

KEY ISSUE PAPER: COASTAL ZONE MANAGEMENT AND CONSERVATION IN THE SOUTH PACIFIC

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INTRODUCTION

Conservation needs in the coastal zone are of particular importance. With the exceptions of Papua New Guinea, Australia and New Zealand virtually all settlement and development activities in the South Pacific region took place in the coastal zone.

Extensive changes in terrestrial ecosystems of the coastal zone began during the nineteenth century as one plant species, *Cocus nucifera*, became widely established as the basis of the copra industry. This species produces best, near to the sea. Here it now dominates - at the expense of the original lowland forests and strand ecosystems.

Marked changes in coastal marine ecosystems are a more recent development, associated with over-fishing, sedimentation, sewage entrophication, chemicals, explosives and freshwater discharges.

This paper addresses the topic of coastal zone conservation in two parts; first, a brief overview in which key issues are identified; and, second, proposals for a comprehensive coastal zone management programme for the region.

SPECIES PROTECTION

Most marine coastal conservation efforts have been species - focused and sea turtles have received special attention, efforts having been made to boost depleted populations by protecting nesting beaches and hatchlings. For all the dedication, time and money applied to turtle conservation projects their effectiveness in the South Pacific region remains uncertain. Apart from the ecological questions which arise there is one very important lesson to be learned from these efforts - that, without a firm commitment and involvement of all affected local communities such projects must eventually fail.

Populations of large cetaceans (whales) were long ago depleted by whalers. The whaling industry of the Cook Islands, Tonga and Australia have all ceased and, coupled with conservation efforts elsewhere, some recovery is anticipated. However, there remain some conservation problems with small cetaceans (porpoises). These are still killed in large numbers at a few locations in Malita, Solomon Islands - for food, but primarily for the teeth, used in strings as a form of traditional currency.

The Malaitan hunt is certainly a traditional activity. However, its cultural significance cannot compare with that of the bowhead whale hunt of the Inuit of the Arctic Region. In this latter case the hunt has been shown in social terms to be clearly the keystone of Inuit culture. Complete cessation of bowhead whaling could cause dramatically adverse changes in Inuit society. A cessation of porpoise hunting in Malaita would not be expected to have socially damaging consequences.

Another aspect of small cetacean conservation arises in Kiribati where these animals have interfered with the catches of fishermen. Attempts to frighten or even destroy these porpoises have failed. Kiribati's Fisheries Division is promoting an avoidance strategy, trying to encourage fishermen to shift their fishing effort from surface waters to deep bottom stocks.

Dugong conservation efforts in Papua New Guinea and Australia have achieved mixed results. Most dugong conservation activities in Papua New Guinea have been undertaken in Wildlife Management Areas - an innovative conservation area concept involving management by those people who have traditional rights to these areas. In Australia, where the dugong has absolute legal protection except for limited personal use by communities with traditional harvest rights it seems that "tradition" in the Torres Strait area has been used by some as a cover for excess harvest for commercial purposes. Dugong populations in this area are reported to be fast declining.

Some mollusc species are threatened. A conspicuous example is the giant clam. Until fairly recently many isolated reefs had populations of very large, old clams. Today, many of these reefs are clam graveyards, their breeding stock annihilated, following illegal visits by the vessels of distant water fishing nations. The conservation status of some of the rarer mollusc species, too, may be threatened in some of the areas visited by cruising shell collectors.

COASTAL AREA CONSERVATION

The "coconut overlay" has dramatically changed the appearance of coastal landscapes, making it difficult to locate relatively undisturbed areas for protection as examples of terrestrial coastal ecosystems. Some examples of the ecosystems of cliffed coastlines survive, not least being the dramatically beautiful black lava seascape of Western Samoa's O le Pupu Pu'e National Park.

Coastal dune systems outside Australia and New Zealand are few. A distinctive dune complex at Songatoka, in Fiji, has long been listed for conservation attention. It is an area of important archaeological value but has suffered severe ecological damage from cattle and goats.

Coastal marine area conservation is dealt with in a number of papers in this session. The conservation status and prospects of such areas vary. Often they are vulnerable to adjacent land-based activities over which conservation authorities have little control.

Coastal area conservation efforts are sometimes focused too intensely on efforts to rigorously exclude all use and impacts from a chosen area. Too close a fixation on this ideal of protection may mean that management of the area becomes nothing less than a continuing battle to preserve the area's integrity - against usually overwhelming odds.

In this respect, the model of protection and multiple use coastal area management developed by the Great Barrier Reef Marine Park Authority (GMRMPA) seems to be well suited to South Pacific conservation needs.

RECENT DEVELOPMENTS IN COASTAL AREA CONSERVATION

The GBRMPA model for nature conservation and resource management must rank as one of the major developments in coastal area conservation in the region since the Second South Pacific National Parks and Reserves Conference. On a less dramatic scale, useful coastal area conservation

management innovations have arisen in the course of establishment of a number of less extensive protected areas in the region. Some of these are reported on in this session.

There has been a marked expansion of interest and effort in coral reef research in recent years, and an increased application of basic coral reef research results to reef ecosystem management needs. Mangrove ecosystems also have benefited from increased research and management attention; seagrass areas to a lesser extent.

Sound ecological guidance for the selection and establishment of coral reef conservation areas has developed from the pioneering work of Ray, and the more recent efforts of Salm, both with IUCN support. Effective application of these reef conservation principles and methods in the South Pacific, however, is dependent upon adequate understanding of traditional South Pacific Island concepts of reefs and other coastal areas, their allocation for various uses, and the nature and social significance of traditional coastal tenure systems.

Improvements in knowledge and understanding of coastal ecosystems has been accompanied by very useful advances in remote - sensing technology and data processing. These are proving to be valuable aids in mapping; ecosystem identification, location and extent; and in the detection and monitoring of certain oceanographic conditions relevant for marine conservation area management.

The new focus on the oceans which results from the enthusiastic acceptance of the Law of the Sea Convention by over 150 nations provides a stimulus for marine conservation efforts in coastal areas. Several articles of the Convention provide for pollution control and for careful management of resources in the coastal zone (see Appendix).

COASTAL AREAS TO OPEN OCEAN

Whereas the terrestrial limit of the coastal zone may be defined in terms of a watershed boundary, its seaward limits cannot be so exactly defined. Ecologically, a continuum extends from shore to deep ocean. As the Law of the Sea Convention recognises, management of ocean resources effectively begins in coastal waters.

This paper focuses on coastal area conservation. Regional concerns for marine species and area conservation range further - to oceanic areas whose conservation needs have scarcely been recognised, let alone provided for. It is important that attention now be paid to oceanic features such as seamounts, ocean trenches, ocean canyons; perhaps even less discrete areas such as upwellings.

KEY ISSUES IN COASTAL ZONE CONSERVATION

Some of the key issues to be considered in coastal zone conservation are:

- * New and more comprehensive approaches to conservation of marine animal species such as cetaceans, turtles, dugong.
- * The challenge of developing multiple resource management regimes which provide for nature conservation and which effectively incorporate the knowledge and tenure systems of traditional communities.

- * Resolution of the problem of legal and administrative distinctions between land and sea which frustrate successful coastal zone management.
- * Slow progress in helping the public and governments of the islands region of the South Pacific to understand the importance of nature conservation and to make the necessary commitment.
- * Ocean features conservation needs.
- * Theoretical and practical considerations of the ecological viability of protected coastal areas, more especially marine.

REGIONAL APPROACHES TO COASTAL AREA CONSERVATION

The overall framework for environmental protection, resource conservation and nature conservation in the region is provided by the South Pacific Regional Environment Programme (SPREP). The action strategy being developed by the conference for the establishment and management of protected areas is designed to provide effective direction for the region's nature conservation objectives within the SPREP framework.

Concurrently, a regional programme in coastal zone management is being prepared by the Commonwealth Science Council as a component of the SPREP Action Plan. Within that proposed programme, which is outlined below, there is provision for a Regional Theme - Protected Coastal Areas and Species. No activities have yet been specified for this particular theme of the coastal zone management programme. Ideas and priorities in coastal zone nature conservation are awaited from the Conference.

COMMONWEALTH SCIENCE COUNCIL : COASTAL ZONE MANAGEMENT PROGRAMME IN THE SOUTH PACIFIC

At Papeete, Tahiti, 2-4 June 1985 representatives of South Pacific Island countries met, in the company of various coral reef scientists and coastal resource administrators, to consider a Commonwealth Science Council proposal to assist the region, through the South Pacific Regional Environment Programme (SPREP), to formulate a relevant programme of coastal zone management.

This meeting was planned following discussions between the SPREP Co-ordinator and the Secretary of the Commonwealth Science Council in which CSC sought to contribute towards full implementation of the SPREP Action Plan.

Prior to consideration by the meeting of an "ideas" paper put forward by CSC as a basis for discussion, representatives of island countries outlined the status of their coastal zone resources, management of these and problems arising. From these presentations it was obvious that:

- (i) there is considerable variation in living and non-living resources available to the different countries;
- (ii) the types of impacts are again varied and are principally:

land-based	e.g. domestic waste, industrial solid and liquid waste, increased sediment influx to the sea from increased land clearing, coastal building;
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sea based e.g. sand mining, increased fishing pressures, uses of non-selective fishing methods, pollution from boats and ships.

natural hazards recent hurricanes and increased water temperatures have affected marine environments of the coastal zone as well as onshore vegetation;

- iii) knowledge and relevance of traditional management practices in the coastal zone is varied, and the justification of claims for traditional rights to offshore lands and resources is not always easy to verify;
- (iv) while there is not clear agreement on some of the types of data that are necessary for a satisfactory data base to gauge the impact of changing coastal resource use patterns, one matter is clear - that data on water circulation is crucial for determining the nature and effect of land derived sediment on coastal resource productivity;
- (v) highly sophisticated equipment could not be justified for general use in the region. There was a preference for survey methods that could be implemented and maintained by local people, after training, and which could be generally applied throughout the region.

Participants subsequently considered the "ideas" paper, using it as a basis for discussion about what approach to coastal zone management best fitted the South Pacific island region's needs. An appropriate framework for a South Pacific regional programme in coastal zone management was agreed. This incorporated a "model" for site-specific coastal zone management projects and "themes" through which regional activities could be developed.

It was clear that no single project in any one locality could satisfy the requirements of all countries in the region. As a first step it was proposed, and agreed, that two site-specific projects, one, "low island", and another, "high island", should be undertaken. Interested governments would submit proposals for CSC's attention through the SPREP Co-ordinating Committee.

These two projects to some extent were seen as demonstration projects, in which provision would be made for monitoring and reporting on these so that other countries would have the opportunity to develop similar projects as appropriate to their needs.

The approach and the emphasis adopted in developing this coastal zone management programme framework differ from those of coastal zone programmes of other areas.

The approach is broad, encompassing social, technical, administrative and ecological factors, while the emphases are on:

- preventive coastal zone management, rather than remedial efforts;
- project formulation and implementation through existing institutions - village, provincial, national and international;
- developing the local capacity for coastal zone resource assessment, monitoring and balanced utilisation;

- using, wherever relevant, elements of traditional coastal resource management knowledge as a basis for modern management systems;
 - development of simple survey and monitoring techniques and the harmonisation of such techniques through the region;
 - the needs, perceptions and participation of the coastal zone resource user;
 - gathering and reporting data in forms which are meaningful for decision makers at all levels - from rural community to nation.
1. A "MODEL" COASTAL ZONE MANAGEMENT PROJECT

A site specific project would be made up of a number of components, namely:

- the social context of the prevailing coastal zone resource management systems;
- the resource base;
- threats to sustainable use of coastal zone resources;
- administration for sustainable resource management;
- tradition for development; and
- education and training.

The Social Context

A coastal zone management project cannot be effective unless it is designed and implemented so as to fit into the local social context.

For this component of a project large and detailed study is not necessary. All that is needed is a modest survey from which an understanding might be obtained of:

- attitudes to resources and environment;
- the nature and social context of traditional reef-lagoon resource tenure;
- the relative importance to the local communities of various coastal zone resources;
- local decision-making processes and procedures; and
- means by which resource management knowledge and understanding is disseminated.

The social study should be so designed as to make it possible to:

- understand the structure of the society and the roles of its members in relation to coastal zone resource development;
- develop some capacity for predicting the social and economic implications of change in coastal zone resource exploitation and availability.

- identify effective means of involving local communities in the coastal zone management project and developing appropriate "tradition and development" activities.

The Resource Base

Basic to the assessment of the resource base is an examination of the physical structure and functioning of the coastal zone-lagoon water circulation, some bathymetry, sediment sources and dispersal.

Some understanding of the magnitude and seasonality of primary production may be necessary. Secondary productivity - in particular the standing stock and replacement rates of edible coastal resources - needs closer attention.

Simple techniques will be used for monitoring change and for determining "the health" of the resource base.

Aerial photographs, coupled with simple survey and planning techniques (for example, overlays), are useful devices for developing community participation in this component of the project.

Threats to Sustainable Resource Use

The project should identify and attempt to explain any existing or potential threats to the resource base from land-based activities and from those inshore and offshore. It seeks to guide the community and its local administration to recognise these threats and to determine appropriate management measures to avoid or curb them.

Administration for Resource Management

A project will always operate through effective existing institutions, largely via an individual of the culture/language area in question who will act as Project Co-ordinator and guide the contributions of any outsiders who become involved in a project.

Through a project the capability of the local administration - traditional and/or contemporary government - to administer its coastal zone will be strengthened. Complementary support and strengthening will also be made available for provincial or district, and national levels of administration.

An important basic element of improved coastal zone administration is a coastal zone resource management plan in the formulation of which, resource owners or custodians and users will actively have participated.

Tradition for Development

The cultures of South Pacific communities have much altered over the past 150 years of European influence but island societies have generally adjusted well. Present rates of social and environmental change, however, are much greater than before.

Tradition provides a stabilising element at a time of potentially socially disruptive change. Further, there is much in traditional knowledge and skills and approaches to coastal resource management, which is relevant for modern development. Yet unless particular attention is paid to supporting relevant tradition, "Western" forms of development are likely to overwhelm it.

There is widespread sympathy throughout the South Pacific island region for this theme of "tradition for development" and governments generally support this ideal - that is, the governments of independent nations of the region.

Incorporation of this theme in coastal zone management projects is a complex matter, and not particularly easy. The main drive for this component of a project must come from the local communities themselves. The project should be seen as providing a framework and an opportunity. Project personnel from outside the communities concerned might serve as catalysts and, where asked, provide some guidance and support.

Through a coastal zone management project, activities which might be undertaken include:

- establishment and recording of the basic fisheries tradition of the area;
- preparation of educational material summarising fisheries tradition and its accompanying ecological understanding, ritual, mythology and art - initially, at least, in the language of the culture concerned;
- encouragement of, and support for, local initiatives to foster understanding and transfer of tradition in the context of coastal zone management;
- transfer and recording of traditional skills for construction of canoes; and
- protection and possible restoration of coastal sites of cultural and/or historical significance.

Education and Training

Education and training as a regional theme is further considered in section 2. Those aspects which are relevant for site-specific projects include:

- local community education about coastal resource use and sustainable management;
- school education activities, using material developed through the project;
- training for local coastal resource managers/monitors - simple coastal resource statistics gathering, collection of samples for laboratory analysis, monitoring of change in coastal ecosystems; and
- promotion of training in traditional skills such as canoe construction.

2. THEME ACTIVITIES FOR A REGIONAL PROGRAMME

Results arising from site-specific projects can be applied on a regional basis through a number of coastal zone management themes. These are:

- Traditional coastal zone resource management.
- Resource assessment and monitoring.

- Coastal zone management policy, administration and legislation.
- Education and training.
- Protected coastal areas and species.
- ecological processes.

(1) Traditional Coastal Zone Resource Management

In developing the theme of traditional coastal zone management into a programme activity the following objectives are appropriate:

- (i) clarify and present the principles of coastal resource management as practised by traditional societies with a view to using these principles to develop systems of coastal resource management suitable for today's changed circumstances.
- (ii) obtain, record and assess traditional ecological knowledge of coastal resources, with a view to providing ecologists with new insights into matters such as fish behaviour which need to be better known for more effective management.

As a first step it is necessary to prepare clear guidelines for obtaining, recording and assessing traditional coastal resource management knowledge. This should be presented in a format suitable for use in the development of contemporary management regimes.

These guidelines should, among other things, address the following matters:

- definition of traditional fisheries;
- clarification of nature of coastal resource use rights;
- social unit(s) on which rights are based;
- principles of boundary delimitation;
- allocation and transfer of coastal resource use rights;
- procedures for sharing of resources with outsiders;
- traditional conservation practices;
- disputes resolution mechanisms;
- adaptability of traditional systems in the face of changes in perception, technology and society;
- the place of traditional knowledge in society - its role in social status and differing sex roles;
- responses to commercial development;
- adaptability of traditional fisheries management regimes;
- effective means of obtaining and recording traditional knowledge.

At a later stage of the CSC programme the results from investigations at island project sites could usefully be drawn together in the form of case studies for publication.

This would mean three activities for the Traditional Coastal Zone Management theme:

- Activity 1. Guidelines for traditional knowledge.
- Activity 2. Traditional knowledge investigations as part of site-specific projects.
- Activity 3. Publication of case studies of traditional coastal resource management and their adaptation for contemporary needs.

(2) Resource Assessment and Monitoring Techniques

An important emphasis of the proposed CSC programme is the involvement, in coastal zone management, of coastal communities - more especially those which have traditional resource use rights and management responsibilities.

To be properly involved in management and in decisions about resource use, these communities need an improved capability for monitoring the status of their resources. For this, they need relatively simple monitoring and assessment methods - simple in concept and application, not too demanding of time, requiring minimal equipment, and providing results which are easy to analyse and to comprehend.

Dahl (1978) has taken an important step in this respect, with the development of a simple technique for assessing the "health" of a coral reef through simple quantitative estimates of the relative abundance of a few indicator animal and plant groups such as fish predators, butterfly fish, coral forms, *Acanthaster* and *Trochus*. Even though developed for use by non-scientists and requiring only two species identifications, data provided by this technique have considerable potential scientific value.

As part of the proposed CSC programme simple techniques would be developed for assessing the status of exploitable resources of reefs, lagoons and mangroves and of the ecosystems from which they derive.

CSC's recent Report on Science and Technology for Development, in proposing coastal zone management programmes for the South Pacific and for the Caribbean, specifically recommended the use of remote sensing techniques. Photography at relatively low altitudes, from fixed-wing aircraft at scales to about 1:100,000 have long been proved effective in coastal zone management. The technique has considerable potential relevance for this proposed programme.

The value of low-level aerial photography for coastal zone management is, however, not generally recognised in the region. It would be appropriate to include in the programme an element of promotion of the technology and of training in its application.

A positive, but cautious, approach to the application of the more sophisticated satellite-based remote-sensing techniques is advocated. There have as yet been few applications of this technology to

tropical reef-lagoon systems but results have demonstrated that "Landsat" imagery has a role in low-resolution, first-order mapping of relatively large surface and shallow water features and of the extent and distribution of ecological "zones" such as seagrass beds. Sediment distribution in coastal areas can be readily detected. Some weather satellites provide imagery which can be useful in detecting and monitoring large water mass variations such as eddies and island wakes which are likely to be associated with local variations in nutrient transfer and productivity.

A Table of Landsat coverage for Commonwealth countries, included in CSC's Report on Science and Technology for Development, indicates very little current coverage of South Pacific island countries and territories. However, the proposed launch of a relay satellite will remove this restriction.

Resource assessment and monitoring activities suitable for the proposed CSC coastal zone management programme include:

- Activity 4. Development of simple techniques for assessing the status of coastal zone resources.
- Activity 5. Application of satellite-based remote sensing techniques to coastal zone management.
- Activity 6. Training in resource assessment and monitoring for rural resource managers, fisheries extension workers, etc.
- Activity 7. Education in resource assessment and monitoring for planners, decision-makers.

(3) Coastal Zone Management Policy, Administration and Legislation

The traditional South Pacific island society concept of land is that, submerged or emerged, it is a whole. Simplistically expressed, the reefs associated with an island, and lagoon bottoms which link those reefs with that island are as much "land" as that which is not covered by water. So, in tradition, the ecological continuum between island and reef is recognised and is administered uniformly, even though in some societies specialists may have resource allocation responsibilities particular to fishing areas or to food gardens.

However, jurisdictional concepts developed in European cultural contexts have been introduced to the South Pacific island region and are now integral components of formal administrative and legal regimes.

These concepts are inconsistent not only with traditional South Pacific island concepts but also with the ecological realities of the coastal zone. A rigid legal and administrative distinction between land and resources above and below high water mark or low water mark hinders the development of effective coastal zone resource management regimes.

To attempt to change this system now would be a radical move, and probably impractical in view of the far-reaching consequences of such a change. What is potentially achievable is a widespread recognition of the threat to effective coastal zone resource management posed by

this diverse and rigidly compartmentalised administrative regime. Such recognition by South Pacific island governments would open up opportunities for initiatives to ease the difficulties - reorganisation of administrative functions, use of ecologically appropriate coastal units for planning purposes, rationalisation and simplification of coastal zone legislation, incorporation of traditional resource management knowledge and roles into contemporary coastal customs.

In all South Pacific Island countries except Papua New Guinea almost the whole population lives in the coastal zone, depends on its resources and exploits its environment for agriculture, industry, roads and towns. Clearly, improvements in coastal zone administration and planning would bring considerable benefits throughout the region.

In its report, Ocean Management: A Regional perspective, a Commonwealth Expert Study Group on Maritime Issues has urged review of administrative structures concerned with marine matters in order that new opportunities arising from resource jurisdiction in Exclusive Economic Zones, and obligations arising from adherence to the Law of the Sea Convention, and to other maritime conventions, might be more effectively addressed.

The obligations of parties to the Law of the Sea Convention begin near to the shore, in the coastal zone. This fact is explained further in the Appendix so as to demonstrate the relevance which this coastal zone management programme proposal has for maritime administration in its broadest sense.

Through the proposed CSC programme it may be possible to assist South Pacific island governments in developing coastal management regimes which mesh effectively with the oceanic element of the new maritime administration. Other agencies in the region are capable of contributing to this objective and any CSC role would be developed in association with these.

The following activities can be identified at this stage:

- Activity 3. Publication of case studies of traditional coastal resource management and their adaptation to contemporary needs.
- Activity 8. Formulation of coastal zone management policy, legislation and administration for specific locales, based on site-specific projects.
- Activity 9. Promotion of the idea that new forms of coastal zone administration and legislation are relevant for the changed circumstances of South Pacific island states.
- Activity 10. Assistance to governments in formulating maritime policy and legislation and establishing appropriate new forms of administration.

(4) Education and Training

This theme activity is crucial to the effectiveness of the whole programme. No matter how good the data obtained through scientific investigation, its value will be limited if the understanding derived

from it is not translated into practical application by resource planners and managers, among them those of rural communities with recognised traditional responsibility for coastal zone resources.

The traditional resource managers will be both teachers and learners. They are to be given opportunities to teach receptive investigators about matters such as traditional coastal resource tenure and management, and about the behavioural ecology of fish. In return, they are to be given opportunities to learn something of what others know about such matters as the vital interactions between mangroves and adjacent waters, and about the crucial ecological process of water exchange within the mangrove ecosystem - and of the resource disruption which can result from interference with this water exchange.

The latter are examples of ecological understanding which was not necessarily known to traditional South Pacific island societies - or which has been lost.

There is considerable scope and a largely unsatisfied demand for effective training of coastal zone resource planners, managers and extension agents in the South Pacific region. Emphasis in the early stages of the proposed CSC programme should be on generating a "demonstration effect" from its education and training activities - showing what can be done and how it might effectively be done, and assisting those agencies which wish to establish education and training programmes of the type developed in the context of the CSC programme.

Proposed education theme activities are:

- Activity 7. Education in coastal zone resource assessment and monitoring for planners, decision-makers.
- Activity 9. Promotion of the idea that new forms of coastal zone administration and legislation are relevant for the changed circumstances of South Pacific island states.
- Activity 11. Community education, as an integral part of site-specific projects, and in more general form on a regional basis.
- Activity 12. Curriculum development assistance, with the help of information arising from site-specific projects.
- Activity 13. Public awareness programme, at local (project) scale, and through existing SPREP activities in this area.
- Activity 14. Publications.

Training theme activities which might be developed include:

- Activity 6. Training in resource assessment and monitoring for rural resource managers, fisheries extension workers, etc.
- Activity 15. Training in the application of remote sensing techniques to coastal zone management.

Activity 16. Transfer of traditional maritime skills such as those of canoe construction.

(5) Protected Coastal Areas and Species

This activity theme is based upon the anticipated need for afford varying levels of protection to certain coastal areas to ensure that they continue to contribute to resource productivity (e.g. protection of areas critical for fish breeding); to protect the habitats of plant and animal species of special cultural or scientific interest; to preserve examples of coastal ecosystems as natural and cultural heritage for education, research and recreation; and to protect areas critical for the maintenance of certain ecological processes.

Species of the coastal zone which are in special need of protection and habitat management include whales - both large whales and porpoises - sea turtles, dugong and giant clams.

Among South Pacific island communities, awareness of the need to afford protection to some marine areas and to give special attention to threatened species is not well developed. Further effort is needed to bring people to realise that, in the face of increasing commercialisation of resources and rapid population growth, greater care is now needed than in traditional times to protect the bases of coastal resources production.

Activities which might be developed under this theme include those relating to species, habitat and ecosystem protection; and resource base preserves (such as fish breeding or nursery areas). It is important to make special provision for the protection of coastal streams, lakes and estuaries - emphasising their critical relevance for coastal species protection and for ensuring continued productivity of coastal resources.

Deliberations at the Third South Pacific National Parks and Reserves Conference are to be used as a basis for deciding which activities should be developed for the "Protected Coastal Areas and Species" theme.

(6) Ecological Processes of the Coastal Zone

Knowledge of the structure, function, species composition, population dynamics and other aspects of coastal zone ecosystems is crucial for an understanding of those ecosystems as a basis for their management for the resources which they provide.

However, at some risk of ecological impropriety, one could single out ecological processes as that aspect of ecology which has special importance in a development context; that the primary impact of development is on these processes.

This is because the effects of modern natural resource development - particularly those which involve large-scale landscape alteration (e.g. logging, reservoir construction, roads, mining) are often expressed in a dramatic way through interference with ecological processes such as nutrient transfer or water exchange. Such activities also may disrupt ecological processes through increased sedimentation of coastal waters.

Activities relevant to the theme "Ecological processes critical for proper coastal zone management" are to be developed in conjunction with initiatives already started through SPREP.

Appendix

SOUTH PACIFIC ISLAND STATES' COASTAL ZONE MANAGEMENT
OBLIGATIONS UNDER THE LAW OF THE SEA CONVENTION

Emphasis on the newly established rights of states to marine resources in sea extending 200 nautical miles from land and reef baselines (Exclusive Economic Zones) tends to have obscured the fact that these rights are accompanied by certain obligations to the international community and, in particular, to neighbouring states.

The outer limits of "coastal zone" for the purpose of the CSC programme are well inside the boundary of EEZs. Nevertheless, since there is a physical and ecological continuum between shore and deep sea, activities in the coastal zone can have effects on the EEZ itself. For this reason a state's obligations in respect of its EEZ begin with effective management of its coastal zone.

Some articles of the Law of the Sea treaty which embrace these obligations are:

- Article 61: Refers to Total Allowable Catch (TAC) in an EEZ. Inshore productivity data of the coastal zone is an important element in determining TAC.
- Article 61(2): Requires that the "best scientific evidence available" be used in determining TAC.
- Article 63(1): Requires co-operation in the conservation and management of straddling stocks. This is a particularly significant requirement for South Pacific island states, to some extent catered for through the Forum Fisheries Agency. The coastal zone is directly involved in some cases e.g. between Papua New Guinea and the Solomon Islands.
- Article 65: Deals with obligation to co-operate in the conservation and management of marine mammals, e.g. whales, dugong, for whom coastal zones are important.
- Article 194(1): Invokes a duty to harmonise policies on pollution prevention, reduction and control. Some of the potential for pollution of the EEZs of neighbouring states lies in coastal zones.
- Article 194(5): A duty to take measures respecting fragile ecosystems and certain habitats. Some of these ecosystems and habitats are likely to extend into coastal zones.
- Article 200: States have a duty to conduct research and exchange data on marine pollution. Much of the necessary research will take place in the coastal zone.
- Article 206: Duty to assess potential effects of planned activities in the marine environment. Many of the "activities" so defined will take place in the coastal zone.
- Article 207: Imposes a duty to control marine pollution from land-based sources.

Article 208: Duty to control pollution resulting from sea-bed activities subject to national jurisdiction. Again, coastal zones will often be involved.

The CSC programme outlined here has the potential to contribute some of the knowledge and understanding required by South Pacific island states to meet their obligations under the 1982 UN Convention on the Law of the Sea.