mines and Minerals Act 1990.

MAIN ICM ORGANISATIONS

Ministry of Forest, Environment and Conservation

PO Box G24
Honiara

Tel: (677) 24325
Fax: (677) 25747

Mr Moses Biliki
Director of Environment

The Environment and Conservation Division coordinates the implementation of the National Environment Management Strategy (NEMS). It works closely with the Fisheries Division on ICM issues. ■

Ministry of Transport, Works and Aviation

PO Box G20
Honiara

Tel: (677) 21718
Fax: (677) 20046

Mr Mike Ariki
Director of Meteorology, Meteorological Service Division

This ministry is responsible for climate change issues and for the Global Environment Facility's Climate Change project. ■

Fisheries Division, Ministry of Agriculture and Fisheries

PO Box G13
Honiara

Tel: (677) 30107
Fax: (677) 30256
E-mail: sbfish@ffa.gov.sb

Mr Albert Wata
Under Secretary for Fisheries

Mr Sylvester Diake
Director of Fisheries

Ms Michelle Lam
Principal Fisheries Officer, Research and Resource Management Section

The division is responsible for the sustainable development and effective management of marine resources. The Fisheries Act aims to assist the management of these resources by placing constraints on the harvest of various resources. It regulates marine resources through quota systems, size limits, seasonal closures, gear restrictions or export regulations. The division is also responsible for Integrated Coastal Zone Management by being the umbrella division under which the Global Environment Facility's International Waters project is implemented. ■

OTHER ICM ORGANISATIONS

Ministry of Agriculture and Fisheries

PO Box G13
Honiara

Tel: (677) 21327
Fax: (677) 21955

Ms Ruth Liloqula
Director of Agriculture Research

This is responsible for developing better plant varieties and land management systems. ■

Ministry of Development and Planning

PO Box G30
Honiara

Tel: (677) 24538
Fax: (677) 25138

Mr Shadrack Fanega
Under Secretary—Planning

The National Planning Unit is responsible for any national development projects and screens them before approval for implementation. ■

Ministry of Lands and Housing

| | |
|-----------------------|--------------------------------------|
| PO Box G38 Honiara | Tel: (677) 23145 Fax: (677) 20094 |
|-----------------------|--------------------------------------|

Chief Planning Officer
Physical Planning Division

This ministry's responsibilities involve general planning issues, including those in coastal areas and, under the Lands and Title Act, government land. It also administers the Town and Country Planning Act. ■

Ministry of Energy, Mines, and Minerals

| | |
|-----------------------|--------------------------------------|
| PO Box G30 Honiara | Tel: (677) 21521 Fax: (677) 25811 |
|-----------------------|--------------------------------------|

Mr Don Tolia
Director, Geology Division

The ministry is responsible for the development of non-living resources while at the same time protecting living resources. ■

World Wide Fund for Nature (WWF) Coastal Resource Conservation and Development Project

| | |
|-------------------------------------|--------------------------------------|
| PO Box 21 Gizo, Western Province | Tel: (677) 60191 Fax: (677) 60294 |
|-------------------------------------|--------------------------------------|

| | |
|---|------------------------------------|
| Ms Kath Means Senior Technical Advisor | E-mail: 100232.3601@compuserve.com |
|---|------------------------------------|

Established in Gizo in 1995, this project aims to assist resource owners in developmental decisions. It provides legal and technical advice and support in resource planning methods in order to facilitate community unity in decision-making. The WWF-CRCD now covers the Western and Choiseul Provinces and will expand to Isabel Province soon. A joint study is planned with the Fisheries Division to determine the current status of inshore marine resources in the Solomon Islands. The study will provide valuable information for ICM. ■

World Heritage Project, Ministry of Culture and Tourism

| | |
|-----------------------|--------------------------------------|
| PO Box G20 Honiara | Tel: (677) 23574 Fax: (677) 23574 |
|-----------------------|--------------------------------------|

Mr Ben Davi
Project Coordinator

In 1989, Solomon Islands recommended that world listing be pursued for Lake Tegano (Rennell and Bellona) and Marovo Lagoon (Western Province). The New Zealand Government was invited to be the sponsor country to enable Solomon Islands to become party to the World Heritage Convention and to assist with the procedures for listing. In 1992 Solomon Islands became a member of the convention. In 1994, the New Zealand Ministry of Foreign Affairs appointed a project manager, resident in Solomon Islands, to continue to provide public awareness about the World Heritage Programme and to assist in preparing the nomination document. ■

The Nature Conservancy (TNC)

PO Box 556
Honiara

Tel: (677) 20940
Fax: (677) 20940

Mr George Myers
Programme Manager

E-mail: tnc@welkam.solomon.com.sb
or: gmyers@tnc.org

TNC is involved in a number of conservation projects in the Solomon Islands, in particular the establishment of a marine and terrestrial conservation area based around the Arnavon Islands. TNC and its partners have also supported the creation of two community-managed cooperative fishing centres in an attempt to develop a biologically and economically sustainable income source for communities affected by the resource harvesting restrictions imposed in the conservation area. ■

ICLARM Coastal Aquaculture Centre

PO Box 438
Honiara

Tel: (677) 29255
Fax: (677) 29130

Dr Johann Bell
Chief Scientist

ICLARM's Coastal Aquaculture Centre at Aruligo specialises in scientific research on seed production and enhancement of commercially important species for the region. Scientists are currently researching seed production of giant clams, beche-de-mer and pearl oysters. ■

USP Institute of Marine Resources

PO Box 460
Honiara

Tel: (677) 21287
Fax: (677) 21287/ 30256

Mr Gunnu Pillai
Director

IMR is a branch of the University of the South Pacific in Fiji, and is based partly at the USP Centre in Honiara and partly at the Fisheries Division headquarters. It carries out research on marine resources and the marine environment as well as running short courses in these areas. ■

Solomon Islands Development Trust

PO Box 147
Honiara

Tel: (677) 23409
Fax: (677) 21131

Mr Nicholas Kikini
Deputy Director

This is a local NGO set up in 1982 to focus on awareness building. Its main concern has been in the field of development, environment and health education. ■

Solomon Islands Broadcasting Commission

PO Box 654
Honiara

Tel: (677) 20051
Fax: (677) 23159

Mr Julian Maka'a
Environment Programmes Director

A weekly programme broadcasts interviews with specialists, visiting authorities and local groups, as well as conferences/ workshops and other happenings concerning the environment. ■

SOLOMON ISLANDS CONT'D

Solomon Islands College of Higher Education (SICHE)

PO Box G23
Honiara

Tel: (677) 30111
Fax: (677) 30390

Mr Frank Wickham
Head of School of Natural Resources

SICHE plays an important role in environmental education in the country. The School of Natural Resources offers certificates in forestry and agriculture, as well as environmental courses. ■

Solomon Islands Women's Information Network (SIWNET)

PO Box 494
Honiara

Tel: (677) 23371
Fax: (677) 21339

Ms Doreen Sam
Director

This organisation, sponsored by the New Zealand Government, provides radio awareness programmes on a wide range of issues, including environmental matters. ■

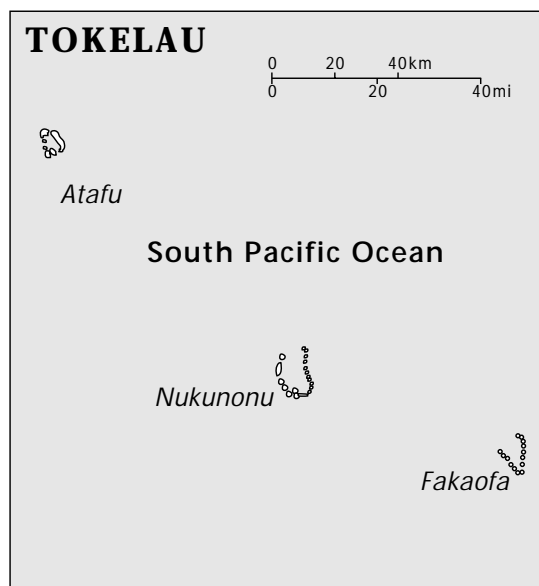
SELECTED DOCUMENTS ON ICM

- Boer, B. 1992, *SPREP Review of Environmental Law in the Solomon Islands. Strengthening environment management capabilities in Pacific Island Developing Countries*, RETA 5403, Australian Centre for International Law, Faculty of Law, University of Sydney, Australia.
- Doulman, D. J. 1992, *Community Based Fishery Management: Toward the Restoration of Traditional Practices in the South Pacific*, in FAO/Japan Expert Consultation on the Development of Community Based Coastal Fishery Management Systems For Asia and the Pacific. FI:CCFM/92/Sp.4. March 1992.
- Fakahau, S. T. and Shepard, M. P. 1986, *Fisheries Research Needs in the South Pacific: Information Required for the Effective Management and Development of the Fisheries of the Islands States of the South Pacific*, report to Forum Fisheries Agency and Canadian International Center for Ocean Development. 94pp.
- Hviding, E. 1988, *Marine Tenure and Resource Development in Marovo Lagoon, Solomon Islands*, FFA Report No: 88/35. Solomon Islands.
- Hviding, E. 1989, *All Things in Our Sea: The dynamics of customary marine tenure, Marovo Lagoon, Solomon Islands*, Boroko, Papua New Guinea: National Research Institute, Special Publication No. 13.
- Hviding, E. and Ruddle, K. 1991, *A Regional Assessment of the Potential Role of Customary Marine Tenure (CMT) Systems in Contemporary Fisheries Management in the South Pacific*, report to the Forum Fisheries Agency. FFA Report 91/71.
- Johannes R. E. and Lam, M. 1998, 'Current status of destructive fishing practices in Solomon Islands and recommendations for government management of the live reef fish trade', *Live Reef Fish Bulletin*.
- Lam, M. 1990, *An Initial Study of Microbial Pollution of the Marine Environment Around Honira, Solomon Islands*, Institute of Natural Resources report No. 90/3. USP. Suva Fiji.
- Lam, M. 1996 *Consideration of Customary Marine Tenure in Marine Protected Areas of the South Pacific*.
- Lam, M. 1997, *Solomon Islands National Task Force Input to GEF International Waters Project Strategic Action Plan for Pacific*, SPREP, Apia, Samoa.
- Leary T. 1993, *Solomon Islands: State of the Environment Report*, SPREP, Apia, Samoa.
- Mani, L. 1994, *An Assessment of Fish Cannery Effluent Discharge on Pollution Stutau of Noro Sea Front, Western Province, Solomon Islands*, report to the Joint Training Programme in Marine Pollution Assessment and Control by the University of the

South Pacific, Fiji, and the University of Victoria, Canada.

- Pulea, M. 1993, *An Overview of Constitutional and Legal Provisions Relevant to Customary Marine Tenure and Management System in the South Pacific*. FFA Report No: 93/23. Solomon Islands
- Skewes, T. 1990, *Marine Resources Profiles: Solomon Islands*. FFA Report 90/61.
- Solomon Islands 1993, *National Environmental Management Strategies*, SPREP, Apia, Samoa.
- Wilkinson, C. R and Buddemeier, R. W. 1994, *Global Climate Change and Coral Reefs: Implications for People and Reefs*. IUCN. Switzerland.
- Wright, A. and Hill, L. (eds) 1993, *Nearshore Marine Resources of the South Pacific—Information for Fisheries Development and Management*, Institute of Pacific Studies, Suva; Forum Fisheries Agency, Honiara; International Centre for Ocean Development, Canada.

TOKELAU



PHYSICAL CHARACTERISTICS

Tokelau consists of three widely spaced atolls lying 8–10°S latitude and 171–173°W longitude. Atafu is the northernmost atoll, 92 km northwest of Nukunonu, which in turn lies 64 km northwest of Fakaofa. The group lies about 483 km north of Samoa, the nearest major landfall. The population peaked in the 1960s at around 2000 but has been declining ever since. The estimated 1994 mid-year population was 1500.

Each atoll consists of a number of reef-bound islets rising 3–5 metres above sea level and encircling a central lagoon. The size of these islets varies from 90 m to over 6 km in length, and from a few metres to over 200 m in width. The largest atoll, Nukunonu, has a total land area of 4.7 sq km, while Fakaofa and Atafu are 4 sq km and 3.5 sq km in area respectively. The reef extends only a short distance from the shore and then drops sharply into deep waters.

The physical characteristics of the atolls allow very little scope for economic development and the few natural resources are sufficient only to meet the needs of the people. Apart from the production of copra, agricultural products are of a basic subsistence nature and include coconuts, taro, breadfruit, pawpaws, pandanus fruit and bananas. Various seeds have been tested but because of the poor quality of the soil very poor results have been obtained. Livestock on the islands comprises pigs, poultry and goats. Ocean and lagoon fish are captured in quantity

and form a staple component of the diet, accounting for 55% of all animal protein consumed.

Transportation to and from Tokelau is via a 57-tonne inter-atoll catamaran, which also makes a monthly trip to Samoa. There are no air services and no plans to introduce an air link. The islanders have opposed the construction of an airstrip despite the recommendations of overseas missions and studies.

GOVERNMENT STRUCTURE

The Government's central office is based on Atafu, where it operates as the Office of the Faipule (Ofiha o te Faipule). However due to the difficulties of accessing or communicating directly with Tokelau, most external contact is via the Tokelau Apia Liaison Office in Samoa.

The administration of Tokelau is the responsibility of the Minister of Foreign Affairs of New Zealand, who is empowered to appoint an Administrator to the Territory. In practice, most of the Administrator's powers are delegated to the Office of the Faipule. Each atoll has its own Council of Elders (Taupulega), which comprises the family heads together with two elected members, the Faipule and the Puleniku. The Faipule represents the atoll in its dealings with the administering power and the public service, and presides over the council and the court. The Puleniku is responsible for the administration of village affairs. The Faipule and the Puleniku are democratically

elected by universal adult suffrage every three years. Twice a year, the representatives of all three Councils of Elders meet at the General Fono, which is attended by 15 delegates from each atoll and chaired by the three Faipules.

ENVIRONMENTAL LEGISLATION

In the past Tokelau's legislative and judicial systems were based on the Tokelau Act 1948 and its amendments. A more coherent body of law, which responds to current needs and gives due recognition to traditional customs, is currently in preparation. At present no national laws exist to deal with conservation and natural resource management. However each Council of Elders has the jurisdiction to formulate its own set of village rules. In regard to fishing, these often include the traditional system of periodic bans on harvesting or on the use of certain fishing gears or areas.

COASTAL ZONE MANAGEMENT ISSUES

The main environmental issues relating to coastal management in Tokelau are beach mining for sand and aggregate, waste disposal and management, soil erosion and land degradation, and the prospect of sea-level rise. There is also concern about overfishing in some lagoon areas.

MAIN ICM ORGANISATIONS

Tokelau Apia Liaison Office

PO Box 865
Apia, Samoa

Tel: (685) 20822/ 20823/ 22007
Fax: (685) 21761

Mr Logotasi Iosefa
Manager

The office has no direct coastal management responsibilities but is the normal channel of communication with the Office of the Faipule (see below). ■

Department of Natural Resources and Environment, Office of the Faipule

c/o Tokelau Apia Liaison Office
PO Box 865, Apia, Samoa

Tel: (685) 20822/ 20823
Fax: (685) 21761

Mr Kirifi Kirifi
Director

Mrs Suia Pelasio
Environmental Advisory Officer

Mr Mose Pelasio
Fisheries Advisory Officer

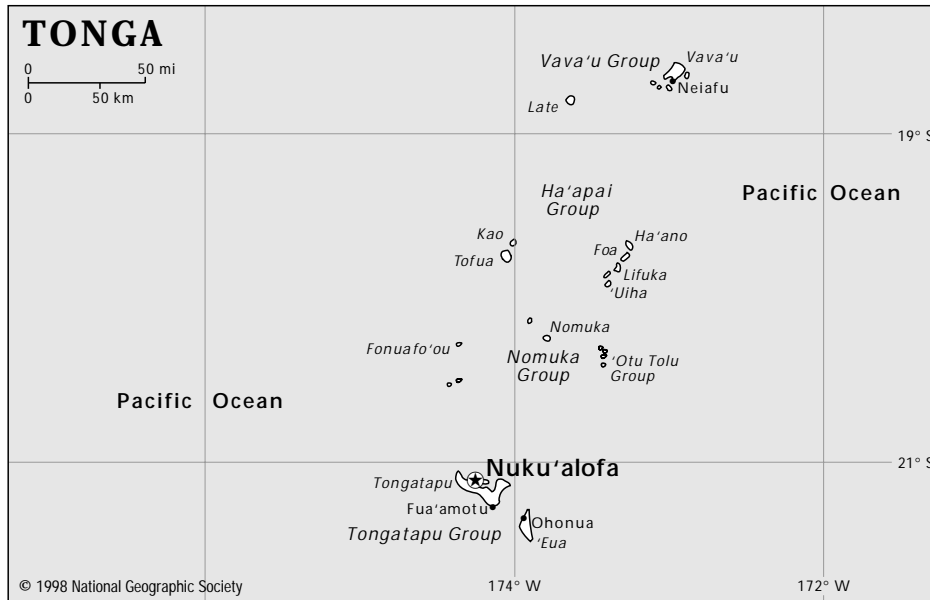
The Department of Natural Resources and Environment deals with all matters relating to the country's environment. The director is supported by a management assistant, four officers and two assistants. Only two of the seven staff deal with environmental issues.

Responsibilities related to coastal management include advising the populace, largely through the National Fono and Island Councils, about environmental issues. Current activities relating to coastal management include solid waste collection and disposal, seawall gabion basket construction, and advising the island councils on the use of traditional closures for marine fishery conservation. ■

SELECTED DOCUMENTS ON ICM

- Angelo, A. H. 1993, *Environmental Legislation Review: Tokelau*, SPREP, Apia, Samoa.
- Balazs, G. H. 1983, 'Sea turtles and their traditional use in Tokelau', *Atoll Research Bulletin*, vol. 279, pp. 1-29.
- Brockliss, C. C. 1990, *Report on seawall protection, Tokelau Islands*, Maccaferri Gabions New Zealand Ltd., Auckland, New Zealand.
- Gillett, R. 1985, 'Traditional tuna fishing in Tokelau', *Topic Review No. 27*, SPREP/ SPC, Noumea, New Caledonia.
- Gillett, R. 1986, *The transplantation of trochus from Fiji to Tokelau*, Report 86-001, UNDP Integrated Atoll Development Programme/ Office of Tokelau Affairs/ FAO South Pacific Regional Fishery Development Programme.
- Gillett, R. and Toloa, F. 1988, 'The importance of small-scale tuna fishing: a Tokelau case study', in *Tuna Issues and Perspectives in the Pacific Islands Region*, ed D. Doullman, East-West Centre, Hawaii, pp. 177-190.
- Humphries, S. and Collins, D. 1991, *Tokelau Country Report for the United Nations Conference on Environment and Development, Brazil*, Office for Tokelau Affairs, Apia, Samoa. 57 pp.
- Ioane, M. K. 1994, *Tokelau State of the Environment Report*, SPREP, Apia, Samoa.
- Lear, B. 1989, *Conservation of the Indigenous Marine and Terrestrial Species and the Associated Traditional Knowledge and Customs Found in Tokelau*, unpublished report commissioned by UNDP, Office of Tokelau Affairs, Apia, Samoa.
- Shuma, G. 1992, *Tokelau Environmental Impact of Shore Protection Works*, unpublished report commissioned by UNDP, Office of Tokelau Affairs, Apia, Samoa.
- Toloa, F. 1994, *Tokelau Environmental Management Strategy*, SPREP, Apia, Samoa.
- Toloa, F., Gillett, R. and Pelasio, M. 1989, 'Aspects of traditional marine conservation in Tokelau', *Proceedings of the Fourth South Pacific Conference on Nature Conservation and Protected Areas, Port Vila, Vanuatu*, SPREP, Noumea, New Caledonia.
- Toloa, F., Gillett, R. and Pelasio, M. 1994, 'Traditional marine conservation in Tokelau', in *Science of Pacific Peoples*, Institute of Pacific Studies, University of the South Pacific, pp. 121-127.
- Tulega, L. 1993, *Waste Management Study for Tokelau*, unpublished paper, SPREP, Apia, Samoa.
- Wodzicki, K. 1973, 'The Tokelau Islands: Environment, natural history and special conservation problems,' in *Regional Symposium on Conservation of Nature: Reefs and Lagoons*, SPC, Noumea, New Caledonia.
- Wodzicki, K. and Laird, M. 1970, 'Birds and bird lore in the Tokelau Islands', *Notornis*, vol. 17, pp. 247-276.

TONGA



PHYSICAL CHARACTERISTICS

Tonga is an archipelagic country comprising about 170 islands (of which 36 are inhabited) running in a roughly north-south axis. The three principal groups are Nuku'alofa, where the administrative centre of Tongatapu is located, in the south; the Ha'apai group in the centre; and the Vava'u group in the north. Other islands extend beyond the three main groups.

Tonga straddles the Tonga trench, an area of active geological subduction. Tectonic activity is frequent and the country is prone to earthquakes. Most of the islands are on the east of the trench and are of coralline formation but there are volcanic islands in the west, some of which are active. The sea floor is deep and characterised by numerous seamounts, some of which are actively volcanic.

GOVERNMENT STRUCTURE

Tonga is a hereditary monarchy. The King is the Head of State and of Government. He appoints, and presides over, the Privy Council which includes the Cabinet (10 permanently-appointed Ministers led by the Prime Minister), the Governors of Ha'apai and Vava'u, and any others the King sees fit to call to the council. The Legislative Assembly comprises the King and 30 members who

include the Privy Council; nine representatives of the hereditary nobles, chosen by their peers; and nine people's representatives, elected by popular vote. Elected members hold office for three years. There are no official political parties, although an opposition group was founded in late 1992 to campaign for democratic reform.

COASTAL ZONE MANAGEMENT ISSUES

ICM issues in Tonga are most acute in the urban centre of Nuku'alofa, which is adjacent to a partially enclosed lagoon. Coastal construction and foreshore reclamation, road and port developments, beach sand mining and waste disposal are some of the predominant issues. In addition recent agriculture projects have led to high and effectively unregulated use of pesticides and fertilisers, and rapidly growing numbers of motor vehicles have increased the amount of lubricants, coolants and other chemical wastes for which proper disposal facilities are not yet in place. Increased contamination of Tongatapu's ground and lagoon waters will occur if these issues are not addressed. Coastal mangroves and reef areas are periodically reclaimed for land development, and mining of sand for construction material continues on some of Tongatapu's beaches. Lagoon and reef fishery resources are heavily exploited by line and spear fishing, gill-netting, gleaning and the use of fish fences.

Other less urbanised areas face different, probably less serious but nevertheless growing ICM problems. Coastal erosion due to deforestation is an issue in some parts of Tongatapu and other islands such as 'Eua. Yachting and sport fishing is becoming increasingly important to the local economy of the Vava'u group, and the area is also expected to become the centre of a pearl farming industry which the Government is promoting. Effective conservation of the group's pristine marine environment will be a major factor in maintaining and strengthening these economic activities.

Coastal fishery resources in many parts of Tonga are threatened by growing fishing pressure and the lack of effective fishery management arrangements. For instance, following a period of intensive exploitation, a 10-year ban on beche-de-mer exports has now been introduced (late 1997) to allow recovery of the resource. In general, fishery conservation regulations such as size limits and closed seasons are poorly known, observed or policed. Five marine parks have been established in Tonga, all around Nuku'alofa, but they are currently not thought to be enjoying any real protection from fishing. Dynamite fishing continues to be practised, even in the marine parks. A marine park specialist is due to be appointed in 1998 and this is expected to improve management of the reserves.

The Ministry of Fisheries has an active aquaculture development programme. In order for aquaculture to be transferred to the private sector as planned it will be necessary to devise a system whereby usage rights to coastal waters, which are the property of the Crown, can be allocated on a private or community basis. This and the development of co-management arrangements (involving both Government and fishing communities) as a means of improving inshore resource management, are both being studied as part of a review of the fisheries sector commissioned by the Government in late 1997.

Future developments may bring new ICM issues to Tonga above and beyond those changes associated with gradually increasing coastal populations. Planned major road extensions currently underway in Vava'u, as well as possible wharf improvements, will create increased sedimentation and reduced water exchange in semi-enclosed lagoon areas. The increasing amount of yacht traffic in Vava'u is raising concerns over the amount of ship-based effluent being discharged into areas which are already being increasingly stressed due to terrestrial sewage discharge. The area in question is also the site of proposed aquaculture developments, which will be adversely impacted by this problem. Considerable effort is going into the development of a locally based tuna longline industry, which will involve redevelopment of the port facilities in Nuku'alofa

(probably at Vuna) including re-dredging of the existing boat basins and wharf construction. The wharf development, the operation of a significantly increased fishing fleet, and the possibility of shore-based fish processing facilities all have the potential to increase pollution of the main Nuku'alofa lagoon. Hydrocarbon extraction in the Nuku'alofa area is a longer term prospect with significant pollution potential.

Various projects and activities are underway to mitigate some of the various ICM issues being experienced. The Environmental Protection Unit (EPU) undertakes public awareness-raising activities (especially through radio and TV segments), carries out enforcement of environmental laws, and attempts to promote coordination between different government departments whose activities may impact on the coastal zone. The Ministry of Fisheries also has a fishery management awareness-raising programme that involves TV advertisements, school visits and posters. Alternative sand-mining sites are being investigated by the Ministry of Lands, and a management plan for the Fanga'uta lagoon is being developed. An Action Strategy for the Management of the Environment, which put forward 31 specific sustainable development projects and programmes, many of which have ICM implications, was proposed in 1993, although so far only a few of these programmes have proceeded towards implementation. One which has is the Ha'apai Conservation Area Project, which aims to promote community-based management of both terrestrial and marine resources in the Ha'apai group.

Coastal zone management is an issue of growing importance in Tonga, and especially Nuku'alofa, but has not yet been fully integrated into national and regional development planning systems. Legislation relating to the development of the coastal zone remains scattered, and responsibility for its implementation may rest with different government or regional agencies. In some cases it may be inconsistent or contradictory. An inter-disciplinary committee has been established as a means of improving coordination between ministries but the committee meets infrequently and many coastal developments continue with insufficient regard their for broader impacts.

ENVIRONMENTAL LEGISLATION

Since 1981 the Ministry of Lands, Surveys and Natural Resources has been attempting to place before parliament a bill on land use, natural resources and environmental planning. The proposed bill includes provisions for environmental impact assessments, planning for coastal protection,

and other ways of integrating environmental legislation into the development planning process. However it does not seem to have found favour and acceptance, perhaps because of its size and complexity, as well as its perceived impact on current land use practices.

- the Parks and Reserves Act (1976);
- the Garbage Act, 1949, and subsequent amendments; and
- the Harbours Act, 1903, and subsequent amendments.

A review of environmental legislation was undertaken by Pulea (1992) who examined 35 relevant legislative instruments. The most important which relate to ICM are:

- the Land Act, 1936, and subsequent amendments, as well as the subsidiary Land (Quarry) Regulations and the Land (Removal of Sand) Regulations;
- the Fisheries Act, 1989, and subsequent amendments, as well as the subsidiary Fishery Conservation and Management Regulations;

The review found a number of instruments to be inadequate and numerous specific revisions or new legislative provisions were proposed. However, the most important step towards improving Tonga's environmental law would be parliament's eventual approval of the draft bill on land use, natural resources and environmental planning. A draft Marine Pollution Bill, drawn up in 1992, is also pending parliamentary approval.

MAIN ICM ORGANISATIONS

Ministry of Lands, Survey and Natural Resources

PO Box 5
Nuku'alofa

Tel: (676) 22655/ 23611
Fax: (676) 23216

Dr Savae Latu
Secretary for Lands, Surveys and Natural Resource

Ms Netatua Prescott
Director, Environmental Planning Unit

This is one of Tonga's largest government ministries, and the one with broadest responsibility for ICM and environmental issues in general. The ministry is in charge of land use planning and surveying, physical planning, issue of land leases, natural resource management and mineral exploitation (including authorisation for sand and gravel mining in foreshore areas and issue of hydrocarbon development permits). It also has principal responsibility for the management of parks and reserves.

The Environment Planning Unit, which has six professional staff, has specific responsibility for most environmental issues. It also acts as a coordinating mechanism and is responsible to an Interdepartmental Environment Committee comprising representatives from the Ministries of: Lands, Surveys and Natural Resources; Health; Foreign Affairs; Agriculture and Forestry; Fisheries, Works; Labour, Commerce and Industries; the Central Planning Department; and the Tonga Visitors' Bureau. The EPU is responsible for the administration of environmental legislation and the raising of public awareness about environmental issues through a regular radio programme and publication of articles in newspapers.

The Ministry's geology section carries out research into the effects of beach mining and the impacts of natural disasters such as cyclones, and maintains maps of coastal areas.

A Marine Parks Management Authority was established in late 1996 under the Parks and Reserves Act. The EPU acts as secretariat to the authority, which includes representatives of the Ministries of Lands, Fisheries, Marine and Ports, and Tourism. However the authority has not yet convened its first meeting. ■

Ministry of Fisheries

PO Box 871
Nuku'alofa

Tel: (676) 21399/ 23730
Fax: (676) 23888

Hon. Akau'ola
Secretary for Fisheries

Mr Mafi Akau'ola
Deputy Secretary for Fisheries

The ministry is responsible for promoting the development and ensuring the effective management of Tonga's living marine resources. It establishes fishery management regulations, licenses fishing operations and fish processing and exporting establishments, and monitors exploitation levels. The ministry is currently conducting public awareness campaigns on fishery management issues. The aquaculture research programme aims to promote commercial aquaculture and also allow restocking of certain over-exploited marine species, both of which are seen as means to relieve fishing pressure on coastal resources. ■

Ministry of Marine and Ports

PO Box 397
Nuku'alofa

Tel: (676) 22555
Fax: (676) 24267

Capt. Sione Tu'itupo Fotu
Secretary for Marine and Ports

Mr Mosese Fakatau
Deputy Secretary for Marine and Ports

Mr Sunia Vikilami
Senior Marine Officer

This ministry is responsible for the development and management of Tonga's ports and harbours, including the enforcement of regulations controlling pollution and dumping in these areas. ■

OTHER ICM ORGANISATIONS

Ministry of Works and Disaster Relief Activities

PO Box 61
Nuku'alofa

Tel: (676) 23100
Fax: (676) 23102

Mr Sione M. Taumoepeau
Director of Works

Ministry of Education

PO Box 61
Nuku'alofa

Tel: (676) 23511
Fax: (676) 23806

Dr Paula S. Bloomfield
Director of Education, Civil Aviation and Works

Central Planning Department

Tonga Development Bank Building
Nuku'alofa

Tel: (676) 21366
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Mr Tevita Paulo Lavulo
Director of Planning

Ministry of Agriculture and Forestry

PO Box 5
Nuku'alofa

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Mr Haniteli O. Fa'anunu
Director of Agriculture

Ministry of Health

PO Box 59
Nuku'alofa

Tel: (676) 23200
Fax: (676) 24291

Dr Laumeesi Malolo
Director of Health

Ministry of Labour, Commerce and Industries

PO Box 110
Nuku'alofa

Tel: (676) 23688
Fax: (676) 23880

Mr James W. Harris
Secretary for Labour, Commerce and Industries

Tonga Visitor's Bureau

PO Box 37
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Tel: (676) 21733
Fax: (676) 23507

Mr Semisi Taumoepeau
Director of Tourism

Ministry of Foreign Affairs and Defence

PO Box 821
Nuku'alofa

Tel: (676) 23600
Fax: (676) 23360

Hon. Tu'a Taumoepeau Tupou
Secretary for Foreign Affairs

SELECTED DOCUMENTS ON ICM

Anon. 1996, *Tonga-Australia Environment Planning and Management Strengthening Project Feasibility Study Report and Project Design Document, Vol I (Report and Annexes) and Vol II (Working Papers)*, prepared for AusAID and the Government of Tonga.

Bell, L., U Fa'anunu, A. J. and Koloa, T. 1994, *Fisheries Resource Profiles: Kingdom of Tonga*, FFA Report 94/5, South Pacific Forum Fisheries Agency, Honiara, Solomon Islands.

Central Planning Department 1991, *Kingdom of Tonga, Sixth Development Plan*, Nuku'alofa Government of Tonga, 331 pp.

Chesher, R. 1984a, *Pollution Sources Survey of the Kingdom of Tonga*, SPREP Topic Review 19, SPC, Nouméa, New Caledonia.

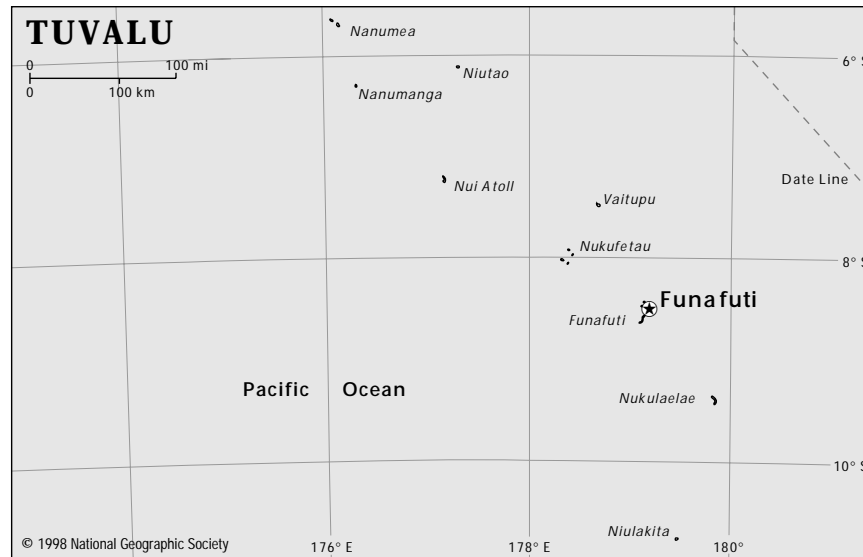
Chesher, R. 1984b, *Resource Assessment Report: Black Coral of Tonga*, SPC, Nouméa, New Caledonia.

Chesher, R. 1985, 'Practical problems in coral reef utilisation and management: A Tongan case study', in *Proceedings of the Fifth International Coral Reef Congress*, Antenne Museum—Moorea, French Polynesia, vol 4.

Dahl, A. 1978, *Environmental and Ecological Report on Tonga*, SPC, Nouméa, New Caledonia.

- ESCAP 1990, *Environmental Management Plan for the Kingdom of Tonga*, Bangkok ESCAP.
- Faka'osi, T., Filial, L. Thaman R. R. and Smith, A. J. 1996, *Tonga Coastal Reforestation Project: Final Project Report*, SPREP, Apia, Samoa.
- Government of Tonga 1991, *National Report of the Kingdom of Tonga to the United Nations Conference on Environment and Development*, Nuku'alofa Government of Tonga, 54 pp.
- Hayes, T. 1980, *Mission Report of the Inter-regional Consultant on Marine Pollution—Kingdom of Tonga*, Inter-Governmental Maritime Consultative Organisation.
- Holthus, P 1996, *Coral Reef Survey, Vava'u, Kingdom of Tonga*, SPREP, Apia, Samoa.
- Matoto, S., Ledua, E., Mou-tham, G., Kulbicki, M. and Dalzell, P. 1996, *The Aquarium-fish Fishery in Tongatapu, Tonga. Status and Recommendations for Management*, SPC, Nouméa, New Caledonia.
- Miria-Tairea, M. 1995, *Fisheries Legislative Profile, Kingdom of Tonga*, FFA Report 95/3. Forum Fisheries Agency, Honiara, Solomon Islands.
- Ministry of Lands, Survey and Natural Resources 1995, *Ha'apai Conservation Area Project Preparation Document*, South Pacific Biodiversity Conservation Programme, SPREP, Apia, Samoa.
- Nunn, P. D. and Waddell, E. 1992, *Implications of Climate Change and Sea Level Rise for the Kingdom of Tonga*. SPREP, Apia, Samoa.
- Oliver, J. and Smith, A. 1994, *Report to the Prime Minister's Office Concerning the Collection of Corals and Aquarium Fish for Export from the Kingdom of Tonga*, SPREP, Apia, Samoa.
- Tongilava, S. L. 1994, *Traditional Practices and their Implications for Sustainable Development in Tonga*, SPREP Reports and Studies Series no. 71, SPREP, Apia, Samoa.
- Onorio, K. and Morgan, R. K. 1996, *Strategic Environmental Assessment Report, Neiafu Master Plan, Vava'u, Kingdom of Tonga*, SPREP, Apia, Samoa.
- Petelo, A., Matoto, S. and Gillett, R. 1995 'The case for community-based fisheries management in Tonga', *Workshop on Inshore Resource Management, Background Paper 61, Workshop on the Management of Pacific Island Inshore Fisheries*. SPC, Noumea, New Caledonia.
- Pulea, M. 1992, *SPREP Review of Environmental Law in the Kingdom of Tonga. Strengthening Environment Management Capabilities in Pacific Island Developing Countries*, RETA 5403. Australian Centre for International Law, Faculty of Law, University of Sydney, Australia.
- Thistlethwaite, R., Sheppard, D. and Prescott, N. 1993, *Kingdom of Tonga: Action Strategy for Managing the Environment*, SPREP, Apia, Samoa.

TUVALU



PHYSICAL CHARACTERISTICS

Tuvalu, formerly known as the Ellice Islands under the British Protectorate, is an archipelago consisting of three small reef islands and six atolls. It lies 5°35'–10°45' S and 176–180°E. The total land area is about 24.4 sq km.

The atolls of Tuvalu were formed through the growth of coral fringing reefs surrounding central volcanic islands that were gradually sinking. The country's shallow marine environment is dominantly barrier, patch and fringing reefs. Patch reefs and relatively barren coralline sand flats within shallow (less than 50 m) lagoon waters are surrounded by deep open ocean. Scattered throughout the EEZ are many submarine seamounts whose summits may rise to within 30 m of the water's surface. Little of the country exceeds 3 m above sea level.

The natural environment is extremely fragile and subject to cyclones and coastal erosion. Marine resources, principally fisheries, are the nation's main natural resource. Land-based resources are extremely limited and characterised by very poor soils, high salinity and porosity.

GOVERNMENT STRUCTURE

Tuvalu is a constitutional monarchy. Executive authority is vested in the British sovereign as Head of State, and is exercisable by her

representative, the Governor-General, who is appointed on the recommendation of the Prime Minister and acts in almost all cases on the advice of the Cabinet. Legislative power is vested in the unicameral parliament, with 12 members elected by universal adult suffrage for four years (subject to dissolution). The Cabinet is led by the Prime Minister who is elected by and from the members of parliament. On the Prime Minister's recommendation, other ministers are appointed by the Governor-General. The Cabinet is responsible to Parliament. Each of the inhabited atolls has its own elected Island Council which is responsible for local government and which is empowered by law to have control over Crown Lands.

COASTAL ZONE MANAGEMENT ISSUES

Tuvalu appears well aware of the importance of protecting its fragile environment and conserving scarce natural resources. The main natural threats are coastal erosion arising from wave action and, in the longer term, inundation if the predicted effects of global warming eventuate. Other environmental threats are largely anthropogenic and relate to domestic pollution, waste disposal, harmful fishing practices and the extraction of sand and gravel.

Traditionally Tuvaluans have depended heavily on the more easily accessible resources of the nearshore reef environment for their immediate subsistence

needs. In the past turtle meat and eggs have been prized as food while the shell has been used in the manufacture of handicrafts, ornaments and household articles. Recent regulations restricting the collection of turtles are aimed at curbing over-exploitation of what are internationally regarded as endangered species. Stocks of certain invertebrates have also been depleted due to high demand, the most important of which are giant clam and giant spider conch. However, no regulations have been enacted to protect these species. Past surveys and anecdotal reports from the main island of Funafuti indicated that a decline in populations of finfish resources and other prized food species (notably turtles, giant clam and spider conch) have already begun due to direct over-exploitation.

Certain coastal developments have caused environmental concerns. During the period 1976–1987, there were 19 newly constructed channels and 170 existing channels. In 1991 Tuvalu requested further assistance from New Zealand for the construction of additional channels, and the maintenance and improvement of existing channels on most of its atolls. As a consequence of the likely impacts of such activities, an environment assessment of the effects of channel construction on coral reef communities was carried out. Many of the effects of channels may be subtle (such as changed lagoon circulation and erosion of beaches or land) though there is evidence that small fringing channels do not substantially affect subtidal marine communities or fisheries yield. Not all major coastal developments (e.g. sea harbours/ wharves) in Tuvalu require an EIA, particularly those which are directly funded from overseas.

In coming years, with demographic shifts towards a growing population centre on Funafuti, pressures on nearshore resources within the Funafuti lagoon are likely to increase. Also fish resources may be adversely impacted by the effects of increased pollution in the lagoon. Dredging in the Funafuti lagoon for the in-filling of ponds (excavated during World War II) has been evaluated for its effects on the overall health of lagoon flora and fauna, particularly implications on the continuing productivity of the lagoon and its capacity for sustained harvesting. There would surely be some ecological consequences on the lagoon ecosystem if dredging is to continue.

Other reef-related ecosystems in Tuvalu include small inland ponds with mangrove-covered fringes. In some areas, especially the capital Funafuti, overcrowding has resulted in the degradation of these ecosystems so as to make way for housing and other developments. In fact the Government is currently in-filling the ponds to cater for housing schemes and other development activities, while some people are building houses on stilts in the ponds. In other

islands of Tuvalu where overcrowding is not a problem these mangrove ecosystems are properly managed and provide fish for subsistence use.

The establishment of the Funafuti Conservation Area is aimed to conserve marine life, corals, plants and animals in the area. The marine park covers a large area of over 40 sq km on the western side of the lagoon and includes six islets and adjoining reef and waters in that zone. The park is operated by the local community of Funafuti with supervision of the Funafuti Town Council and technical and advisory assistance from the Environment Unit and the Fisheries Department. To date a bill has been formulated for the proper management and conservation of the park. In the interim however, the Funafuti community has made a ruling/ by-law that prohibits anyone seen actively participating in any form of fishing or harvesting activities in the park; this includes collection of birds and plants on land. It is possible that the project could be expanded to include some of the outer islands.

Tuvalu has had many problems with ciguatera and recently, outbreaks of crown-of-thorns starfish. Tuvalu has one of the highest rates of ciguatera poisoning in the world, with Niutao island having an incidence rate of 10% of the population a year. The presence of crown-of-thorns starfish in the Funafuti lagoon has recently been reported, and is a new event. Knowing their major threat to coral reefs as they feed on live corals, and of their propensity to undergo population explosions that can cause widespread damage to coral reefs, the Fisheries Department is now carrying out investigations. It seems likely that the animals were only recently introduced to Tuvalu waters, probably through the discharge of ship ballast waters.

Despite the growing population and intense pressure on its meagre land resources, Tuvalu has no apparent problems of serious pollution. However Funafuti's borrow-pits (land-locked, man-made ponds excavated for airport construction during the war) are badly polluted with rubbish as well as with scrap and junk from World War II. Most rubbish on the island is dumped in the pits. Elsewhere villages and islands are meticulously clean; women normally clean the beaches near the village each Saturday in preparation for the Sabbath.

Secrecy, clan specialisation and other cultural features have aided the management of Tuvalu's fish resources. In Tuvalu, each clan has a specific skill (such as octopus fishing) and the special techniques of each are closely guarded. The invocation of a taboo was an effective mechanism of enforcing a protective proclamation. It is stated that a range of penalties from fines to removal of fishing rights might be imposed by the island king or community for

breaches of fisheries regulations. Taboos are rarely used today, but all taboos and various penalties were geared towards conserving fish stocks and settling disputes in the community. From surveys carried out it appears that sustainable development and conservation are not new concepts. It appears that the ancestors of Tuvaluan people attempted to manage their marine resources. Few of those practices involved have survived, although sea tenure was probably important in limiting access.

Current development efforts emphasise the need for environmental protection and the formulation of appropriate measures to promote coastal zone management goals. Such efforts include strategies in the preparation of sectoral plans, with the assistance of SPREP, to provide guidelines for future activity; the formulation of a disaster preparedness plan; and devising of appropriate regulations that govern protection and conservation of resources in coastal areas. Tuvalu is also participating in monitoring sea-level rise resulting from global warming, an activity which highlights the implications of sea-level rises for small island countries.

ENVIRONMENTAL LEGISLATION

Tuvalu has coastal and environmental management regulations regarding the proper use of coastal resources and the environment. Most of the eight island councils have passed by-laws that range from restriction on certain fishing gears/ techniques, waste disposal, total bans on fishing in certain areas at certain times to the removal of stones and gravel from coastal areas. Although some protection/ conservation of coral reefs and related ecosystems is achieved through regulation of waste disposal and restriction of certain fishing gears, there are no regulations that specifically call for the protection of coral reefs or related ecosystems. This arises from the fact that most of the people including decision-makers are not sensitised to the economic significance (e.g. the basis of fisheries productivity) of coral reefs and related ecosystems as they are regarding other forms of economic development. Despite that, the Government initiated the process of establishing the first marine park which was officially formalised in 1995. Furthermore, the Government has also included regulations for the protection of corals into its tourism development plans.

The *Marine Zones (Declaration) Ordinance 1983* demarcates various marine areas, and by doing so seeks to determine the precise limits of Tuvalu's jurisdiction under international law. This Ordinance contains broad powers to make regulations in relation to activities in the EEZ, covering:

- scientific research;
- exploration and exploitation for economic purposes, including the production of energy from waters, currents and winds;
- the construction and use of structures such as artificial islands and oil rigs; and
- measures for the protection and preservation of the marine environment.

Tuvalu has the same jurisdiction over its internal waters, archipelagic waters and the territorial sea as it has over the land mass, although it must allow passage to ships and aircraft.

Under the *Foreshore and Land Reclamation Ordinance* the State, not private individuals, own the foreshore and seabed, but this is subject to public rights of navigation, fishing and passing over the foreshore, as well as any private rights which may exist. This Ordinance also requires a licence from the Island Council for the removal of sand, gravel and reef mud, coral and any similar substances from the foreshore. Despite variations in such restriction on each island, Funafuti Town Council appears to have adopted a more restrictive policy in relation to the removal of coral for aggregate. Such activities are only restricted on land bordering the foreshore, which includes the area affected by tidal movement and does not concern the seabed, which is permanently covered by water.

The *Fisheries Ordinance 1978* emphasises the Minister's role in developing the fisheries of Tuvalu by taking appropriate measures to 'promote the development of fishing and fisheries to ensure that the fisheries resources are exploited to the full for the benefit of Tuvalu'. Such Ordinance omits any reference to conservation of the resource. It does not reflect the internationally accepted objective of sustainable development. Nevertheless under this Ordinance the Prime Minister has powers (with the advice of Cabinet) to make regulations relating to the conservation and protection of all species of fish, for example:

- established closed seasons;
- limiting the size and quantity of fish caught;
- designating prohibited fishing areas; and
- prohibiting fishing practices and equipment likely to damage the fish stock.

Under the *Fisheries (Trochus) Regulations 1990*, fishing for trochus is prohibited. The primary aim is to protect species of trochus introduced on the outer reefs in 1988–1989. There is evidence of pressure on giant clams from subsistence fishing, but there are no regulations protecting them even though, as with trochus, introduced species have been seeded for

commercial harvesting. There are no provisions regulating the harvest of turtles or coconut crabs. No protection is given to turtles while they are at sea, and the protection given to their eggs under the *Wildlife Conservation Ordinance 1975* is limited.

There are provisions regulating local practices and these are established in the format of local by-laws by the authority of the island councils. Local government councils for eight islands have been established under the provisions of the *Local Government Act*. Specific local regulations may have direct conservation significance, such as by limiting the catch, although the primary objective may be to protect those who are still using traditional practices from commercial operations and an increasing resort to new technologies, such as outboard motors.

Some of the regulations in question include:

- prohibition of certain fishing practices;
- prohibition of fishing practices in certain areas; and
- prohibition of fishing practices in certain areas at certain times in relation to certain types of fish.

The area encompassed under the authority of the island councils includes not only the land and the lagoon, but also oceanic waters up to three nautical miles from the coast. In addition to the regulatory powers of the Minister of Natural Resources and the local governments, the Council of Chiefs (maneapa) exercise powers over the fishing practices of the community. For example, by decree of the Council of Chiefs, the Vaitupu central lagoon has been closed to fishing for any species but specifically milkfish. On Nanumea, the Council of Chiefs has banned the use of spears within the lagoon. On Nanumaga, the Council of Chiefs has banned the use of spears and prohibited anchoring on the reef. On Nui, spear fishing is forbidden by the Maneapa by-law. These laws are recognised by the local communities and respected. Enforcement of these *maneapa* by-laws is through the strong social conscience and responsibility that is characteristic of many Polynesian cultures.

In inshore areas there is already evidence of non-sustainable fishing in relation to some species and the question is whether the Government should intervene now on the basis of the precautionary principle. There is clearly the power to make regulations designed to conserve fish and crustacean stocks, either under the Fisheries Ordinance or local by-laws. These could impose size restrictions, household quotas or closed seasons, depending on what existing scientific research results suggest would be most helpful. The problems of enforcing

such regulations should not be underestimated, however, especially if they conflict with customary practices.

The following are the regional and international environmental conventions to which Tuvalu has become or is about to become a contracting party as part of a regional and global effort to protect the environment:

- Convention for the Protection of the Ozone Layer. Tuvalu has acceded to this convention and the Montreal Protocol;
- Convention on Climate Change, 1992. Tuvalu signed in June 1993 and is expected to ratify in the near future;
- Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972 (London Dumping Convention). Tuvalu became a party to this convention in November 1975 through the ratification by the UK. This extended the convention to Tuvalu;
- Convention for the Prohibition of Fishing with Long Driftnets in the South Pacific, 1989. Tuvalu has signed but not ratified this convention;
- International Convention for the Prevention of Pollution from Ships 1973 and as modified by the Protocol of 1978. Tuvalu is a signatory to this convention but has not ratified;
- Convention on Biological Diversity, 1992. Tuvalu signed this convention June 1992 but has not ratified; and
- Convention for the Protection of the Natural Resources and Environment of the South Pacific Region, 1986 (SPREP Convention). Tuvalu is a contracting party to this convention and related protocols.

MAIN ICM ORGANISATIONS

Five government ministries and the Office of the Attorney General share the responsibility for coastal zone management and planning.

Ministry of Natural Resources & Environment

| | | |
|----------|------|-------------|
| Vaiaku | Tel: | (688) 20827 |
| Funafuti | Fax: | (688) 20826 |

Mr Afelee F Pita
Permanent Secretary

| | | |
|--|------|-------------|
| Mr Fanoanoaga Patolo | Tel: | (688) 20170 |
| Director, Department of Lands & Survey | | |

| | | |
|--|------|-------------------|
| Mr Malaki Tihala | Tel: | (688) 20344/20742 |
| Acting Director, Department of Fisheries | Fax: | (688) 20346 |

| | | |
|---|------|-------------|
| Mr Mataio Tekinene | Tel: | (688) 20171 |
| Asst. Environmental Officer, Environment Unit | | |

| | | |
|-------------------------------------|------|-------------|
| Mr Tavau Teii | Tel: | (688) 20186 |
| Director, Department of Agriculture | | |

This is the most relevant ministry managing resources in coastal areas. The Department of Fisheries handles matters relating to flora and fauna in the marine environment, the Department of Agriculture deals with terrestrial plants in coastal areas and the Environment Unit focuses on the environment in general. These departments have certain strategies and plans in the overall management of resources in coastal areas. There have been EIAs carried out by this ministry in relation to major development projects in the country. ■

Ministry of Education and Culture

| | | |
|----------|------|-------------|
| Vaiaku | Tel: | (688) 20403 |
| Funafuti | Fax: | (688) 20832 |

Mr Penehuro Hauma
Acting Permanent Secretary

| | | |
|--|------|-------------|
| Mr David Manuella | Tel: | (688) 20407 |
| Acting Director, Department of Education | Fax: | (688) 20414 |

The importance of education and promoting awareness of ICM in the country is often seen as a priority. There is no formal provision for ICM issues in the primary and secondary school curriculum but talks relating to ICM have been held in schools. There are currently attempts to incorporate environmental issues (including ICM) in the school curriculum. ■

Ministry of Home Affairs & Rural Development

| | | |
|----------|------|-------------|
| Vaiaku | Tel: | (688) 20172 |
| Funafuti | Fax: | (688) 20821 |

Mr Seve Lausaveve
Acting Permanent Secretary

Mr Talakatoa O'Brien
Acting Director, Department of Rural Development

The management of coastal areas should start with 'grass root' people living in villages. Thus, the involvement of this ministry in ICM is important, especially where it deals with the development of rural areas. The ministry also handles by-laws on each island, and intervenes in conflicts caused by the use of resources in coastal areas. ■

OTHER ICM ORGANISATIONS

Ministry of Finance & Economic Planning

| | |
|----------|------------------|
| Vaiaku | Tel: (688) 20202 |
| Funafuti | Fax: (688) 20210 |

Mr Lutelu Faavae
Acting Permanent Secretary

| | |
|---|------------------------|
| Mr John Howe | Tel: (688) 20205/20206 |
| Acting Director, Economic Policy and Research Division | Fax: (688) 20205 |

This ministry helps devise and implement policies relating to ICM. All policy matters in every sector are under the portfolio of this ministry, hence its relevance especially to multiple-use or integrated coastal management plans. This ministry handled all environment-related matters before the recent establishment of the Environment Unit. ■

Ministry of Commerce, Trade and Tourism

| | |
|----------|------------------|
| Vaiaku | Tel: (688) 20182 |
| Funafuti | Fax: (688) 20832 |

Mr Apisai Ielemia
Acting Permanent Secretary

Mr Uale
Tourism Officer

This ministry is new and is primarily responsible for promotion of tourism and business in the country. The number of tourists entering the country is low; but policies have nevertheless been formulated to restrict misuse of coastal areas. ■

Pacific Islands Climate Change Assistance Programme

| | |
|----------|------------------|
| Vaiaku | Tel: (688) 20171 |
| Funafuti | Fax: (688) 20826 |

| | |
|--|-------------------------------------|
| Mr Seluka Seluka National Coordinator | E-mail: seluka@internetnorth.com.au |
|--|-------------------------------------|

This project which is based at the Ministry of Natural Resources and Environment was established in late 1997. The main purpose of the project is to assist Tuvalu build national capacity in order to implement the United Nations Framework Convention on Climate Change (UNFCCC). The national coordinator also established a country team comprised of 13 different ministries and sectors including the non-government sector. The Project has completed a Greenhouse Gas Inventory, a Vulnerability and Adaptation Assessment, and is completing Tuvalu's first National Communication to the UNFCCC. Public awareness and training of national expertise is a high priority in this project. ■

Funafuti Conservation Area Unit, Funafuti Town Council

Vaiuku
Funafuti

Tel: (688) 20489
Fax: (688) 20800

Sir Toaripi Lauti
Project Manager

Rev. Teleke Peleti
Conservation Officer

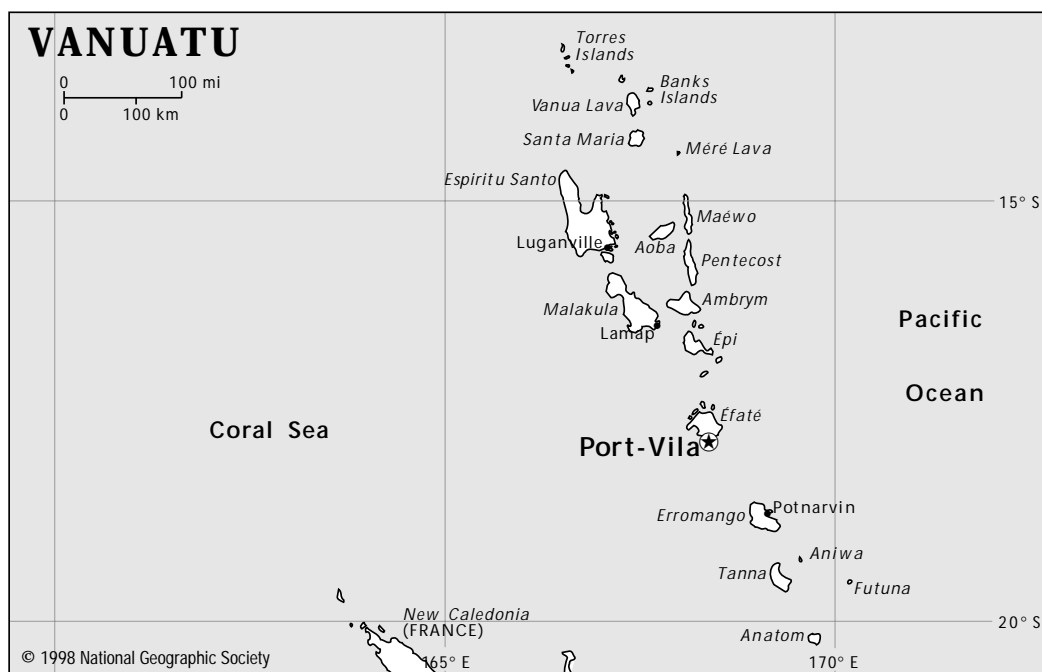
The conservation area is operated by a special unit under the Funafuti Island Council (a non-government organisation), and is directly funded by SPREP. This is the first marine park established in the country, and it is expected to expand to all outer islands. In spite of having operated under the Council, all residents on the island are expected to help in looking after the park. The conservation law has not yet been passed so, in the interim, it is operated under a by-law of the Funafuti *maneapa*. ■

SELECTED DOCUMENTS ON ICM

- Aalbersberg, W. and Hay, J. 1991, *Implications of Climate Change and Sea Level Rise for Tuvalu*, SPREP, Apia, Samoa.
- Anon. 1995, *Funafuti Marine Conservation Area Project*, unpublished project preparation document, Government of Tuvalu, 14pp.
- Belhadjali, K., 1995, 'Tuvalu Country Statement: Tuvalu Fisheries Legislation and Management', *Joint FFA/SPC Workshop on the Management of the South Pacific Inshore Fisheries*, Government of Tuvalu, 8pp.
- Belhadjali, K., 1998, *A Survey of the Inshore Fisheries Resources of Tuvalu*, Fisheries Department, Government of Tuvalu, 57 pp.
- Belhadjali, K., Laloni, S., Apinelu, N. and Maatusi, S. 1996, *Tuvalu Reef Channels Project Environmental Monitoring: Ciguatera Component; Technical Report 1: Present status of the abundance of toxic dinoflagellates around the impact and control sites in Funafuti atoll, before construction*, report submitted to the New Zealand, Ministry of Foreign Affairs and Trade, and the Government of Tuvalu.
- Braley, R. D. 1988, *The Status of Giant Clam Stocks and Potential for Clam Mariculture in Tuvalu*, A report prepared for the Fisheries Division, Funafuti, Tuvalu and the FAO South Pacific Aquaculture Development Project, Suva, Fiji. 41pp.
- Buckley, R. 1985, 'Environmental survey on Funafuti Atoll', *Proc. 5th Coral Reef Congr.*, Tahiti 6: 305-310.
- Buckley, R. C. 1983, *Tuvalu Lagoon Bed Materials Resource Survey: Environmental Baseline And Impact Study*, AMDEL Report No. 1508 to ADAB and Gibb Australia. AMDEL, Adelaide.
- David, T. W. E. and Sweet, G. 1904, 'The geology of Funafuti' in *Royal Society, The Atoll of Funafuti: Boring into a Coral Reef and the Results*, London, pp. 61-124.
- Fairbairn, T. I. 1993, *Tuvalu: Economic Situation and Development Prospects*, AIDAB, Australia, 59 pp.
- Fawcett and Partners 1982, *Report by Consulting Engineers on Coastal Protection Needs Formed the Basis for A\$800 000 Worth of Funds from the EEC (EU)*.
- Jones, J. P., Kaly, U. L. and Clements, K. 1991, 'Preliminary records of the coral reef fishes of Tuvalu', *South Pacific Journal of Natural Science*, 11: 40-57.
- Kaly U. L. and Jones G. P. 1996, *Tuvalu Reef Channels Project Environmental Monitoring. Technical Report 1*, unpublished report, MFAT, New Zealand, 44 pp.
- Kaly, U. L., Jones, G. P. and Tricklebank, K. 1991, 'Preliminary assessment of a severe outbreak of ciguatera at Niutao, Tuvalu', *South Pacific Journal of Natural Science*, 11: 62-81.
- Kaly, U. L. and Jones, G. P. 1993b, *Pilot Dredging Project—Funafuti, Tuvalu: Assessment of Ecological Impacts on Lagoon Communities*.
- Kaly, U. L. and Jones, G. P. 1994a, 'Long term effects of blasted boat passages on intertidal organisms in Tuvalu: A mesoscale human disturbance', in *Bulletin of Marine Science*, 54: 164-179.
- Kaly, U. L. and Jones, G. P. 1994b, 'Test of the effect of disturbance on ciguatera in Tuvalu', in *Memoirs of the Queensland Museum*, 34: 523-532.
- Kaly, U. L., Jones, G. P. and Asher, P. J. 1995, *Tuvalu Reef Channels Project—Report 1: Project Plans and Environmental Risks*, Report for New Zealand Ministry of Foreign Affairs and Trade, Development Cooperation Division, 31pp.

- Langi, V. 1990, *Marine Resource Survey on Nanumea and Nui Is., Northern Tuvalu (giant clams, trochus, beche-de-mer, pearl oysters)*, Report for the Fisheries Division of the Ministry of Natural Resources and Home Affairs, Tuvalu.
- McLean, R. F. and Hosking, P. L., 1992a, *Tuvalu Lands Resource Survey, Funafuti*, Island Report No.7, Government of Tuvalu, 58pp
- Pita, E. 1985, *An Overview of the National Fisheries Development Programme*, Fisheries Division, Government of Tuvalu, Funafuti, Tuvalu.
- Preston, G. L., Gentle, M. T., Kamatie, M. and Naseli, M. 1990, *Report of a Survey of Pearl Oyster Resources at Nukulaelae Atoll, Tuvalu*, Country assignment report, SPC, New Caledonia.
- Pulea, M. and Farrier, D. 1994, *Environmental Legislation Review—Tuvalu*, Report for the South Pacific Regional Environment Programme and the Government of Tuvalu, 81pp.
- Royal Society 1904, *The Atoll of Funafuti, Boring into a Coral Reef and the Results*. London.
- Sauni, S. 1997, *An Assessment of Fisheries Statistics in Tuvalu: With Specific Reference to Funafuti and Nukufetau Islands*, MSc thesis, University of Newcastle upon Tyne, England. 94 pp.
- Taumaia, P. and G. L. Preston 1982, *Report of the SPC Deep Sea Fisheries Development Project's second visit to Tuvalu*, SPC, Nouméa, New Caledonia.
- Tuvalu, 1994, *Tuvalu National Environmental Management Strategy*, prepared for SPREP and the Government of Tuvalu, SPREP, Apia, Samoa.
- Tuvalu, 1997, *Draft Conservation Areas Act for Tuvalu*, Office of the Attorney General, Funafuti, Tuvalu.
- Zann, L. P. 1983, *Man and Atolls: Traditional Utilisation and Conservation of Marine Resources and Recent Changes in Tuvalu and Kiribati*, paper given at 15th Pacific Science Congress, Dunedin, New Zealand.
- Zann, L. P. 1985, 'Traditional management and conservation of fisheries in Kiribati and Tuvalu atolls', in *The Traditional Knowledge and Management of Coastal Systems in Asia and the Pacific*, eds K. Ruddle and R. E. Johannes, UNESCO-ROSTEA, Jakarta, pp 53–77.
- Zann, L. P. 1983, *Traditional Management and Conservation of Fisheries in Kiribati and Tuvalu Atolls*, Institute of Marine Studies, The University of the South Pacific, Fiji, 23pp.

VANUATU



PHYSICAL CHARACTERISTICS

Vanuatu consists of 80 islands that lie 12–21°S latitude and 166–171°E longitudes. The main island of Efate is home to the capital city of Port Vila and is the centre of government. The total land area is 11 880 sq km with the island of Espiritu Santo being the largest. Other larger islands include Malekula, Maewo, Pentecost, Ambrym, Epi, Efate, Erromango, Malo, Tanna and Anatom. The highest peak is at Mt Tambwemasana (1877 m) on the island of Espiritu Santo. The climate is tropical with a mean annual rainfall of 2300 mm and a mean annual temperature of 27°C. The population of Vanuatu in 1996 was estimated at 168 400, most of whom are indigenous Melanesians. Over 80% of the population is rural.

It is estimated that 75% of Vanuatu's land is under tropical rainforest. Species diversity and endemism in Vanuatu is limited although some of its coral reefs have exceptional aesthetic appeal. Vanuatu has large stocks of tuna within its 200-mile exclusive economic zone. Marine mammals such as dugongs are also abundant, although there is potential for overfishing and destruction of reefs by land-based extractive industries such as mining and logging.

GOVERNMENT STRUCTURE

Vanuatu was a joint French and British Condominium for 74 years until 30 July 1980 when it gained independence. The country subsequently became the 155th member of the United Nations in September 1981.

Vanuatu's national political structure consists of legislative, executive and judiciary branches. The legislative branch consists of a single chamber, the parliament, with 52 seats. Members of parliament are elected every four years. The executive consists of the Prime Minister and the council of ministers, all of whom are members of parliament (there are nine ministers). The judiciary consists of a Supreme Court with a chief justice and three judges. The Head of State is the President of the Republic who is elected for a period of five years by an electoral college consisting of members of parliament and the presidents of the six provincial governments. There is a National Council of Chiefs which is mainly a governmental advisory body and is composed of custom chiefs who are elected by their peers sitting in the Area Council of Chiefs. The Council of Chiefs advises on custom and tradition as well as the preservation and promotion of the country's culture and indigenous languages. For administrative efficiency the archipelago is split into six provincial government areas.

Vanuatu's constitution states that, until otherwise provided by parliament, pre-independence British and French laws shall continue to the extent that they are not expressly revoked or are incompatible with the independent status of the Republic.

The Government's capital sources of revenue include grant aid, government collection (e.g. import duties, export duties, licences, company registration, land registration, other taxes, public enterprises, interest and rent, fees and fines), foreign borrowing (soft loans) and direct investment.

COASTAL ZONE MANAGEMENT ISSUES

In Vanuatu coastal management-related responsibilities are jointly administered by the Environment Unit and the Department of Fisheries within the Ministry of Agriculture, Livestock, Forestry, Fisheries and Environment; and the Department of Lands and Surveys within the Ministry of Lands and Natural Resources. There is at present only one coastal management officer who is employed to undertake coastal management planning within the Department of Lands and Surveys. There is no coastal management-related legislation in effect in Vanuatu.

Coastal construction, land reclamation, waste disposal, livestock farming, logging, soil erosion and effluent from septic tanks are some of the causing factors which directly affect marine resources. The well-being, health, safety and economy of especially urban communities depends to a large degree on the quality of fresh and marine waters. Maintaining the quality of these waters to support wildlife, amenity and landscape values is a priority. However in many ways, the activities of life in and around the urban areas adversely impact on the valuable fresh and marine water resources through discharges, agricultural activities, reclamations and the harvesting of plant and animal life.

Land-based sources of pollution have been recognised as a problem, affecting marine and fresh water alike. There are two main types of discharges that can affect water quality. These are generally called *point source*, those that occur at a definable place, often through a pipe or drain, and *non-point source* discharges, which are those discharges that enter a water body from a diffuse source, such as land runoff or infiltration. The most direct point source contribution to urban waters and lagoons include the central hospital, which discharges treated effluent. Non-point sources of pollution are sometimes extremely difficult to identify and quantify. Non-point sources of pollution are carried in both storm water

and ground water, and where contaminants are not retained and treated within the soils, they are eventually discharged to the sea. The total quantity of contaminants however, does not necessarily reflect deleterious impact. The total effect of different contributions is dependent on local conditions of soil type and quality, rainfall and hydrology, the health of the environment, and the time frame over which an activity has been occurring.

Contributors to non-point source pollution in Vanuatu include:

- activities which generate discharges of leachate, nutrients or other chemicals, including septic tank effluent disposal, pit toilets, sullage (domestic waste water), timber processing, garages, agriculture, pig or poultry farms;
- activities which have the potential to involve accidental spills of hazardous substances, such as industry, oil storage and transport; and
- activities which disturb or generate sediment when they occur in close proximity to water courses, such as agricultural activities, construction and reclamations.

Until recently, the Government of Vanuatu through the relevant departments such as the Department of Lands, Geology and Mines, Forestry, Agriculture, Livestock, Fisheries, and the Environment Unit is now making an effort to actively and effectively address ICM issues as they are now potential threats to the limited and fragile fresh water and marine resources. In order to effectively address the land management issues the Government, through the Department of Lands, implemented a Land Use Planning Project in 1995, with the aim to strengthen land use planning and resource management systems to bring about sustainable development of land and other natural resources in Vanuatu. This is a community development project in partnership with the Government. It comprises community, provincial, national, social and physical planning exercises whose overall objectives are to:

- establish a sustainable system of land use planning
- establish a National Resource Information System (VANRIS)

Coastal fisheries resources are also under threat due to over-exploitation and inefficient strategic and effective management regimes. The coastal fisheries resources of Vanuatu play a significant role in providing protein, sources of income, recreational and cultural value for the rural and outer island people. In 1996, the national population was estimated at 168 400 of which 126 200 was in rural areas. Recent

information from the Vanuatu statistics office indicates that the national population is increasing at slightly more than 2.8% annually. The ongoing introduction of a cash economy to many rural households has also led to much greater fishing effort as an alternative income-generating activity, with 40% of fishing households reporting selling fish seven days per week. With the increasing levels of fishing intensity, taking into consideration the increasing population size and its attendant issues, there is a possibility that unless effective management regimes are implemented, commercially important marine resources such as, beche-de-mer, green snails (*Turbo marmoratus*), trochus shell (*Trochus niloticus*) and giant clams face the risk of depletion.

Concern over depletion of important marine resources has created an incentive for the Government through the Department of Fisheries to seriously devise ways by which marine resources could be sustainably managed and exploited. The Department of Fisheries, through its Coastal Research Programme, has and will continue to execute research activities into finding an effective management system. At present, research has been concentrated on customary marine tenure, where local communities and the Fisheries Department collaborate to effectively managed the marine resources.

There are a number of marine protected areas in Vanuatu, including:

- President Coolidge/ Million Dollar Point Reserve, Santo;
- Narong Marine Reserve, Malekula;
- Vatthe Conservation Area, Santo;
- Wiawi Conservation Area, Malekula;
- Erakor Conservation Area, Efate;
- Nawo Marine Reserve, Uripiv Island, Malekula; and
- Lese Marine Reserve, South Pentecost.

Additional MPAs are proposed at Malekula, Cooks Reef, Reef Island, Elephant Island, Epi Island, Tongoa, Laika Island and Efate Island.

ENVIRONMENTAL LEGISLATION

At present there is no implemented environmental legislation but the Government is aware of the need to protect the environment in order to achieve sustainable development. A new Environment Legislation Bill has been drafted and is currently in the process of submission to the National Parliament. The legislation has five different components which would give the Environment Unit more enforcement powers, make it more regulatory, and would include within its functions responsibility for environmental impact assessment, pollution, waste management and biodiversity conservation.

Despite the absence of specific legislation relating to environmental matters, the following legislative instruments have some provisions that are relevant to ICM in Vanuatu:

- Fisheries Act, Cap 158 of 1982;
- Forestry Act, Cap. 147 of 1982;
- Land Surveyors Act, Cap. 175 of 1985;
- Mine and Minerals Act, Cap.190 of 1986;
- Animal Imports Act, Cap. 98 of 1997;
- Maritime Act, Cap. 131 of 1981;
- Maritime Zones Act, Cap 138 of 1982;
- Explosives Act, Cap.6 of 1917 (Revised Edition 1988);
- Ports Act, Cap. 26 of 1957 (Revised Edition 1988); and
- Public Health Act N0. 22 of 1994.

MAIN ICM ORGANISATIONS

Four government ministries share the responsibility for coastal zone management and planning.

Department of Lands and Surveys, Ministry of Lands and Natural Resources

PO Box 024
Port Vila

Tel: (678) 22427
Fax: (678) 25973

Mr Goerge Tambe
Director of Lands

Mr Mr Edwin Arthur
Director of Land Survey

The Department of Lands and Suuveys is responsible for policing and control of urban land, approval of land developments and collection of land rents. ■

Environment Unit Ministry of Agriculture, Livestock, Forestry, Fisheries and Environment

Private Mail Bag 063
Port Vila

Tel: (678) 25302
Fax: (678) 23565
E-mail: enveduin@pactok.peg.apc.org

Mr Ernest Bani
Principal Environment Officer

The Environment Unit is the smallest government unit but has a diverse range of responsibilities, extending from terrestrial resources down to coastal and offshore marine resources. The Unit is responsible for the coordination of all activities across sectors, government agencies, NGOs and the private sector that deal with environmental matters; it also provides technical advice and specialist attention on environmental matters. The Unit's objectives are listed as:

- complete environmental legislation and formulate an environment master plan to guide future development activities;
- review the organisational structure of the Environment Unit with the view of upgrading its status to a full department to monitor environmental changes, enforcing environmental legislation, continuing environmental awareness and educational programmes and continuation of Vanuatu's active participation in global environmental issues;
- prioritise environmental problems and ensure that scarce financial resources are committed to priority areas; and
- provide community extension programmes that assist individuals to see the importance of a healthy environment and enable community leaders and landowners to establish their own policies of land use, resource protection and sustainable development. ■

Department of Fisheries Ministry of Agriculture, Livestock, Forestry, Fisheries and Environment

Private Mail Bag 045
Port Vila

Tel: (678) 23119/ 23621
Fax: (678) 23641
E-mail: fishery@vanuatu.com.vu

Mr Moses Amos
Director

The Department of Fisheries is responsible for the control, development and management of the

VANUATU CONT'D

fisheries resources under the Fisheries Act 1983 [CAP. 158]. Development objectives are to:

- achieve an increased degree of economic self-reliance based natural resource development compatible with appropriate and acceptable levels of service provision;
- accelerate human resource development for increased ni-Vanuatu participation in, and control of, the economy;
- achieve a more even pattern of regional and rural development;
- further expand the private sector's contribution to national development efforts for the benefit of the whole country; and
- ensure sustainable utilisation and exploitation of aquatic and marine resources. ■

National Planning Office, Office of the Prime Minister

Private Mail Bag 008
Port Vila

Tel: (678) 22043
Fax: (678) 23087

Mr Jimmy Andeng
Acting Director of National Planning Office

Mr Johnson Naviti
Natural Resource Planner

Mr George Plant
Natural Resources Advisor

The fundamental role of the National Planning Office is to coordinate the implementation and monitoring of all development activities executed by government departments. The Planning Office is responsible for:

- coordinating the formulation and preparation of all national development plans and monitoring their implementation through the preparation, appraisal, monitoring and evaluation of development projects; and
- improving overall coordination of development assistance activities. ■

OTHER ICM ORGANISATIONS

Foundation for the Peoples of the South Pacific

PO Box 951
Port Vila

Tel: (678) 22915
Fax: (678) 24510
E-mail: kfry@vanuatu.com.vu

Kathy Fry
FSPI Regional Coordinator

FSP International or FSPI is the name of the Regional Pacific Network for the Foundation for the Peoples of the South Pacific independent affiliates. It is an autonomous regional NGO, registered in Papua New Guinea in 1991. Its board comprises representatives from each of the 10 FSP affiliates, which include: FSP/PNG; SIDT; FSP/Kiribati; FSP/UK; Australian Foundation for Asia and Pacific (AFAP); FSP/Vanuatu; FSP/Fiji; FSP/Tonga Trust; and FSP/USA. FSPI has a regional network office based in Vanuatu that coordinates regional development programmes, communications and technical assistance for and between the independent FSP affiliates.

FSPI has been coordinating a sub-regional Melanesian Eco-Forestry programme in PNG, Solomon Islands and Vanuatu for the past five years. This programme was completed in 1996. The main objective of this USAID grant was to build FSP local institutional capacity to work in the community forestry sector by funding support costs for local professional personnel. Matching donor funds supported much

of the actual forestry extension costs, such as training with portable sawmills, a village-based ICAD project, and general forestry conservation and awareness for communities. In Vanuatu the grant was matched by substantial funding from the European Union to support the FSP/Vanuatu Community and Environmental Forestry (CEF) Programme. This programme focused on providing general community forestry and environmental awareness in high risk areas, and specialised technical expertise to communities on request in sustainable resource planning using participatory rural appraisal techniques.

Amongst other environmental activities FSP/Vanuatu provides technical expert advice on coastal zone management issues. ■

Vatthe Conservation Area Project

c/o Environment Unit, PMB 063
Pot Vila

Tel: (678) 36153
Fax: (678) 36153
E-mail: environment@vanuatu.paktok.net

Charles Vatu
Project Manager

Vatthe Conservation Area Project covers a total area of 4470 hectares of forest. The project was initiated in 1994, with funding assistance from the Global Environment Facility (GEF) through the United Nations Development Programme and executed by SPREP. The area provides protection for all terrestrial and aquatic animals. Vatthe Conservation Area is managed by a joint management committee. The committee decides the types of activities to be carried out within the conservation area. ■

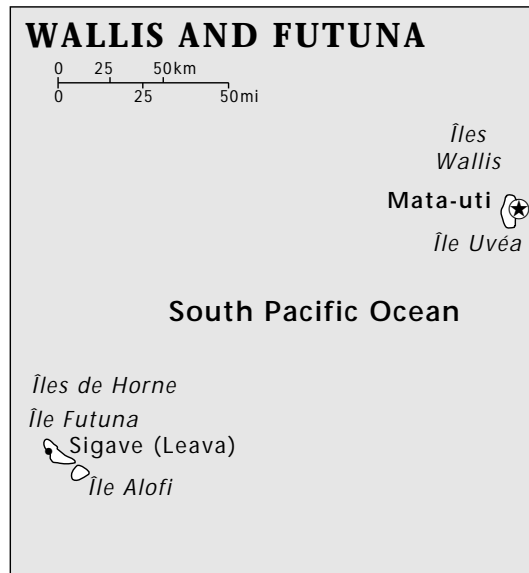
SELECTED DOCUMENTS ON ICM

- Amos, M. J. 1991, 'Experiences on trochus resource assessment and field survey', *Workshop on Trochus Resource Assessment, Development and Management, Port Vila, Vanuatu, 13 May—2 June 1991*, Department of Fisheries, Port Vila, Vanuatu. 10pp.
- Amos, M. J. 1991, 'History and present status of the trochus resource in Vanuatu—Country statement' *Workshop in Trochus Resource Assessment, Development and Management, Port Vila, Vanuatu, 13 May—2 June 1991*, Department of Fisheries, Port Vila, Vanuatu, 11pp.
- Amos, M. J. 1992, *The Overview of Trochus and Green Snails within the Archipelago*, Department of Fisheries, Port Vila, Vanuatu.
- Amos, M. J. 1993, 'Traditionally based marine management systems in Vanuatu', *SPC Traditional Marine Resources Management and Knowledge Information Bulletin*, No. 2: 14–17.
- Amos, M. J. 1995, *A Study on Field Release Techniques of Hatchery-Reared Juvenile Trochus Niloticus and the Potential of using Hatchery-Reared Juveniles for Stock Enhancement*, Department of Fisheries, Port Vila, Vanuatu.
- Amos, M. J. 1995, 'Combination of fisheries management regulation, traditionally based management and wild stock enhancement using hatchery-reared trochus juveniles as a precautionary management principle for *Trochus niloticus* resources in Vanuatu', in *South Pacific Commission and Forum Fisheries Agency Workshop on the Management of South Pacific Inshore Fisheries*, eds P. Dalzell, and T.J.H. Adams, SPC, Noumea, New Caledonia.
- Amos, M. J. 1996, 'Management policy for trochus fishery in the Pacific', in *Trochus: Status, Hatchery Practice and Nutrition* eds C. L. Lee, and P. W. Lynch, ACIAR Proceedings No. 79, Australian Centre for International Agriculture Research, Canberra, Australia, pp 164–169.
- Anon. 1987, *Comprehensive Report of the Vanuatu Coastal Fishery Development Project*, Overseas Fishery Cooperation Foundation, December 1987, Department of Fisheries, Port Vila, Vanuatu.
- Bell, L. A. J. and Amos, M. J. 1993, *Republic of Vanuatu Fisheries Resource Profiles*, FFA Report 93/49, Forum Fisheries Agency, Honiara, Solomon Islands.

- Blackburn, D. 1982, *Summary of baitfish survey conducted jointly between Japanese Fishermen, South Pacific Fishing Company and Vanuatu Fisheries Department*. Department of Fisheries, Port Vila, Vanuatu.
- Carter, R. 1983, *Baseline Studies of Port Vila and Erakor Lagoon*, CCOP/ SOPAC/ SPREP/ UNDP, Cruise Report No: 82.
- Chambers, M. R. and E. Bani. 1989, *The Status of the Dugong (Dugong Dugong) in Vanuatu*, Environment Unit, Port Vila, Vanuatu.
- Chambers, M. R. 1990, 'Beche-de-mer', in *Vanuatu Marine Resources: Report of a Biological Survey*, eds T. J. Done, and K.F. Navin, Australian Institute of Marine Science, Townsville, Australia.
- Chambers, M. R. and D. Esrom 1980, *The Status of the Estuarine Crocodile in Vanuatu*, Environment Unit, Port Vila, Vanuatu.
- Crossland, J. (n.d.) *Vanuatu's First Marine Reserve*, Department of Fisheries, Port Vila, Vanuatu.
- Crowe, T. P., Amos, M. J. and Lee, C. L. 1996, 'The potential of reseedling with juveniles as a tool for the management of Trochus Fisheries', in *Trochus: Status, Hatchery Practice and Nutrition* eds C. L. Lee, and P. W. Lynch, ACIAR Proceedings No. 79, Australian Centre for International Agriculture Research, Canberra, Australia, pp. 170–177.
- Dahl, A. 1988, *National Conservation Strategy, Vanuatu, Phase I*, Environment Unit, Port Vila, Vanuatu.
- Dalzell, P. 1992, *The Status of Statistical Reporting from Artisanal Fisheries in Vanuatu*, Inshore Fisheries Research Project, SPC, Nouméa, New Caledonia.
- David, G. (n.d.) 'The mangroves of Vanuatu', *Naika 22*, Department of Fisheries, Port Vila, Vanuatu, pp. 22–28.
- David, G. 1985, *A Survey of Village Fisheries in Vanuatu 1—Equipment and the Catch*. Studies in Oceanography No. 12, ORSTOM, Vanuatu.
- David, G. and Cillauren, E. 1992, 'National fisheries development policy for coastal waters, small-scale village fishing, and food self-reliance in Vanuatu', *Man and Culture in Oceania*, 8: 35–58.
- David, G. and Cillauren, E. 1989, *A Survey of Village Subsistence Fishing in Vanuatu* Notes and Documents on Oceanography, No. 19, ORSTOM, Vanuatu.
- David, G. and Cillauren, E. 1992, *National Fisheries Development Policy for Coastal Waters, Small-Scale Village Fishing and Food Self Reliance in Vanuatu*, ORSTOM, Port Vila, Vanuatu.
- Devambe, L. C. 1959, *Survey of Trochus Reefs in the Central and Southern Groups of the New Hebrides*, SPC, Noumea, New Caledonia.
- Devambe, L. C. 1961, *Report on a Supplementary Survey of Trochus and Green Snails in the Central and Southern Groups of the New Hebrides*, SPC, Noumea, New Caledonia.
- Done, T. J. and Navin, K. F. 1990, 'Shallow-water benthic communities on coral reefs', in *Vanuatu Marine Resources: Report of a Biological Survey*, eds T.J. Done and K.F. Navin (eds.). Australian Institute of Marine Science, Townsville, pp. 10–36.
- Fairbairn, T. I. J. 1992, 'Reef and lagoon tenure in the Republic of Vanuatu and prospects for mariculture development', in *Giant Clams in the Sustainable Development of the South Pacific: Socio-economic Issues in Mariculture and Conservation*, ed C. Tisdell, ACIAR Monograph No. 18, pp. 153–168.
- Fisheries Department 1995, *Fisheries Resource management and Licensing System for Shefa Provincial Government*, Fisheries Department, Ministry of Agriculture, Livestock, Forestry and Fisheries, Port Vila, Vanuatu.
- Fletcher, W. J. 1992, *Stock Assessment and Management of Coconut crabs (Birgus latro) in Vanuatu*, Fisheries Department, Port Vila, Vanuatu.
- Foster, M. 1989, *Environment Law in Vanuatu: A Description and Evaluation. Preliminary Report*. International Union for Conservation of Nature, (IUCN).
- Hickman, R. W. 1989, *The Potential for Farming Green Mussels in the Federated States of Micronesia, Papua New Guinea, the Solomon Islands and Vanuatu*, South Pacific Aquaculture Development Project, Food and Agriculture Organisation of the United Nations, Suva, Fiji.
- Jim, P. and Johnson, I. 1998, *Sanitation Master Plan for Port Vila, Vanuatu*, Asian Development Bank TA: 2597-VAN, Asian Development Bank, Metro Manila, Philippines.
- Jimmy, R. 1995, 'Vanuatu—Country statement: Current management policies and problems of the inshore fisheries in Vanuatu', in *South Pacific Commission and Forum Fisheries Agency Workshop on the Management of South Pacific Inshore Fisheries*, eds P. Dalzell, and T. J. H. Adams., SPC, Nouméa, New Caledonia.
- Jimmy, R. 1995, 'Case study: the application of traditional management on trochus fishery in South Pacific Commission and Forum Fisheries Agency Workshop on the Management of South Pacific Inshore Fisheries', eds P. Dalzell, and T. J. H. Adams., SPC, Nouméa, New Caledonia.

- Johannes, R. E. 1994, *Government-supported, Village-based Management of Marine Resources in Vanuatu*, FFA Report 94/2, Forum Fisheries Agency, Honiara, Solomon Islands.
- Kailola, P. J. 1996, *Assessment of the Role of Women in Fisheries in Vanuatu*, Technical Cooperation Project TCP VAN/4552, Strengthening of National Fishery Policy. Technical report No. 2, FAO, Bangkok, Thailand.
- Lal, P. N. and Esrom, D. 1990, *Utilization and Management of Mangroves, "narong", Resources in Vanuatu*, Environment Unit, Port Vila, Vanuatu.
- Marsh, H. 1983, 'Conserving the dugong (cowfish) in Vanuatu', *Naika* No. 9, Department of Fisheries, Port Vila, Vanuatu.
- Messel, H. and King, F.W. 1992, *Survey and Plan for Recovery of the Crocodile Population of the Republic of Vanuatu, Southwestern Pacific Ocean*, Environment Unit, Port Vila, Vanuatu.
- Naidu, S. D. and Morrison, R. J. 1988, *Water Quality Assessment of Port Vila Harbour and Erakor Lagoon, Vanuatu*, Pacific Lagoon Study, Interim Report, INR Technical Report No: 88/4, Institute of Natural Resources, Univesity of the South Pacific, Suva, Fiji.
- Nash, W. J. 1990, *Spawning and Hatchery Rearing of Trochus (Trochus niloticus) in Vanuatu, with a Discussion of Management of the Vanuatu Trochus Fishery*, FAO South Pacific Regional Aquaculture Development Programme, Suva, Fiji.
- Pickering, R. 1983, 'Marine turtles and their conservation', *Naika*, No. 9, pp. 11–12, Department of Fisheries, Port Vila, Vanuatu.
- Preston, G. L. 1996, *Masterplan for the Sustainable Management and Development of Vanuatu's Inshore Fisheries Resources*, Technical Cooperation Project TCP VAN/4552—Strengthening of National Fishery Policy, Technical report No. 2, FAO, Bangkok, Thailand.
- Preston, G. L. 1996, *Vanuatu: Fisheries Sector Policy Statement*, Technical Cooperation Project TCP VAN/4552—Strengthening of National Fishery Policy, Technical report No. 4, FAO, Bangkok, Thailand.
- SPREP 1992, *Vanuatu: A Country Report for UNCED*, SPREP, Apia, Samoa.
- Ursula, L. K. and Carter, G. 1998, *Environment Impact Assessment for the Replacement of the Erakor Causeway, Port Vila, Efate, Republic of Vanuatu*, Report to Asian Development Bank, Government of Vanuatu and SMEC International, Public Works Department, Port Vila, Vanuatu.
- Veron, J. E. N. 1990 'Hermatypic corals', in *Vanuatu marine resources: Report of a Biological Survey*, eds T.J. Done and K.F. Navin, Australian Institute of Marine Science, Townsville, pp. 37–65.
- Williams, D. M. 1990, 'Shallow-water reef fishes', in *Vanuatu Marine Resources: Report of a Biological Survey*, eds T.J. Done and K.F. Navin, Australian Institute of Marine Science, Townsville, pp. 66–76.
- Wright, A. J. 1989, *A Review of Fisheries Research in Vanuatu and Suggestions for the Future*, FFA Report 89/20, Forum Fisheries Agency, Honiara, Solomon Islands.
- Yuen T. L. 1980, *Coastal Survey of Water Quality around Port Vila*, SPC Document 279/81 Noumea, New Caledonia.
- Zann, L. P. and Ayling, A. M. 1988, 'Status of giant clams in Vanuatu', in *Giant Clams in Asia and the Pacific*, eds J. W. Copland, and J. S. Lucas, ACIAR Monograph No. 9, Australian Centre for International Agriculture Research, Canberra, Australia, pp. 60–63.
- Zann, L. P. and Ayling, A. M. 1990, 'Giant clams', in *Vanuatu Marine Resources: Report of a Biological Survey*, eds T.J. Done and K.F. Navin, Australian Institute of Marine Science, Townsville, pp. 77–81.

WALLIS AND FUTUNA



ORGANISATION DU TERRITOIRE

Le statut de Wallis et Futuna est fixé par la loi n° 61.814 du 29 juillet 1961 qui confère aux îles le statut de Territoire d'outre-mer. Ces îles se distinguent cependant des autres TOM du fait de leurs institutions traditionnelles, notamment du maintien de royaumes : un à Wallis (royaume d'Uvea) et deux à Futuna (royaume de Sigave et royaume d'Alo qui s'étend aussi sur l'île d'Alofi), où le roi et ses ministres, choisis parmi les familles nobles, veillent au respect des règles coutumières.

Quatre collectivités sont en place, l'Etat, le Territoire, et les circonscriptions. A Wallis seulement, existent également trois districts (Hihifo, Hahake et Mua). Le Territoire ne comporte pas de communes.

L'ETAT

L'Etat est représenté par un administrateur supérieur, chef du Territoire (nommé en Conseil des Ministres). Ses compétences sont étendues: ordre public, sécurité, respect des lois, des règlements et décisions des tribunaux, administration de la justice, relations extérieures, enseignement, état civil, fonctionnement du Trésor, de la douane, contrôle administratif, santé publique. Pour exercer ces compétences, l'Etat dispose de

ORGANISATION OF THE TERRITORY

The status of Wallis and Futuna is laid down by Act No. 61.814 of 29 July 1961 which confers upon the islands the status of Overseas Territory. However, these islands differ from the other Overseas Territories in terms of their traditional institutions, namely the survival of kingdoms—one in Wallis (Uvea Kingdom) and two in Futuna (Kingdom of Sigave and Kingdom of Alo which also extends to the island of Alofi)—where the King and his ministers, chosen among the noble families, ensure that the customary rules are observed.

There are four established authorities: the State, the Territory and the Wards. In Wallis only there are also three Districts (Hihifo, Hahake and Mua). There are no municipalities in the Territory.

THE STATE

The State is represented by a senior administrator, the Head of the Territory (appointed in the Council of Ministers). His powers are wide-ranging: law and order, security, compliance with the laws, the regulations and the orders of the courts, administration of justice, external relations, education, registry office, treasury, customs, administrative control and public health. To exercise these powers, the State has departments

services placés sous l'autorité de l'administrateur supérieur du Territoire, c'est-à-dire le préfet, et sous l'autorité du Haut-Commissaire de Nouvelle-Calédonie.

placed under the authority of the senior administrator of the Territory, namely the prefect, and under the authority of the High Commissioner of New Caledonia.

LE TERRITOIRE

Le Territoire est représenté par

- le chef du Territoire, qui prend tous actes réglementaires nécessaires pour assurer l'exécution des délibérations de l'assemblée territoriale. Il est l'ordonnateur du budget territorial;
- l'Assemblée Territoriale, composée de 20 membres élus au suffrage universel et au scrutin proportionnel, qui représente l'appareil législatif et vote le budget préparé par le représentant de l'Etat. Les sièges sont répartis en 13 sièges pour Wallis et 7 pour Futuna;
- le Conseil Territorial, présidé par le préfet et composé des trois rois et de trois membres nommés par le chef du Territoire, examine notamment tous les projets devant être soumis à l'Assemblée Territoriale.

Les trois **circonscriptions administratives**, une à Wallis et deux à Futuna, sont dotées d'une personnalité morale. L'organisation de ces circonscriptions est définie par arrêté de l'administrateur supérieur, après avis de l'Assemblée et du Conseil territorial. L'administrateur supérieur exerce les fonctions de chef de circonscription.

THE TERRITORY

The Territory is represented by:

- the Head of the Territory, who passes the necessary statutory measures to implement the decisions of the Territorial Assembly. He has authority to pass the Territorial budget;
- the Territorial Assembly, made up of 20 members elected by universal suffrage and by proportional representation. It represents the legislative power and passes the budget presented by the representative of the State. There are 13 seats allocated to Wallis and 7 to Futuna; and
- the Territorial Council, presided over by the Prefect and made up of the three kings and three members appointed by the Head of the Territory, examines in particular all the projects to be submitted to the Territorial Assembly.

The three **administrative wards**, one in Wallis and two in Futuna, have legal entity status. The organisation of these wards is determined by order of the senior administrator after consultation of the Territorial Assembly and Council. The senior administrator discharges the functions of head of the ward.

ORGANISMES RESPONSABLES DE LA GESTION DES ZONES CÔTIÈRES

ORGANISATIONS RESPONSIBLE FOR COASTAL ZONE MANAGEMENT

Service d'Etat de l'Agriculture, de la Forêt et de la Pêche

Department of Agriculture, Forestry and Fisheries

BP 19, Mata Utu
98600 Uvea

Tel: (681) 722823/ 722606
Fax: (681) 722544

M. Bernard Guegan
Chef de Service/ Head of Service

Missions et politique du service

Le Directeur est chargé, sous l'autorité de l'administrateur supérieur, d'appliquer les politiques agricoles, forestière, de développement, d'aménagement rural et de la pêche arrêtées dans les domaines de compétence de l'Etat. Le directeur est mis à disposition du ministre chargé de

Functions and policy of the department

The director is responsible, under the authority of the senior administrator, for the implementation of the agricultural, forestry, development, country planning and fisheries policies decided in the areas of State jurisdiction. The director is placed at the disposal of the minister in charge of the

l'environnement pour les missions relevant du ministère métropolitain de l'environnement et du ministre chargé des DOM-TOM pour les missions relevant du ministère métropolitain des DOM-TOM dans les domaines agricole, rural et des pêches. Il a aussi mission à gérer pour le compte du Territoire les services Territoriaux compétents dans les domaines de l'Agriculture, de la forêt et de la pêche.

Textes institutionnels du service

Arrêté du 4 novembre 1994 portant création du service. ■

environment for the duties within the jurisdiction of the French Ministry of the Environment, and of the minister in charge of DOM-TOMs [Overseas Départements and Territories] for the duties within the jurisdiction of the French Ministry of DOM-TOMs relating to agriculture, the rural sector and fisheries. He also has the responsibility of managing on the Territory's behalf the Territorial Services specialising in the fields of agriculture, forestry and fisheries.

Legal framework of the department

Order of 4 November 1994 setting up the department. ■

Service Territorial de l'Economie Rurale et de la Pêche

Territorial Department of Rural Economy and Fisheries

BP 19, Mata Utu
98600 Uvea

Tel: (681) 722823/ 722606
Fax: (681) 722544

M. Bernard Guegan
Chef de Service/ Head of Service

Missions et politique du service

Le service a la responsabilité du développement agricole et de la Pêche sur le Territoire. La politique actuelle est le maintien du potentiel productif des cultures traditionnelles et la progression vers l'autosuffisance en produits alimentaires, notamment en poissons.

Organisation du Service

Outre ladDirection générale et l'administration, le service compte quatre unités: Pêche; Economie agricole: Technique et vulgarisation (phytosanitaire, agriculture, forêt et élevage); Formation; basé à Wallis, il comprend également une Antenne à Futuna.

Effectifs: 50 permanents et 4 contractuels; dont section pêche: 8 personnes.

Responsabilités du service en matière de gestion des zones côtières

Le service est chargé d'assurer le développement de la pêche:

- gestion du secteur de construction navale;
- mise en place de dispositifs de sécurité;
- animation du secteur économique de la pêche;
- commercialisation, stockage, conditionnement;
- mise en place d'infrastructures de pêche;
- exploitation de la zone Economique;
- gestion et protection des stocks;

Functions and policy of the department

The department is responsible for the development of agriculture and fishing in the Territory. The current strategy is to maintain the productive potential of traditional cultures and the progress achieved towards self-sufficiency in foodstuffs, especially fish.

Organisation of the department

In addition to senior management and administration, the department consists of four units: Fisheries; Agricultural Economy (technology and popularisation—plant health, agriculture, forestry and breeding); Training (based in Wallis); and an outpost in Futuna.

Staff: 50 permanent officers and 4 contract workers (including 8 in the Fisheries Unit).

Responsibilities of the department in terms of coastal zone management

The department is responsible for the development of fishing:

- *management of the boat-building industry;*
- *establishment of safety arrangements;*
- *organisation of the economic sector of fishing;*
- *marketing, storage, packaging;*
- *setting-up a fishing infrastructure;*
- *exploitation of the Economic Zone;*
- *stock management and protection;*
- *formulation of fishing regulations; and*

- préparation de la réglementation de la pêche;
- recherche océanographique.

Il assure en particulier la formation des pêcheurs et l'appui (technique et gestion) aux opérateurs, l'élaboration des textes réglementaires dans le domaine de la pêche, le suivi des activités de pêche, le suivi et l'analyse des statistiques de pêche (poissons et autres produits de la mer - crabes, trocas, poulpes, langoustes).

Les objectifs actuels du service tendent à faciliter l'émergence de petites entreprises artisanales de pêche.

Activités actuelles en matière de gestion des zones côtières

Les activités actuelles concernent: Sessions de formation de stagiaires pêcheurs; Mise en place de dispositifs de concentration de poissons (DCP); Suivi de la pêche; Préparation d'une réglementation en matière de pêche, inexistante jusqu'alors. Les projets: Etude du potentiel halieutique du lagon de Wallis, des tombants de Wallis et Futuna et de la zone des 200 milles; renouvellement des DCP. ■

- *oceanographic research.*

It specifically provides training for fishermen and support (technical and managerial) for operators, formulates statutory fishing regulations, monitors fishing activities, monitors and analyses fishing statistics (fish and other products of the sea, such as crab, trochus, octopus and lobster).

The current objectives of the department aim to facilitate the emergence of small-scale fishing concerns.

Current activities relating to coastal zone management

Current activities are as follows: training courses for trainee fishermen; introduction of Fish Concentration Devices (DCP); monitoring of fishing; formulation of fishing regulations (previously non-existent). Projects include: survey of the fishing potential of Wallis Lagoon, of the underwater slopes of Wallis and Futuna, and of the 200-mile zone; replacement of Fish Concentration Devices (DCP). ■

Service des Travaux Publics

Public Works Department

BP 13, Mata Utu
98600 Uvea

Tel: (681) 722626
Fax: (681) 722115

M. Jean-Yves Gallois
Chef de Service/ Head of Service

Le service est responsable de l'entretien et de la construction d'ouvrages en zone littorale (routes, ports), ainsi que du balisage maritime.

Autres services ayant des activités dans le domaine littoral

Les circonscriptions administratives, qui ont pratiquement les attributions des communes, en métropole, ont la responsabilité de la protection du littoral contre l'érosion. Leurs activités concernent ponctuellement la construction de murs de protection, de remblais ou de digues. ■

The service is responsible for the maintenance and construction of works in the coastal zone (roads, ports) as well as for maritime buoys and beacons.

Other departments carrying out activities in the coastal area

The administrative wards, whose powers are virtually those of municipalities in mainland France, are responsible for the protection of the coastline against erosion. Their activities focus on the construction of protection walls, bund walls or seawalls in selected places. ■

Circonscription administrative d'Uvéa

Uvea Administrative Ward

BP 65, Mata Utu
98600 Uvea

Tel: (681) 722588
Fax: (681) 722716

M. Philippe Saffrey
Chef de Service/ Head of Service

Circonscription administrative d'Alo et de Sigave

Alo and Sigave Administrative Wards

BP 01, Leava
98620 Sigave

Tel: (681) 723306
Fax: (681) 723208

M. Lemonier
Chef de Service/ *Head of Service*

Le service assure ponctuellement, dans le cadre des opérations "contrats de village", la réalisation d'un mur de protection contre la mer, dont les travaux sont confiés à une entreprise ou aux chantiers de développement. ■

Within the framework of the "Village Contracts" operations, the ward is putting up a protection wall against the sea in selected places. The works are entrusted to a business concern or to development units. ■

