MARINE PROTECTED AREA OBJECTIVES

- To protect and manage substantial examples of marine and estuarine systems to ensure their long-term viability and to maintain genetic diversity.

- To protect depleted, threatened, rare or endangered species and populations and, in particular to preserve habitats considered critical to the survival of such species.

- To protect and manage areas of significance to the life cycles of economically important species.

- To prevent outside activities from detrimentally affecting the marine protected area.

- To provide for the continued welfare of people affected by the creation of marine protected areas.

- To preserve, protect and manage historical and cultural sites and natural aesthetic values of marine and estuarine areas, for the present and future generations.

- To facilitate the interpretation of marine and estuarine systems for the purpose of conservation, education and tourism.

- To accommodate within appropriate management regimes a broad spectrum of human activities compatible with the primary goal in marine and estuarine settings.

- To provide for research and training, and for monitoring the environmental effects of human activities, including the direct and indirect effects of development and adjacent land-use practices.

Source: IV World Congress on National Parks and Protected Areas. Workshop III.2.

CONSERVATION OBJECTIVES FOR PROTECTED AREAS

Sample ecosystems. To maintain large areas as representative samples of each major biological region of the nation in its natural unaltered state for ensuring the continuity of evolutionary and ecological processes, including animal migration and gene flow.

Ecological diversity. To maintain examples of the different characteristics of each type of natural community, landscape and land form for protecting the representative as well unique diversity of the nation, particularly for ensuring the role of natural diversity in the regulation of the environment.

Genetic resources. To maintain all genetic materials as elements of natural communities, and avoid the loss of plant and animal species.

Education and research. To provide facilities and opportunities in natural areas for purposes of formal and informal education and research., and the study and monitoring of the environment.

Water and soil conservation. To maintain and manage watersheds to ensure an adequate quality and flow of fresh water, and to control and avoid erosion and sedimentation, especially where these processes are directly related to downstream investments which depend on water for transport, irrigation, agriculture, fisheries, and recreation, and for the protection of natural areas.

Wildlife management. To maintain and manage fishery and wildlife resources for their vital role in environmental regulation, for the production of protein, and as the base for industrial, sport, and recreational resources.

Recreation and tourism. To provide opportunities for healthy and constructive outdoor recreation for local residents and foreign visitors, and to serve as poles for tourism development based on the outstanding natural and cultural characteristics of the nation.

Timber. To manage and improve timber resources for their role in environmental regulation and to provide a sustainable production of wood products for the construction of housing and other uses of high national priority.

Cultural heritage. To protect and make available all cultural, historic and archaeological objects, structures and sites for public visitation and research purposes as elements of the cultural heritage of the nation.

Scenic beauty. To protect and manage scenic resources which ensure the quality of the environment near towns and cities, highways and rivers, and surrounding recreation and tourism areas.

Options for the future. To maintain and manage large areas of land under flexible land-use methods which conserve natural processes and ensure open options for future changes in land use, incorporate new technologies, meet new human requirements, and initiate new conservation practices as research makes them available.

Integrated development. To focus and organize conservation activities to support the integrated development of rural lands, giving particular attention to the conservation and utilization of "marginal areas" and to the provision of stable rural employment opportunities.

Source: Miller 1980, McNeely et al. 1994

SELECTION CRITERIA cf. Salm and Clark

The following examples of criteria for protected areas in general have been compiled from IUCN (1981) and Salm (1982). The major headings represent programme goals, the numbered headings are the criteria.

Social Criteria. Social benefits are measured in the following terms:

1. *Social acceptance,* the degree to which the support of local people is ensured. When an area is already protected by local tradition or practice, it should be encouraged, and the area should receive a higher rating. An "official" protected area designation may not be necessary if local support is high.

2. *Public health,* the degree to which the creation of a protected area may serve to diminish pollution or other disease agents that contribute to public health problems. Granting protected status to contaminated areas, such as shellfish beds or bathing beaches, may result in reduced pollution as the polluting source is recognised and controlled.

3. *Recreation,* the degree to which the area is, or could be, used for recreation by country residents. Areas that provide the local community opportunity to use, enjoy, and learn about their local natural environment should receive a high rating for this criterion.

4. *Culture,* the religious, historic, artistic, or other cultural value of the site. Natural areas that also contain important cultural features should be given high ratings as their protection may help to maintain the integrity of the adjacent ecosystems.

5. *Aesthetics,* a seascape, landscape, or other area of exceptional scenic beauty. Natural areas that also contain features of natural beauty should be given higher ratings since such features depend on maintaining the integrity of the adjacent coastal and marine systems. However, when species diversity and the biological conservation value are low, and the site is picturesque, it retains a high value for recreation.

6. *Conflicts of interest,* the degree to which area protection would affect the activities of local residents. If the area is to be used for recreational purposes, for example, the site should not be a major fishing area and should have few dependent fishermen. In some instances, careful zoning can minimise such conflicts.

7. *Safety,* the degree of danger to people from strong currents, surf, submerged obstacles, waves, etc. The principal users will often be swimmers, snorkelers, divers, and boaters. It is important that they are able to pursue their activities safely.

8. *Accessibility,* the ease of access across both land and sea. Areas to be used by visitors, students, researchers, and fishermen must be accessible to them. The more accessible, the greater the value, but the greater the likelihood of conflicting interests (such as between coral mining and fisheries or fisheries and diving) and the greater the impact of users. Accessibility weighs high for goal one (social), fairly high for goal two economic), and low for goal three (ecological).

9. *Benchmark,* the degree to which the area may serve as a "control group" in the scientific sense, an un-manipulated area used to measure changes elsewhere. Benchmark areas are essential to an ecological monitoring programme and should receive a higher rating.

10. *Education,* the degree to which the area represents various ecological characteristics and can serve for research and demonstration of scientific methods. Areas that clearly demonstrate different habitat types and ecological relationships and are sufficiently large both to serve conservation and to accommodate teaching (i.e., field trips or on-site learning centres) should receive a higher rating.

Economic Criteria. Economic benefits are measured in the following terms:

1. *Importance to species,* the degree to which certain commercially important species depend on the area. Reefs or wetlands, for example, may be critical habitats for certain species that breed, rest, shelter, or feed there and that form the basis of local fisheries in adjacent areas. Such habitats need management to support these stocks.

2. *Importance to fisheries,* the number of de-pendent fishermen and the size of the fishery yield. The greater the dependence of fishermen on an area, and the greater its yield of fishes, the more important it becomes to manage the area correctly and to ensure sustainable harvest.

3. *Nature of threats,* the extent to which changes in *use patterns threaten the overall value to people. Habitats may be threatened directly by destructive practices, such as fishing with explosives and certain bottom trawls, or by overexploitation of resources. Areas traditionally harvested by local fishermen be-come important to manage. The numbers of fishermen on these grounds may increase, bringing extra pressure to bear on stocks and habitats. Even if the numbers do not change, the traditional capture methods may be re-placed by others that yield more per unit effort (an extreme example is the use of explosives). The stocks of some species may not be capable of withstanding such in-creased drains on their breeding populations. In this way whole species have disappeared from fishing grounds or have become exceedingly rare.

4. *Economic benefits,* the degree to which protection will affect the local economy in the long term. Initially, some protected areas may have a short-lived, disruptive economic effect. Those that have obvious positive effects should have higher ratings (for

example, for protecting feeding areas of commercial fishes or areas of recreational value).

5. *Tourism*, the existing or potential value of the area to tourism development. Areas that lend themselves to forms of tourism compatible with the aims of conservation should receive a higher rating.

Ecological Criteria. The values of ecosystems and their species are measured in the following terms:

1. *Diversity*, the variety or richness of ecosystems, habitats, communities, and species. Areas having the greatest variety should receive higher ratings. However, this criterion may not apply to simplified ecosystems, such as some pioneer or climax communities, or areas subject to disruptive forces, such as shores exposed to high energy wave action.

2. *Naturalness*, the lack of disturbance or degradation. Degraded systems will have little value to fisheries or tourism, and make little biological contribution. A high degree of naturalness scores highly. If restoring de-graded habitats is a priority, a high degree of degradation may score highly.

3. *Dependency*, the degree to which a species depends on an area, or the degree to which an ecosystem depends on ecological processes occurring in the area. If an area is critical to more than one species or process, or to a valuable species or ecosystem, it should have a higher rating.

4. *Representativeness*, the degree to which an area represents a habitat type, ecological process, biological community, physiographic feature or other natural characteristic. If a habitat of a particular type has not been protected, it should have a high rating. (A classification scheme for coastal and marine areas is desirable in applying this criterion).

5. *Uniqueness*, whether an area is "one of a kind. " Habitats of endangered species occurring only in one area are an example. The interest in uniqueness may extend beyond country boarders, assuming regional or international significance. To keep visitor impact low, tourism may be prohibited but limited research and education permitted. Unique sites should always have a high rating.

6. *Integrity*, the degree to which the area is a functional unit-an effective, self-sustaining ecological entity. The more ecologically self-contained the area is, the more likely its values can be effectively protected, and so a higher rating should be given to such areas.

7. *Productivity,* the degree to which productive processes within the area contribute benefits to species or to humans. Productive areas that contribute most to ecosystem sustainment should receive a high rating. Exceptions are eutrophic areas where high productivity may have a deleterious effect.

8. *Vulnerability,* the area's susceptibility to degradation by natural events or the activities of people. Biotic communities associated with coastal habitats may have a low tolerance to changes in environmental conditions, or they may exist close to the limits of their tolerance (defined by water temperature, salinity, turbidity, or depth). They may suffer such natural stresses as storms or prolonged immersion that determine the extent of their development. Additional stress (such as domestic or industrial pollution, excessive reductions in salinity, and increases in turbidity from watershed mismanagement) may determine whether there is total, partial, or no recovery from natural stress, or the area is totally destroyed.

Regional Criteria. The contribution of an area to a regional network of protected areas can be assessed in the following terms:

1. *Regional significance,* the degree to which the area represents a characteristic of the region, whether a natural feature, an ecological process, or a cultural site. The role the area plays in contributing nutrients, materials, or support for species (especially migratory ones) to the region as a whole should be evaluated. Both ecological processes and natural resources are often shared among nations, so areas contributing to the maintenance of species or ecosystems beyond national boundaries should have higher ratings.

2. *Subregional significance,* the degree to which an area fills a gap in the network of protected areas from the sub-regional perspective. This contribution may be assessed by comparing the distribution of protected areas with sub-regional characteristics. If a type of area is preserved in one sub-region, that type should also be protected in another sub-region.

3. *Awareness,* the degree to which monitoring, research, education, or training within the area can contribute knowledge and appreciation of regional values. Areas that can combine such activities as pollution monitoring and education should receive a higher rating.

4. *Conflict and compatibility,* the degree to which the area may help to resolve conflicts between natural resource values and human activities, or the degree to which compatibilities between them may be enhanced. If an area can be used to exemplify the resolution of conflicts in the region, it should receive a higher rating. Protected areas that demonstrate the benefits, values, or methods of protection or restoration should also have higher ratings.

Pragmatic criteria. The feasibility and appropriate timing of protection can be measured in terms of the following:

1. *Urgency,* the degree to which immediate action must be taken, lest values within the area be transformed or lost. Lack of urgency should not necessarily be given a lower rating since it is often best, and least costly, to protect well in advance of the threat.

2. Size, which and how much of various habitats need to be included in the protected area. Size is an important factor in designing protected areas. It has often been overlooked in the design process, resulting in severe degradation, even total destruction, of protected areas. The protected area must be large enough to function as an ecological unit to receive a high rating.

3. *Degree of threat,* present and potential threats from direct exploitation and development projects. The farther the protected area is from potential sources of accidental poisoning (such as large ports, petroleum deposits, or river mouths) the better are the survival prospects of species and communities. However, if an important habitat is severely threatened, it may be important to implement a management plan to reduce the threats to tolerable levels.

4. *Effectiveness,* the feasibility of implementing a management programme. A site that satisfies many criteria, but cannot be adequately managed (i.e., monitored, patrolled, and defended) is not of much use. Higher ratings should go to sites that are manageable.

5. *Opportunism,* the degree to which existing conditions or actions already under way may justify further action. An extension of an established protected area should have a higher rating.

6. *Availability,* the degree to which the area is available for acquisition or can be managed satisfactorily by agreement with the owners. The problem of tenure rarely applies to the sea. Beaches also often belong to the central or provincial government. Thus, acquisition of aquatic areas, wetlands, and seashores may not be necessary. However, adjacent lands and islands may be privately owned or leased. Generally, to secure long-term control over these areas, the title or lease will need to be bought from current owners. Higher ratings should go to areas owned by state or national governments.

7. *Restorability,* the degree to which the area may be returned to its former natural state. Areas that can increase in productivity or value to important species and processes should receive higher ratings.

SELECTION CRITERIA cf. Kelleher and Kenchington 1992

The following list identifies factors or criteria that can be used in deciding whether an area should be included in an MPA or in determining boundaries for an MPA.

Naturalness - the extent to which the area has been protected from, or has not been subject to human-induced change.

Biogeographic importance - either contains rare biogeographic qualities or is representative of a biogeographic "type" or types.
- contains unique or unusual geological features.

Ecological importance - contributes to maintenance of essential ecological processes or life-support systems .e.g. source for larvae for downstream areas
- integrity.
- the degree to which the area either by itself or in association with other protected areas, encompasses a complete ecosystem.
- contains a variety of habitats.
- contains habitat for rare or endangered species
- contains nursery or juvenile areas.
- contains feeding, breeding or rest areas.
- contains rare or unique habitat for any species.
- preserves genetic diversity i.e. is diverse or abundant in species terms.

Economic importance - existing or potential contribution to economic value by virtue of its protection e.g. protection of an area for recreation, subsistence, use by traditional inhabitants, appreciation by tourists and others or as a refuge nursery area or source of supply for economically important species.

Social importance - existing or potential value to the local, national or international communities because of its heritage, historical, cultural, traditional aesthetic, educational or recreational qualities

Scientific importance - value for research and monitoring

International or National significance - is or has the potential to be listed on the World or a national Heritage List or declared as a Biosphere

		Re-serve or included on a list of areas of international or national importance or is the subject of an international or national conservation agreement.
Practicality/feasibility	-	Degree of insulation from external destructive influences.
	-	social and political acceptability, degree of community support.
	-	accessibility for education, tourism, recreation.
	-	compatibility with existing uses, particularly by locals.
	-	ease of management, compatibility with existing management regimes.

SELECTION CRITERIA cf. Kelleher et al 1995

Criteria for Selection of Priority Areas

Biogeographic criteria

- Presence of rare biogeographic qualities or representative of a biogeographic "type" or types; and
- Unique or unusual geological features.

Ecological criteria

- An essential part of ecological processes or life-support systems (for example, is a source for larvae for downstream areas);
- Area's integrity, or the degree to which the area either by itself or in association with other protected areas, encompasses a complete ecosystem;
- The variety of habitats;
- Presence of habitat for rare or endangered species;
- Nursery or juvenile areas;
- Feeding, breeding or rest areas;
- Rare or unique habitat for any species; and
- Genetic diversity (is diverse or abundant in species terms).

Naturalness

- Extent to which the area has been protected from, or has not been subject to, human-induced change.

Economic importance

- Existing or potential contribution to economic value by virtue of its protection (for example, protection of an area for recreation, subsistence, use by traditional inhabitants, appreciation by tourists and others or as a refuge nursery area or source of economically important species).

Social importance

- Existing or potential value to the local, national or international communities because of its heritage, historical, cultural, traditional aesthetic, educational or recreational qualities.

Scientific importance

- Value for research and monitoring.

International or national significance

- Potential to be listed on the World (or national) Heritage List, declared a Biosphere Reserve, or included on a list of areas of international or national importance, or is the subject of an international or national conservation agreement.

Practicality/or feasibility

- Degree of insulation from external destructive influences;
- Social and political acceptability, degree of community support;
- Accessibility for education, tourism, recreation;
- Compatibility with existing uses, particularly by locals; and
- Ease of management or compatibility with existing management regimes.

MODEL OF MANAGEMENT PLAN cf. Kelleher and Kenchington

This example of the content of an MPA Management Plan is provided to assist those involved in the preparation of plans and submissions in government agencies and non-government organisations. It should be viewed as an ideal since it implies a planning situation where there is a high level of description and understanding of the area under investigation. The precise format adopted will depend upon the provisions of the legislation establishing the MPA and the government 'processes required for putting a management plan into effect.

The relationship between a management plan and a zoning plan is optional. In large, multiple use MPAs, the zoning plan may be the primary document that defines the strategic framework for management. In such cases it will be supplemented by various subordinate tactical documents such as guidelines arid day-to-day management plans.

The example that follows refers to the case where the management plan is the primary policy-setting document and the zoning plan is subordinate to it. In many cases, the items 1-4.1 may form a preliminary document which establishes the initial case for protection of the area in question.

All the information listed in the following example should be provided in one document or another.

TITLE PAGE

This includes:

- The name of the area subject to the plan and its status;
- The words - MANAGEMENT PLAN;
- The name of the agency/agencies responsible for implementing the plan; and
- The date when the plan was prepared and the expected date for review.

EXECUTIVE SUMMARY PAGE

On this page are summarised:

- The reason why the plan was prepared;
- The period of time for which it applies;
- Any special conditions which controlled its preparation, including the legislative basis and authority for plan development;
- The principal provisions of the plan;
- The estimated budget; and
- Acknowledgements.

CONTENTS PAGE

The headings of the body of the plan are listed here against the appropriate page numbers. It may be preferable to list only the main headings, but sub-headings are usually included.

BODY OF THE PLAN

1. Objectives for Management

   The goal and objectives for management are stated in this section. They will reflect the purpose(s) for which the area is protected and the use(s) that will be permitted.

2. Resource Description

   This section provides information on the following categories for the areas to be protected. Maps will be an important feature of this section.

   2.1 Name of Area and Location
   To include the geographic location (State district, etc.); latitudes and longitudes (preferably on a map); surface area (square kilometres, hectares or other units of area).

   2.2 Geographic and Habitat Classification
   The area should be categorised according to a habitat classification scheme to identify its geographic zone, substrate type(s) and major biological feature(s).

   2.3 Conservation Status
   This should indicate the area's degree of naturalness, aesthetic values, degree and nature of threats (if any), jurisdiction(s) and present ownership. The degree of habitat representativeness should also be indicated.

   2.4 Access and Regional Context
   The regional land and sea surroundings and access routes to the area are described, in addition to the character and use of contiguous areas, emphasising their effectiveness as buffer zones.

   2.5 History and Development
   This section contains a summary account of direct and peripheral human involvement in the area. This section may be divided into several sub-sections e.g.:

2.5.1 Archaeology

A summary description of the people who used the area before historical times, including any known areas of religious significance, species taken and if closed seasons or closed areas were ever used as management techniques. Archaeological information could also provide clues to species that were found in the area.

2.5.2 Historical relics

This sub-section should identify submerged wrecks and any submerged structures.

2.5.3 Written and oral history

2.5.4 Recent developments

Give a brief history of fishing and other human use of the area and developments on the land that may have had a major influence on the area.

2.5.5 Current human use and development

In this section the current use of the area by subsistence, artisanal, commercial and recreational fishermen, tourists and others is discussed. It is most important to establish who the users are, where they conduct their activities, at what times of the year, and for how long, and the social and economic importance of their use. A user survey may be helpful. This information is just as important as biophysical data.

2.6 Physical features

In this section the non-living features of the area are described. Maps in addition to descriptions should be included.

2.6.1 Coastal landforms

Nearby landforms should be described together with islands and underwater formations.

2.6.2 Bathymetry

A map showing isobaths is needed. The depth of water can provide an important insight into the dynamics of the system. Major trenches, canyons and shallows should be described in as much detail as is available.

2.6.3 Tides

A description of the tidal regime and resultant currents and water movements associated with phases of the tidal cycle.

2.6.4 Salinity and turbidity

Measurements of salinity and turbidity in all seasons are desirable.

2.6.5 Geology

A description in geological terms about how the area was formed and how that process is continuing with the deposition of present day substrates and by erosion processes observable in the area.

2.6.6 Dominant currents

A description of physical oceanographic features of the area, wind-driven, tidal and residual currents, on a seasonal basis.

2.6.7 Freshwater inputs

Major river and estuarine areas should be noted.

2.7 Climate

2.7.1 Precipitation

Annual precipitation figures and a chart to indicate average precipitation on s a monthly basis should be included.

2.7.2 Temperature

Monthly charts for both air and average sea temperatures (surface and at given depth). If possible include a monthly chart of solar radiation received.

2.7.3 Winds

Monthly charts of rose diagrams plus a description of any unusual feature of the local winds.

2.8 Plant life

This section should contain at least a description of dominant marine plant life, and wherever possible a comprehensive summary of the plant community and related environmental factors such as the depth of occurrence, together with any botanical features that may have special scientific, recreational or other interest. Phytoplankton could be included if information is available. Plant species identified in the area should be listed in an appendix.

2.9 Marine fauna

As a minimum, a description of the dominant marine or estuarine fauna is required, with an account of their ecological relationships if known. Include sections on Mammals, Reptiles, Amphibians, Fish, Birds, Invertebrates and Zooplankton as appropriate. A separate appendix should list the species.

Note: Sections 2.8 and 2.9 could be amalgamated to one section entitled "Marine Wildlife". Wildlife would be defined as animals and plants that are indigenous to the nation, to its coastal sea, to its continental shelf, or its overlying waters; migratory animals that periodically or occasionally visit its territory; and such other animals and plants, not being domesticated animals or cultivated plants, as are prescribed by legislation.

2.10 Miscellaneous

This can be a varied section that includes those matters which do not fit under any of the other descriptions of the plan. Each plan will be site specific and could therefore have features or problems which are not encountered in other plans.

3. Description of Management Issues

A summary of past, present and possible future threats and management conflicts should follow.

3.1 Historic and current conflicts

A brief statement of any historic or current conflicts between uses or user groups.

3.2 Pollution

Include point and non-point sources of external pollution within the area and in nearby areas, especially those up-current, e.g. runoff, sewage inputs, fish processing, industrial pollution and pollution from tourism and shipping.

3.3 Future demand

Estimate future demand for recreational and other uses, and if applicable, future pollution loading and proposed developments.

3.4 Potential conflicts

Potential conflicts specific to the area within and close to the boundary of the MPA should be described. Any potential conflicts due to more distant regional influences should also be identified. This should include review of sectoral development plans and propose projects for, or likely to influence, the area in question.

4. Management policies

In this section, the management plan comes to grips with the threats and conflicts and prescribes solutions.

4.1 Objectives

The goal of protecting the area is briefly reiterated. The objectives of management are stated clearly. If the area is to be subdivided, sub-objectives should be stated for each zone or subdivision of the managed area.

4.2 Resource units

It could be useful to divide the area into resource units.

4.2.1 Natural

Each MPA will have unique characteristics and the resource units will be site specific. An area could be divided into resource units such as beaches, islands, deep-water trenches, turtle or seal rookeries etc.

4.2.2 Development areas

Another category could be areas that are either developed or proposed to be developed.

4.2.3 Areas of impact

Areas showing marked impact from human activity could be identified.

4.3 Zoning

The resource units defined above may provide a basis for zoning, which should be kept as simple as practicable, consistent with avoiding unnecessary restriction on human activities. Zoning must be easy to understand both from the point of view of the manager and the managed. This section should explain why a particular area has been given a zone classification and what activities are permitted and prohibited within each zone.

Special habitats or wildlife areas such as a seagrass bed or a turtle rookery, may require additional management provisions such as seasonal closures or permanent restrictions to human access. Unusual prescriptions may be needed in the short term and these should be described in this section.

4.4 Management policies for resource units

In the draft management plan a list of management options can be presented in this section and a choice made between them in the final version of the plan.

5. Surveillance

This section should describe any programmes proposed to assess movement of people, vessels and aircraft within and through the area and the use made of the area.

6. Monitoring

This section should describe any biological, environmental and usage-monitoring programmes proposed for the area, when these programmes will be completed and how they are to be used in reviewing the management plan. It may also identify other monitoring programmes to be initiated during the first stage of the plan and who could carry them out. Some of the results from monitoring may eventually be included in the appendices.

7. Education and Interpretation

This section should describe programmes and co-operative arrangements with educational institutions, public associations and community groups to promote protection, wise use, public understanding and enjoyment of the MPA.

8. Enforcement

This section should outline the arrangements which will need to be made to detect apparent offences and to apprehend and prosecute offenders in order to achieve an acceptable level of adherence to.MPA regulations. No nation could afford to manage primarily on the basis of enforcement in the face of general public hostility or to apprehend every breach of regulation. Education is therefore the primary management tool.

9. Maintenance and Administration

A section will be required to address the subjects of budget, staffing, etc.

9.1 Budget

Anticipated costs should be identified so that adequate funding may be arranged.

9.2 Staffing

The management plan should indicate staffing needs and identify major functions. Volunteers, consultants and head office staff involved in the planning process should also be identified, as this will provide a more accurate indication of staffing levels. Staffing deficiencies can be predicted

and recommendations suggested. Section 9 should be updated and released as part of an annual report.

10. Information Sources

Information regarding the area will come from sources outside the manager's regular information base. These should be identified and listed wherever possible, and include those other government agencies, non-government organisations, individuals, consultants, overseas sources etc that were consulted. A bibliography should be appended.

11. Appendices

Appendix 1: Boundary and Area Description

This should provide the legal description of the area including any outstanding legal tenure or matters of existing interest that might have become clear during the development of the management plan. In most federal systems of government, there are complex and sometimes unresolved questions of jurisdiction between levels of government especially in the intertidal environment. These problems should be highlighted and, if appropriate, solutions suggested. One solution is to have complementary legislative, planning and management provisions on each side of that jurisdictional boundary. Examples of this include adjacent Federal and State Marine Protected Areas at Florida Keys and the Californian Channel Islands in the United States of America and the Great Barrier Reef Marine Park and adjacent Queensland Marine Parks in Australia.

Appendix 2: Legislation

All legislation and regulations relating to the area and their interactions, should be noted and explained. Where feasible, the legislation that prevails in the event of conflict between the provisions of different enactments should be identified. Implications for the protective status of the area should be identified.

Appendix 3: Plant Species

A comprehensive list of plant species should be attempted for the first management plan. As the process continues over the years, it is very likely that new plant species will be discovered in the area. Plant names should be listed in broad taxonomic groups, with botanical and common names where possible.

Appendix 4: Animal Species

Animal species should be listed in broad taxonomic groups: e.g. Mammals, Reptiles, Amphibians, Fish, Birds and Invertebrates and common names provided where possible.

Appendix 5: Special Features

This section could describe unusual or outstanding features of the area and could range from whale strandings, waterspouts, oil slicks to spiritual revelations and cultural beliefs.

Appendix 6: Past, Present and Proposed use

This section should attempt to provide 'more detail on uses, identify key user groups and assess the social and economic significance of areas.

Maps

The following are suggested as a minimum number of maps required.

Map 1	-	Location
Map 2	-	Land/water tenure and jurisdiction
Map 3	-	Land topography and seabed bathymetry
Map 4	-	Geology
Map 5/6	-	Dominant plant and animal communities
Map 7/8	-	Major uses
Map 9	-	Major use conflicts and threatened resources
Map 10	-	Zoning

Where practicable the use of overlay presentation is recommended in order to illustrate the associations between such factors as topography, biological communities, and uses.

MODEL OF MANAGEMENT PLAN cf. Salm and Clark

I. Executive Summary

II. Introduction

A. Purpose and scope of plan
B. Legislative authority for the action

III. Management Content

A. Regional setting: location and access
B. Resources (only facts pertinent to management, with other data in an appendix or separate document)
    1. Physical
    2. Biological
    3. Cultural
C. Existing uses (economics, description, facilities, etc.)
    1. Recreational
    2. Commercial
    3. Research and education
    4. Traditional
D. Existing legal and management framework
E. Existing and potential threats and implications for management (i.e., analysis of compatible or incompatible uses, solutions)
F. The plan
    1. Goals and objectives
    2. Management tactics
        a. Advisory committees
        b. interagency agreements (or agreements with private organizations,
        c. institutions or individuals)
        d. Boundary and zoning
        e. New regulations
        f. Resource studies plan
        g. Resource management plan
        h. Interpretive plan
    3. Administration (phased over 3- to 5-year plan)
        a. Staffing
        b. Training
        c. Facilities and equipment
        d. Budget
    4. Surveillance and enforcement
    5. Evaluation of plan effectiveness (monitoring uses, impacts, etc.) and revision
G. References
H. Appendices.

Indonesia Model
(Bali Barat National Park)

This is a rather old management plan (1980) prepared under the WWF Indonesia Programme and the UNDP/FAO National Parks Development Project. Follow-up and implementation of the plan is unknown. The original park did not have a marine component and the management plan was prepared in response to the Government's decision to extend the park with 6,220 ha of marine area in the early eighties.

Organization of the plan:

INTRODUCTION
- The status of planning
- Management objectives
- Marine tourism potential in Bali Barat

MARINE RESOURCES AND PROBLEMS
- Marine resources
- Human impacts on the marine habitats
- Conclusions

MANAGEMENT AND DEVELOPMENT PROPOSALS
- Conservation values and options
- Regulations, boundaries and zoning (also including permits and enforcement)
- Staffing, administration, resource management and guarding.
- Visitor use and facilities
- Summary of facilities, equipment, costs and scheduling

APPENDIX
Description of the major marine ecosystems of proposed marine extension.

Comments: This is a fairly traditional model of a management plan. The management and development section is quite detailed, although the management plan would gain in clarity by a more elaborate division into sections and subsections of the different chapters.

Netherlands Antilles Model
(Curacao Underwater Park)

This plan is called a management guide, perhaps to reflect its primary purpose to serve as a guide for management of an already established park. The park was *de facto* established in 983, but was never formally enacted by government. This has hampered the implementation of management, which has been solely based on an existing but inadequate reef management ordinance. For these reasons the plan has had little, if any, effect on actual management practice.

Organization of the plan:

PART I: DESCRIPTION

GENERAL INFORMATION
Includes location, tenure and map coverage

SITE INFORMATION
- Physical
- Biological
- Cultural
- Ecological relationships

PART II: PRESENT SITUATION

REASONS FOR ESTABLISHMENT

EVALUATION OF FEATURES AND SITE POTENTIAL

OBJECTIVES

RESOURCE USERS AND AVAILABLE FACILITIES

IMPACT OF RESOURCE USERS

PAST MANAGEMENT

PART III: MANAGEMENT ISSUES/MANAGEMENT ACTIONS

LEGAL AND MANAGERIAL CONSTRAINTS

FINANCIAL REQUIREMENTS

ADMINISTRATIVE ARRANGEMENTS

MAN INDUCED TRENDS
Includes impacts of uses, artificial beaches and mariculture

NATURAL TRENDS
Includes impact of coral diseases, bleaching, sea urchin die off, and storms

IMPACT ASSESSMENT

MANAGEMENT ACTIONS
Includes both on-site and off-site management programs

PART IV: BIBLIOGRAPHY AND RESEARCH REGISTER

Comments: The plan is well organized and very detailed, but is heavy on the descriptive/background information and light on management actions. As such it will not constitute a good model for a management planning exercise. The management plan has since been replaced by a management plan for the entire nearshore marine environment.

Turks and Caicos Marine Parks Model

The management plan relates to two almost adjacent MPAs, which were to be managed from a single operational base. The parks have been in existence for quite some time, but were not under active management. The management plan was intended to change this. The management activities for both areas are very similar in nature.

Organization of the plan:

SECTION I: BACKGROUND
- Introduction
- Objectives of the plan
- Review of existing legislation
- Resource description
- Uses and impacts

SECTION II: MANAGEMENT
- Objectives for management
- Legal framework for management
- Zoning
- Institutional framework for management
- Park equipment, infrastructure and facilities
- Public outreach, education and interpretation
- Research and monitoring
- Carrying capacity and visitor management
- Licensing procedures
- Enforcement
- Staffing and training
- Revenue generation and budget
- Timetable for implementation

SECTION III: ANNEXES
I. Information sources/bibliography
II. Legal texts
III. Job descriptions park staff
IV Visitor survey

CONCLUSIONS OF EVALUATION OF EXISTING MANAGEMENT PLANS

(Tom van't Hof, 1999)

- Management plans are being prepared by scientists, managers, consultants, or teams of experts from several agencies.
- Each author or team appears to have its own preferred model for a management plan.
- All management plans follow a general pattern, including a descriptive part and a management issues/activities part.
- Some management plans follow a strict pattern of policy, goals and objectives, strategy and actions.
- Management plans that have been prepared on the basis of extensive public consultation and review seem to be the most valuable and may have the best chances of implementation.
- Some management plans were prepared prior to implementation of management, others after IUCN has prepared a generic management plan outline which constitutes a useful basis for any organization involved in management planning.
- There is no single model that MPAs can adopt for its management planning without modifications.
- MPAs should develop its own model, based on the comprehensive outline proposed by IUCN, and using formulas and approaches of existing management plans as appropriate.