An Assessment on the Development of Marine Parks and Reserves in Papua New Guinea

John Mark G. Genolagani
National Parks Service, Office of Environment and Conservation
Papua New Guinea

ABSTRACT. *The Papua New Guinea National Parks Service has tried since the early 1970s to establish marine protected areas. This development, however, has made very little progress in establishing additional reserves due to the traditional ownership systems, limited manpower and finance, and lack of enforcement and training. This account is an assessment of the problems in establishing marine parks and reserves, while discussing preliminary needs, actions and future developments and support that is needed. Within this framework, a case study on the proposed Horseshoe Reef-Tahira Marine Park is presented. The experience of the Horseshoe Reef Marine Park is then discussed to identify appropriate actions and support that is needed for marine conservation on a national scale.*

1. INTRODUCTION

The marine waters of Papua New Guinea (PNG) comprise some 65% of her territory and cover some 7,300 km of coastlines, excluding a declared 200-mile economic zone which covers 308,800 sq km of ocean (Perry, 1982; PNG Foreign Affairs 1982). There are several major river systems which run over 1000 km before reaching the sea, a number of large lakes, and extensive marine and fresh water wetlands. Most of the coastal population still employ traditional fishing methods but these are being superseded by outboard motors and monofilament nets. The marine resources contribute to the national economy; the average total value of marine resource exports (tuna, crayfish and prawns, shells, and crocodile skins) in 1980 was K33 million.

Although PNG has been fortunate in not experiencing large scale marine environmental problems such as over-exploittion of fisheries and widespread oil pollution, there is a rising concern for protection and management measures for marine resources.

More than 90% of the coastal people are subsistence farmers or fishermen in PNG, and the reefs and the surrounding waters have been traditionally exploited for food, shells, corals and other marine life for personal adornment, artifacts for daily use and currency. However, this strong dependence is being undermined along the Papuan coast, as the realization that some of these marine resources may have economic potential has led to an increasing commercialization of many traditional resources (Pernetta and Hill, in press). To protect traditional uses for the future while accommodating social changes and economic development, it is necessary for conservation and management measures to be implemented now.

The need for protected reserves has been established and proposed by different Government departments (e.g., Primary Industry; Lands, Surveys and Environment), Government institutions (e.g. Motupore Island by the University of Papua New Guinea), and even by non-governmental agencies (e.g. the Horseshoe Reef Marine Park by Tropical Diving Adventures, Ltd.). However, it is the Division of Wildlife and the National Parks Service (NPS) of the Office of Environment and Conservation (OEC) which have been entrusted specifically to establish and develop marine nature reserves (Andrews, 1980).

The Wildlife Division has made a significant contribution in marine conservation by developing a working model suited to PNG under its Wildlife Management Area programme (Spring, 1980; Kwapena, 1980; Hudson, 1980). The NPS has in the meantime established protection of a representative biological area (Talele Islands Nature Reserve) and nature or historic parks for visitor and recreational uses (Nanuk Island Provincial Park, Cape Wom International Memorial Park), but has experienced considerable problems similar to those of

the terrestrial reserves (Eaton, 1980; Gorio, 1980); these programmes have now been discontinued due to lack of finance. It appears that only if enough revenue can be generated from conservation areas will they warrant recognition by decision makers, a requirement which the established marine reserves have failed to meet.

It is obvious, however, that there is already interest in establishing 'marine nature reserves' based on money-making ventures by some provincial governments (e.g., Manus, Madang, Morobe and Milne Bay Provinces) and also private organizations (e.g., Tropical Diving Adventures, Port Moresby Sub-Aqua Club).

The purpose of this account is to describe the problems and constraints in establishing an envisaged pioneer marine park, the Horseshoe Reef-Tahira Marine Park in the Bootless Inlet, near Port Moresby, Central Province, and potential conflicts that may arise. It is hoped that the experience of the reserve may suggest appropriate approaches in realizing a more practical marine conservation strategy for PNG.

2. HORSESHOE REEF-TAHIRA MARINE PARK

2.1. Background to the area

The Central Province, in the south-eastern portion of PNG, has received considerable attention due to the primacy of Port Moresby, the seat of the National Government as well as the Central Provincial Government; it also serves a dual function as an administrative and commercial centre, providing opportunities of employment which encourages urban drift, while its 'youthful demography' is giving rise to a high natural population growth.

The Papuan coastal lagoon covers a surface area of some 200 sq km and borders the open ocean (Coral Sea) by a discontinuous coralline barrier reef, referred to as the "Papuan Barrier Reef" on the narrow continental shelf. The configuration of the coastline and the barrier reef at the north-west of the Papuan coastal lagoon show a funnel-shaped opening (Caution Bay) into the lagoon while toward the southeast the lagoon is narrowed where the fringing reefs and the barrier reef meet. The barrier reef is discontinuous with four major and many small channels. There are two major embayments, Port Moresby harbour and Bootless Inlet. Within and outside the embayments in the lagoon, are some coral fringed islands. The embayments and the adjacent coastlines are sheltered by low hills at a maximum height of 300m while the Owen Stanley Range towers to over 1,000m above sea level behind a narrow coastal plain.

The Bootless Inlet and its surrounding coastal environments have been under occupation for some 2000 years by the Motuans (Swadling, 1981) and fishing activities have formed part of their livelihood due to the frequent poor seasons of garden yields (Groves, 1977). This area has a relatively low rainfall and marked dry seasons and subsistence farming has led to a savanna vegetation (Paijmans, 1982). Fishing was not even sufficient to cater for different populations of the area, perhaps due to economic warfare (Oram, 1980), or the depletion of marine resources (Groves, 1977; Oram, 1981). This has been very significant even under European occupation; as Groves (1977) reports, "A major function of *hiri* (trade), Motu themselves insist, was economic. Without it they would not have subsisted, for in the frequent poor seasons neither their gardens nor their inland exchanges of fish for banana and tuber yielded sufficient staple food to tide them over the months immediately preceeding the annual harvest." The items of this traditional trade with the Gulf of Papua and their eastern neighbours included clay pots, sago, logs and shells (Lacey, 1982); it was the shells in the form of armshells and other ornaments that was the major item for ceremonial currency and, even at present, for bride prices.

The marine resources of the area are limited; from existing accounts it appears that fishing activities have been restricted by and large to the fringing reefs while very little attention has been focussed on activities on the barrier reef.

The urban development of Port Moresby is directly imposing social and economic changes, particularly in the use of marine resources, for instance the depletion of shells at the Pari Village (Swadling, 1980) and holothurians for pech-der-mer (Shelley, 1981). In addition, the extraction and transport of minerals from the area has had some impact, such as the discarded copper ore slug in the mangrove stands in Bootless Inlet (Johnstone, 1977), and the transport of the copper ore from the OK Tedi development in the Western Province into the Port Moresby harbour for eventual export (Moore, 1982).

The Horseshoe Reef Marine Park was first proposed in 1978 by the Tropical Diving Adventures Pty. Ltd. (TDA) based in Port Moresby, who specialize in water-based recreational activities, particularly SCUBA diving and underwater photography. The proponents themselves have recently changed the area's name to Tahira Marine Park (Coleman, 1982). As a portion of the barrier reef off the Bootless Inlet next to the Nateara Reef, the reserve is exclusively marine in that it includes no islands or coastal areas; this includes the coral reefs as well as the surrounding seas to an area of 295.9 ha. The reserve was proposed primarily to make aware to the coastal villages the effects of reef fishing on coral reefs in the area by protecting the Horseshoe Reef; however, terms regarding local participation in the establishment and management of the reserve have not been defined.

An official declaration to establish the area is still in process. Few surveys have been, so physical descriptions (physical profile, diversity and distribution of different species) are scanty and there are no assessments of its conservation and management needs; the objectives of the reserve have not been defined and there is no management plan.

The reserve is primarily a portion of the barrier reef in the shape of a horseshoe; the southern portion of the reef is exposed during the low-water spring tidal levels while the northern side is submerged. The submerged south-eastern end of the reef is connected to the adjacent submerged reefs while the north-west end immediately borders the Padana Nahua channel, one of the four major channels of the western sector of the Papuan Barrier reef. The most comprehensive data to date of its marine life is given by Coleman (1982).

2.2. Coral reefs

Coleman (1982) in his faunal survey of 1980 over a period of about 60 hours, recorded 70 coral species, including 37 species of hard corals in the genera *Acropora, Seriatopora, Stylophora, Pocillopora, Montipora, Fungis, Herpolitha, Parahalomitra, Coniopora, Porites, Echinopora, Favia, Hydnophora, Leptoria, Oulophyllia, Galaxea, Lobophyllia, Lithophyllis, Pectinia, Physogyra, Euphyllia, Dendrophyllia, Tubastrea* and *Turbinaria*.

2.3. Large animals and special sites

Large animals recorded in the same survey include wobbegongs *Orectolobus dasypogon*, catsharks *Hemiscyllium ocellatum*, and sharks *Sphyrna lewini, Carcharchinus spallanzani, Charcharchirus* sp, *Triaenodon obesus*. No turtles or dugongs were recorded.

A special site within the reserve is the 'Parama', a wreck that was sunk as ar artificial reef and houses the major attractions of the reserve, a big grouper named Nessie, a moray eel *Gymnothorax flavomarginatus* and Fred Parker, a sea snake *Laticauda colubrina*.

2.4. Present human uses

Although the major traditional coastal villages of Pari, Tubusereia and Barakua are fishing villages, their activities on the reef are not known in detail though fishermen are occasionally seen on the reef. In addition, people from new settlements in the Tahira and the Mirigeda areas of the Bootless Inlet fish within or on adjacent reefs. The fishermen use either spear guns and mono filament gill nets for fish, but other marine resources such as shells may be collected. Some city dwellers have ventured into night spear fishing and occasionally intrude into the reserve area. Clearly, the area is vulnerable to pressure from other coastal populations as well as from its traditional users.

2.5. Problems in establishing the reserve

The initial problem in establishing the reserve was its boundary description, a function of the Lands Division (which is independent of the National Parks Service although they are both within the same Lands, Surveys and Environment Department); the proposal was submitted in December 1978 and the boundary descriptions were not completed until August 1980, after a period of more than two and a half years. This boundary description had to be submitted to the Department of Justice for approval and forwarded to the Lands Department for gazettement under its legislation; this step was completed on 9 July 1981.

This gazettal was for the public to show, within a three month period, causes why the area could not be used for conservation purposes. There were no complaints or enquiries as such and the reserve would have been declared Government land and finally the National Park Act of 1982 would have declared the NPS to be responsible for its management. None of this, however, has been done since the area was found to be within a traditional fishing zone and therefore the area must be subjected to valuation for compensation payment to the traditional owners before it can be managed by the government. A further problem has been realized in that this is the Lands Division's first experience with marine areas, and hence there is a lack of personnel who can do the valuation of marine resources underwater. Furthermore the traditional owners still have to be identified, since the survey by NPS in 1979 and the reports that followed have failed to mention the traditional owners of the area.

Meanwhile, due to the sensitive nature of land compensation for areas under customary ownership, the establishment procedure for the reserve has been suspended. In conclusion, reserve establishment at present is a very lengthy process and it is apparent that follow-up visits have been non-existent, both to the reserve and to the coastal villagers; lack of training in conducting field surveys, reporting and drawing up management plans has made the problem worse.

A major constraint has been a failure to consider how and to what extent will the traditional owners and non-traditional owners will participate in the reserve's establishment, although this was one of the terms that was agreed with Tubusereia and Barakua villages in 1979. The NPS in the meantime has limited manpower and lacks the resources to commit itself to enforcement measures. Perhaps the ultimate test for the NPS is in making a set of compromises between the traditional owners and the Tropical Diving Adventures.

The TDA use the reserve as their base of operations and can be regarded as a significant component for its revenue. The traditional owners, on the other hand, pose a potential concern in that plans or compromises proposed between the three parties (NPS, TDA, and traditional owners) may not be acceptable, and a demand for a higher percentage of the revenues of the marine park by the traditional owners is not impossible. The primary concern here would be over shares for the traditional owners, fees to be imposed by the NPS, and profits the TDA need to earn for its operations.

From the above, it is obvious that the NPS has given the reserve in practical terms a very low priority. And one may ask, why? Most of the senior technical officers attribute the lack of attention to the marine parks and reserves concept being new. The rural populations have very little understanding of the concept of marine nature reserves, and even to those acquainted with 'marine parks' the term implies 'tourists and money' with very little consideration for conservation of the environment.

The current situation is that the only NPS Officer involved with marine matters (writer of this account) has only a basic marine sciences background and very limited experience in field surveys and in preparing management plans. Further, the NPS has very limited general resources, particularly on equipment, with only two sets of SCUBA diving gear available. It may, therefore, be premature at this stage to embark on such a programme due to constraints of finance and staff.

Thus it is only when the availability of finance can be assured that the Horseshoe Reef Marine Park or other marine reserves can be established.

2.6. Needs for the future

Due to the sensitiveness of the customary ownership of the area and potential conflicts that may develop, the reserve's immediate establishment has been put off for an indefinite period to identify appropriate actions. The basic needs recognized include: 1) more biological data such as for coral species number diversity and distribution, dominant coral assemblages, concentrations of adults, juveniles, and breeding sites of lobsters, commercial fish distribution, known concentrations of endangered, threatened, or highly sought after species, and the presence of marine turtles and dolphins; 2) socio- economic data including identification and location of fishing villages fishing grounds, location of industry, agricultural areas and proposed developments, and sites of specific interest; 3) determination of the conservation potential of the area through assessments of conservation values, threats and socio-economic considerations involved; and 4) a management plan.

3. EXPERIENCE FROM THE HORSESHOE REEF MARINE PARK

The experience of the Horseshoe Reef Marine Park shows that establishment of marine reserves in PNG is a very lengthy process which reflects the situation for the terrestrial reserves as well (Eaton, 1980; Gorio, 1980). Coupled with this is the lack of data on environmental, biological and socio-economic aspects of the coastal populations and their traditional uses of the environment; such data is necessary to prepare management strategies or propose necessary changes as new problems are encountered. This shows the need for a marine conservation unit which will include a cadre of trained personnel who can ensure wider public awareness and the development of marine conservation.

Note that within this account there is no mention of the Central Provincial Government (CPG) being involved, simply because it has not been involved. The NPS have failed to cooperate with the CPG, but the CPG has also ignored the possibility of the NPS to assist its own conservation efforts. This is at least partly due to the availability of finance within its own budget for initiating its own projects, such as the Idlers Bay Reserve near Port Moresby. Since the NPS lacked financial resources to purchase and develop the area from its traditional owners, the CPG purchased the area to be a provincial project without NPS assistance. However, due to lack of consultation and cooperation, there has been no development, and the CPG is envisaging returning the land to the traditional owners.

The development of the Horseshoe Reef MP to ensure direct benefits (e.g., payment of fees, local employment, protection of marine species and habitats) will meet some of the Provincial Government's priorities on protecting the welfare of the Central Province people, so this could be an initial point for the NPS to discuss with the CPG, particularly regarding finance.

With regard to traditional ownership, the Division of Wildlife has pioneered a model suited to PNG in the form of Wildlife Management Areas (WMA) (Kwapena, 1980), where a reserve's rules and regulations for its management and enforcement are created and implmented by the traditional owners of the reserve while the Wildlife Division assists in technical and resource management aspects. Major concerns with the WMA model include providing alternative means to generate local revenue to the villagers and the degree of authority that traditional owners or the NPS shall exercise over each other.

Where the people may be inconvenienced by conservation measures to the extent that they lose money, the model needs to provide alternative marine resources; an example of this is where the Kiwai people of the Western Province have been suggested to look to barramundi and crayfish—which have virtually unlimited and lucrative market and wildstocks for more intensive fishing—as alternative commodities from dugongs. However, the people need new techniques, such as catching crayfish alive so they can be marketed; the Dept. of Primary Industry could be requested to assist in such training.

With regard to the second concern, the traditional owners may neglect important conservation values of a reserve for economic exploitation and the Government can have very little control over such activities.

In view of this, local people and the NPS may need to reach a compromise between the WMA model and a more conventional marine parks system.

The viability of establishing Marine National Parks in PNG is greatly affected by recreational tourism, but PNG lacks a tourism base. As Ranck (1982) points out, there is considerable potential but costs of services and

accommodation are very high when compared to similar facilities in neighouring countries. This is due partly to the national economy depending on extraction of minerals, plantation products, timber and fisheries, which seem less risky than tourism but contribute to PNG's expensive accommodation industry. As long as PNG's national currency stays very strong in comparison to other currencies, recreational tourism may remain a minor development in the national economy.

4. ACTION AND ENVISAGED DEVELOPMENTS

To establish and develop a system of marine reserves, critical habitats, ranges of endangered species, and sites for tourism need to be identified. This is a constraint since the environment of PNG has been very little studied and so true interests as to conservation may not be known for some time yet (Dahl, 1980). However, preliminary sites have been compiled for field surveys, and Table 1 shows the areas of priority as proposed by different bodies and individuals.

Since there is no national strategy and thus a lack of guidelines for a marine conservation strategy, there is still considerable groundwork to be done. This includes developing a marine conservation strategy and establishing a marine conservation specialists team at the initial stages to enable the longer term goals of establishment of marine protected areas and a marine conservation unit.

The development of a marine conservation strategy would follow the national conservation strategy when it is prepared. Forming and developing a marine conservation specialist team is already in process due to the amalgamation of NPS into the OEC.

As for in-service training on marine conservation, PNG is inconvenienced by the discontinuation of the marine turtle and dugong projects where the national staff were being trained under the Wildlife Division. Under NPS there have been no training programmes, so an appropriate training programme will have to be developed.

4.1. Staff and resources available within the OEC

With the constraints of finance, manpower and training, the establishment of a small unit is envisaged which would be oriented mostly to efforts to assist local people in managing the way they use their environment in the light of recent alterations of life style. The unit would have a nucleus of officers of varying degrees of experience in village-based management work, drawing on all the organizations involved and on their active support to develop the skills and experience needed to improve the environmental conditions of the country.

Acknowledgements

I am grateful to the IUCN for enabling me to realize this manuscript, with special mention to Mr. Jeffrey McNeely for his comments and personal assistance. I am also indebted to Dr. Rodney Salm for his encouragement, and to Dr. Nicholas C.V. Polunin for additional comments.

A word of appreciation extends to all those who directly or indirectly contributed, particularly Dr. Lance Hill, Dr. Peter Eaton, Mr. Bob Halstead, and the staff of the Wildlife Division and the National Park Service. Finally, thanks and appreciation to Mr. Neville Coleman for making available his 1980 survey data, Mase Asigau and Wendy U. Lewa for typing the manuscript.

Table 1. Existing and Proposed Marine Protected Areas and Terrestrial Protected Areas with Marine Components in Papua New Guinea

Category	*No.*	*Name of Area**	*Province*	*Area (Ha) Total*	*Coral Reef*	*Mangrove*	*Marine Conservation Elements*
Declared Marine Park Reserve							
1. Management Protection Established	1.	Talele Island NR[1] (1973)	E. New Britain	—	—	—	seabirds, coral reef, mangrove
	2.	Nanuk Island pp[1] (1973)	E. New Britain	12	—	—	seabirds, coral reef, recreation
	3.	Maza WMA[2]	Western	184,230	—	—	dugong, coral reef
	4.	Swataeteae WMA[2] (1977)	Milne Bay	—	—	—	turtles, coral reef
	5.	Baniara Islands PA (1975)	Milne Bay	—	—	—	no information
	6.	Long Island WMA[2]	Madang	—	—	—	marine turtle breeding areas (hawksbill, green turtles) seabirds, coral reef
	7.	Crown Island WS[2] (1977)	Madang	—	—	—	marine turtle nesting areas
	8.	Bagiai WMA[2]		—	—	—	Marine turtles, coral reefs
2. No Fully Established Management Protection	9.	Garu WMA[2]	W. New Britain	—	—	—	no information
	10.	Horseshoe Reef MP[1]	Central	395,9	—	—	coral reef recreation, tourism, research and education
	11.	Unei Island VR[1]	East Sepik	—	—	—	coral reef, fish, seabirds
	12.	Fly Island MP[1]	Morobe	—	—	—	coral reef
Proposed Marine Park Reserve (by N.P.S. and Wildlife Division)	13.	Vuvulu Islands	Manus	—	—	—	coral reef
	14.	Ninigo Groupo	Manus	—	—	—	coral reef, turtle
	15.	Hermit Islands	Manus	—	—	—	coral reef, turtle, wildlife
	16.	Western Islands	Manus	—	—	—	seabirds, coral reef
	17.	Sabben Islands	Manus	—	—	—	no information
	18.	Alim Islands	Manus	—	—	—	no information
	19.	Baluan Islands	Manus	—	—	—	dugong
	20.	Lou Islands	Manus	—	—	—	dugong
	21.	Los Negresis	Manus	—	—	—	dugong
	22.	Rambutyo Islands	Manus	—	—	—	dugong
	23.	St. Mathias Group	New Ireland	—	—	—	turtles, wildlife, coral reef
	24.	Islands between New Hanover & Kavieng	New Ireland	—	—	—	no information, could be coral reef
	25.	Diaul Islands	New Ireland	—	—	—	no information
	26	Tabar Islands	New Ireland	—	—	—	coral reef
	27.	Lihir Group	New Ireland	—	—	—	coral reef
	28.	Tanga Islands	New Ireland	—	—	—	coral reef
	29.	Feni Islands	New Ireland	—	—	—	coral reef
	30.	Pinipel-Nassau Group	N. Solomons	—	—	—	coral reef
	31.	Kulu, Manus, Passu	N. Solomons	—	—	—	coral reef, seabirds
	32.	Duke of York	E. New Britain	—	—	—	wildlife
	33.	Hoskins Bay	W. New Britain	—	—	—	no information
	34.	Cape Gloucester	W. New Britain	—	—	—	dugong
	35.	Arawe Islands	W. New Britain	—	—	—	dugong**
	36.	Cape Anukur	W. New Britain	—	—	—	coral reef
	37.	Tumelo Ali, Seleo & Angel Island	West Sepik	—	—	—	coral reef
	38.	Shouten Islands	East Sepik	—	—	—	no information
	39.	Murik Lakes	East Sepik	—	—	—	no information
	40.	Chambri Lake	East Sepik	—	—	—	no information
	41.	Kuvenumas Lake	East Sepik	—	—	—	no information
	42.	Yimas Lake	East Sepik	—	—	—	no information
	43.	Manam Island	Madang	—	—	—	coral reef** research & education**
	44.	Hansa Bay	Morbe	—	—	—	coral reef**
	45.	Astralobe Bay	Madang	—	—	—	coral reef**
	46.	Umboi Islands	Morbe	—	—	—	mangrove
	47.	Tami Islands	Morbe	—	—	—	coral reef
	48.	Labu Lakes	Morobe	—	—	—	coral reef
	49.	Salamaca Peninsular	Morbe	—	—	—	coral reef
	50	Mangrove Island	Northern	—	—	—	wildlife, coral reef
	51.	Cape Nelson	Northern		—	—	no information
	52.	Trobriand Islands	Milne Bay	—	—	—	coral reef, turtles, seabirds
	53.	Woodlark Islands	Milne Bay	—	—	—	coral reef, seabirds
	54.	Goodenough Islands	Milne Bay	—	—	—	coral reef, seabirds, turtles
	55	Fergusson Islands	Milne Bay	—	—	—	coral reef, seabirds, turtles
	56.	Normanby Islands	Milne Bay	—	—	—	coral reef, seabirds, turtles
	57.	Pocklington reef	Milne Bay	—	—	—	coral reef, seabirds, turtles

6

Table 1 (cont). Existing and Proposed Marine Protected Areas and Terrestrial Protected Areas with Marine Components in Papua New Guinea

Category	*No.*	*Name of Area**	*Province*	*Area (Ha) Total*	*Coral Reef*	*Mangrove*	*Marine Conservation Elements*
	58.	Misima Islands	Milne Bay	—	—	—	dugong, coral reef
	59.	Yela Islands	Milne Bay	—	—	—	coral reef, turtles
	60.	Calvados Chain	Milne Bay	—	—	—	coral reef
	61.	Conflict Group	Milne Bay	—	—	—	coral reef, seabirds
	62.	Engineer Group	Milne Bay	—	—	—	seabirds**, coral reef
	63.	Ware Islands	Milne Bay	—	—	—	seabirds, coral reef
	64.	Killerton Islands	Milne Bay	—	—	—	mangrove
	65.	Milne Bay Islands	Milne Bay	—	—	—	dugong, coral reef
	66.	Abau	Central	—	—	—	mangrove, recreation, dugong**
	67.	White Beach RF	Central	—	—	—	mangrove, recreation
	68.	Coutance Islands	Central	—	—	—	coral reef**, turtles
	69.	Papuan Barrier Reef	Central Nat. Capt. Milne bay	—	—	—	coral reef, tourism, research & education, turtles, recreation
	70.	Motupore Island MR	Central	—	—	—	research & education** coral reef, mangrove**, seagrass
	71.	Lealea Salt Flats	Central	—	—	—	mangroves**
	72.	Taurama Beach RP	Nat. Capital	—	—	—	tourism, recreation, coral reef, seagrass**
	73.	Idlers Bay P.P	Central	—	—	—	tourism, recreation, coral reef, mangrove
	74.	Kerema	Gulf	—	—	—	mangrove**
	75.	Kikori	Gulf	—	—	—	mangrove
Declared Terrestrial Reserves Bordering the Sea							
1. Seaward Extension Exists	76.	Cape Vom IMP[2]	E. Sepik	55	—	—	recreation, stoll, beach forest
2. Seaward Extension Proposed	—		—	—	—	—	—
3. No Seaward Extension, But Includes Marine Component	—		—	—	—	—	—

* *MP = Marine Park, MNP NP = Marine National Park National Park, HP = Hunting Park, SNR = Strict Nature Reserve, MR WR = Marine Reserve Wildlife Reserve, PP = Provincial Park, PA = Protected Area, WS = Wildlife Sanctuary, WMA = Wildlife Management Area*

** *Element of major interest*

[1] *National Parks Service (Division)*

[2] *Wildlife Division*

****Papua Barrier Reef—extends along the south-east of Papua New Guinea (across the National Capital District, Central and Milne Bayu Provinces)*

Envisaged Design; Achievements; and Principal Goals of the Marine Conservation Programme, Papua New Guinea (based on Fig. 3 Salm et al., 1982)

Data Review and Collation—Preliminary Identification of Conservation Needs (Development Stages)

Strategy Formulation	Establishment of Protected Areas	Establishment of Marine Conservation Specialists Team	Establishment of a Marine Conservation Unit
Definition of Data Elements (nonexistent)			
Data gathering + mapping	Preliminary survey	Legalisation by ministerial decree	Recruitment of suitable project manager and counterpart staff (nonexistent)
Data analysis	Assessment of conservation value and needs at different sites (nonexistent)	Identification and invitation of members	Assignments to experts seconded from national institutions or abroad (needs developing)
Data Synthesis			
Identification of: • Potential Conflicts • Themes for Action • Priority Sites for Action	Identification of sites for protection (7 (WMA) completed, none under NPS) Detailed survey (none) Production of management plan (none)	Working meetings Development of government policy and legislation for use of productive habitats and selected species	In-service training (none) Regional study tours (none) Misc. level training abroad
Five (?) Year Plan for Development of Marine Conservation	Declaration (3 in existence, continuing) Establishment of Parks/Reserves	Monitoring, review, revision, advising on Marine Conservation Programme	Marine Conservation Unit in NPS. Assistant Chief of Operation (A C00) Marine Conservation Section Chiefs: • Marine Parks & Reserves • Habitat Management • Species Management • Planning • Survey and Research 4 National Park Managers