UNITED NATIONS ENVIRONMENT PROGRAMME

REGIONAL SEAS

Marine and coastal conservation in the East African region

UNEP Regional Seas Reports and Studies No. 39

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PREFACE

The Regional Seas Programme was initiated by UNEP in 1974. Since then the Governing Council of UNEP has repeatedly endorsed a regional approach to the control of marine pollution and the management of marine and coastal resources and has requested the development of regional action plans.

The Regional Seas Programme at present includes eleven regions 1/ and has over 120 coastal States participating in it. It is conceived as an action-oriented programme having concern not only for the consequences but also for the causes of environmental degradation and encompassing a comprehensive approach to controlling environmental problems through the management of marine and coastal areas. Each regional action plan is formulated according to the needs of the region as perceived by the Governments concerned. It is designed to link assessment of the quality of the marine environment and the causes of its deterioration with activities for the management and development of the marine and coastal environment. The action plans promote the parallel development of regional legal agreements and of action-oriented programme activities. 2/

Decision 8/13(C) of the eighth session of the Governing Council of UNEP called for the development of an action plan for the protection and management of the marine and coastal environment of the East African region. As a first activity in the region, UNEP organized in October and November 1981 a joint UNEP/UN/UNIDO FAO/UNESCO/WHO/IMCO/IUCN exploratory mission which visited the region.

The findings of the mission were used to prepare the following six sectoral reports:

- UN/UNESCO/UNEP: Marine and Coastal Area Development in the East African Region. UNEP Regional Seas Reports and Studies No. 6. UNEP 1982;

- UNIDO/UNEP: Industrial Sources of Marine and Coastal Pollution in the East African Region. UNEP Regional Seas Reports and Studies No. 7. UNEP 1982;

- FAO/UNEP: Marine Pollution in the East African Region. UNEP Regional Seas Reports and Studies No. 8. UNEP 1982;

- WHO/UNEP: Public Health Problems in the Coastal Zone of the East African Region. UNEP Regional Seas Reports and Studies No. 9. UNEP 1982;

- IMO/UNEP: Oil Pollution Control in the East African Region. UNEP Regional Seas Reports and Studies No. 10. UNEP 1982; and

- IUCN/UNEP: Conservation of Coastal and Marine Ecosystems and Living Resources of the East African Region. UNEP Regional Seas Reports and Studies No. 11. UNEP 1982.

1/ Mediterranean Region, Kuwait Action Plan Region, West and Central African Region, Wider Caribbean Region, East Asian Seas Region, South-East Pacific Region, South Pacific Region, Red Sea and Gulf of Aden Region, East African Region, South-West Atlantic Region and South Asian Region.

2/ UNEP: Achievements and planned development of UNEP's Regional Seas Programme and comparable programmes sponsored by other bodies. UNEP Regional Seas Reports and Studies No. 1. UNEP 1982.

The six sectoral reports prepared on the basis of the mission's findings were used by the UNEP secretariat in preparing a summary overview entitled:

- UNEP: Environmental Problems of the East African Region. UNEP Regional Seas Reports and Studies No. 12. UNEP 1982.

The overview and the six sectoral reports were submitted to the UNEP Workshop on the Protection and Development of the Marine and Coastal Environment of the East African Region (Mahé, Seychelles, 27-30 September 1982) attended by experts designated by the Governments of the East African region.

The Workshop:

- reviewed the environmental problems of the region;

- endorsed a draft action plan for the protection and development of the marine and coastal environment of the East African region;

- defined a priority programme of activities to be developed within the framework of the draft action plan; and

- recommended that the draft action plan, together with a draft regional convention for the protection and management of the marine and coastal environment of the East African region and protocols concerning (a) co-operation in combating pollution in cases of emergency, and (b) specially protected areas and endangered species, be submitted to a conference of plenipotentiaries of the Governments of the region with a view to their adoption.

In consultation with the Governments of the East African region the further development of the action plan was focused on activities directly related to preparations for the conference of plenipotentiaries and to other regional activities which received a first priority rating in the programme recommended by the Mahé workshop. 3/ This included the preparation of a series of country reports by experts from the region on:

- national legislation;

- national resources and conservation; and

- socio-economic activities that may have an impact on the marine and coastal environment.

3/ Report of the Workshop on the protection and development of the marine and coastal environment of the East African region, Mahé, 27-30 September 1982, (UNEP/WG/77/4).

The national reports were synthesized in regional reports 4/ 5/ 6/ which were prepared with a view to assisting the Governments of the East African region in their negotiations on the regional convention and its protocols. In addition, a technical training Workshop on the control of pollution from ships in the East African region was convened jointly by the International Maritime Organization (IMO) and UNEP in November 1983.

The present document is the regional report on marine and coastal conservation in the East African region. It was prepared by two consultants, R.V. Salm and L.A. ChongSeng, who worked under the direction of J. A. McNeely, IUCN Programme Director; their assistance is gratefully acknowledged. The report is based on seven national studies written by the following experts under project FP/0503-82-04: L.A. ChongSeng (Seychelles), H. Gruchet (France), I. Jehangeer (Mauritius), D. Kinyanjui (Kenya), A.A.B. Noman (Comoros), A. Razafimbelo and P. Randrianarijaona (Madagascar) and M. Salah (Somalia). No expert was designated by Mozambique, and the expert from the United Republic of Tanzania did not submit a report. References to those States are based on information collected by the authors. Species lists and data were provided by the IUCN Conservation Monitoring Centre in Cambridge and Kew, U.K., and the centre's contribution is gratefully acknowledged.

4/ FAO/UNEP: Legal aspects of protecting and managing the marine and coastal environment of the East African region. UNEP Regional Seas Reports and Studies No. 38. UNEP, 1983.

5/ IUCN/UNEP: Marine and coastal conservation in the East African region. UNEP Regional Seas Reports and Studies No. 39,. UNEP, 1983.

6/ UNEP: Socio-economic activities that may have an impact on the marine and coastal environment of the East African region. UNEP Regional Seas Reports and Studies No. 41. UNEP, 1983.

CONTENTS

BACKGROUND

1. For the purposes of the action plan for the protection and development of the marine and coastal environment of the East African region, the region has been provisionally defined 1/ as including the waters of the Indian Ocean within the jurisdiction of Comoros, France, Kenya, Madagascar, Mauritius, Mozambique, Seychelles, Somalia and Tanzania. The region also includes coastal areas, the specific geographic limits of which will be determined by the Governments concerned on an ad hoc basis, taking into account the particular activity to be carried out.

2. Among the general goals and objectives of the action plan are the following:

a) to promote the sustainable development and sound management of regional marine and coastal resources;

b) to provide for the protection and rational development of the living resources of the region, which are a natural heritage with important economic and social values and potential, through the preservation of habitats, the protection of species, and the careful planning and management of human activities that affect them;

c) to promote methods and practices for the management of socio-economic development activities that safeguard environmental quality and utilize resources wisely and on a sustainable basis; and

d) to adopt regional legal agreements and to strengthen national legislation for the protection and development of the marine and coastal environment.

3. The main objective of this report is to provide background, technical information for a meeting of experts to be convened by UNEP in December 1983 to begin negotiations, at the expert level, on the text of a regional convention for the protection and management of the marine and coastal environment of the East African region, a protocol concerning protected areas and wild fauna and flora in the East African region and a protocol on co-operation in combating marine pollution incidents in the East African region. The report is also intended to assist the Governments of the region in preparing a strategy of conservation activities to be carried out within the framework of the action plan for the protection and development of the marine and coastal environment of the East African region.

4. This report is divided into five parts. The first part presents an overview of sources of threat to habitats and species resulting from human activities, the part discusses principles, criteria and guidelines aimed at assisting States in selecting, establishing, and managing marine and coastal protected areas in the region. Part III reviews coastal and marine habitats in the region. Part IV is concerned with marine and coastal species, and part V reviews marine and coastal protected areas in the East African region.

1/ Report of the Workshop on the Protection and Development of the Marine and Coastal Environment of the East African Region, Mahé, 27-30 September 1982 (UNEP/WG.77/4, annex III, paragraph 3) and subsequent negotiations with the Government of France.

PART I: OVERVIEW ON MARINE AND COASTAL CONSERVATION ACHIEVEMENTS IN THE EAST AFRICAN REGION

INTRODUCTION

5. "With such acute food shortages and many pressing development needs in East Africa, who would take seriously a proposal to invest time, scarce expertise and even scarcer money in such an esoteric activity as conservation?" People asking such a question often assume that conservation is a field reserved for naive idealists who care more about nature than about people.

6. The essence of the problem is that conservation is still often perceived as being opposed to development. They believe we can have conservation or development, not both. Unfortunately, this misconception persists in national, international and bilateral aid and development agencies, and in the minds of some powerful decision makers. They, who are at the cutting edge of development, should be especially concerned not to sacrifice one resource while developing the use of another -- one does not solve a food shortage problem by destroying harvestable resources. It is the variety and sustainability of resources which makes a country rich and gives it stability, not the all-out development of a few resources at the cost of others.

7. Perhaps it is the perception of conservation versus development which explains the relatively little progress made in marine conservation in the East African region. Other factors which undoubtedly contribute include the general lack of knowledge of the functioning of marine ecosystems, the interactions and interdependencies between sea and land, and the limits of the coastal zone.

8. It is important to clarify what is meant by "conservation" and what is to be achieved by it. One definition of conservation arises from the simple principle stated in the World Conservation Strategy (WCS): living resources are renewable if conserved and destructible if not. The WCS defines conservation as "the management of the biosphere (the thin covering of the planet that contains and sustains life) so that it may yield the greatest sustainable benefit to present generations without losing its potential to meet the needs and ambitions of future generations" (IUCN, 1980).

9. There is nothing anti-development about the above definition -- unless development is seen as the total plunder and extermination of a resource in the shortest possible time, by the cheapest method and with total disregard for the consequences of all actions. On the contrary, the objectives of conservation as defined in the World Conservation Strategy have the safeguarding of natural resource-based industries as a central theme (paragraph 94).

MARINE AND COASTAL HABITATS OF THE EAST AFRICAN REGION

10. There is better knowledge of marine and coastal habitats in some countries than others. For example, a fairly detailed classification already exists for Mozambique's coastal habitats; but it needs to be complemented by an equally detailed classification of marine habitats. This needs to be done in each country and for the entire region before it is possible to assess which different habitats are represented in protected areas.

11. Each kind of habitat offers something of unique value, whether this is economic (fishery, mineral deposit or timber), social and cultural (view, recreational attraction, historic feature, legend or religious site), biological (gene pool or endemic, rare or endangered species) or scientific and educational (store of potentially useful species, specific community interactions, accessible examples of different habitats). To preserve these unique characters and genetic resources there needs be protection of a full range of habitats representative of the different types in the region.

12. Marine and coastal habitats are classified into 38 types. Of these, 13 (34 per cent) are found in all States of the region. They probably all also have patch reefs, but this needs to be confirmed. Estuaries and mangroves are found in almost all States. However, these are very small in Mauritius, Comoros and Seychelles. Mozambique has the greatest variety of habitats (33 or 87 per cent).

13. The sabellariid reefs of Inhaca Island and Paisley Seamount in Mozambique are unique. Seychelles is the only State with atolls.

14. A sample of critical habitats of regional importance include those of shared resources, such as turtle nesting and feeding sites; dugong mating, calving, shelter and feeding sites; seabird nesting areas; shrimp and fish spawning, nursery and feeding grounds.

15. The most obvious of the nationally important habitats are the critical habitats of commercially valuable species. These merit highest priority for immediate conservation action. Estuaries, mangrove forests, coral reefs, seagrass beds, submarine banks, and plateaux, rocky reefs and upwellings are all important habitats for fisheries. They all need conservation management. Dunes, seashore habitats and fringing reefs are important buffers against coastal erosion. They also should receive high priority for conservation.

16. Large multiple use areas zoned for different levels of protection and for different activities will probably be the most effective means of managing areas of the seabed; all seas under national jurisdiction should be seriously considered as the minimum planning units. They should be zoned, with different habitats placed under varying degrees of control according to the priorities and capabilities of each country. Thus the tendency should be to think comprehensively in the planning process, which is an appropriate scale for marine ecosystems, but to start piecemeal in the implementation process, which is appropriate given the human and financial resources of the area.

CONSERVING MARINE AND COASTAL SPECIES

17. It is generally true that marine species have been little studied and there is little biological data on which to base their conservation. However, the small and inconspicuous terrestrial species of the coastal zone (butterflies, other insects, small mammals, reptiles) are probably even less known.

18. Based on the limited knowledge and consistent with the definitions of IUCN (paragraphs 251 to 258), there are 15 species in the region which are known to be Endangered; 5 which are Vulnerable; 21 are listed as Rare; 6 are Commercially Threatened; and the remaining 9 are listed as Indeterminate, Insufficiently Known, or have not been assigned a category.

19. There are also endemic species, most of which are found in the island States. The terrestrial endemics have a relatively limited amount of space on islands, as do the people who live there. This generates severe conflict between the need to house and feed more people and the need to safeguard vanishing habitats and their dependent species. It is an unhappy truth that those island species which cannot live in disturbed or man-made environments, particularly on the Mauritian and Comorean islands and possibly Madagascar, have rather bleak prospects.

20. Certain species are being harvested at such a rate and with so few controls that it is difficult to know whether they can recover. The most obvious in this over-exploited species category are the spiny lobsters and seashells (particularly green snails and pearl oysters which yield mother-of-pearl, imperial harp, large tritons, murexes, cones, cowries, helmets, conchs and giant clams and crabs).

21. Migratory species (such as shorebirds, whales, tunas, billfishes, other pelagic fishes, many seabirds, turtles and dugongs) all fall into the category of shared species. Dugongs evidently move along the coast, traversing country borders. But the species has been so little studied that the extent of its migrations is unknown. It is known that turtles breeding on Europa Island move to feed off western and southeastern Madagascar where they are hunted. Northern Mozambique and Tanzania are important feeding grounds for loggerhead turtles nesting in southern Africa.

22. It is highly likely that the East Africa Coastal Current, Mozambique Current and Madagascar Current influence the distribution of marine species in the East African region. They almost certainly transport quantities of nutrient, eggs, larvae, juveniles, organisms and pollutants from one country to the next.

23. Finally, there is the group of species threatened by habitat destruction and pollution. This includes all species on Mauritius which live or breed in brackish water (notably Macrobrachium lar, penaeid prawns, mullets, oysters) because of periodic pollution of streams and rivers with industrial and agricultural wastes and chemicals. In Kenya, construction of a dam on the Tana River threatens to sever the migration of 3 species of Anguilla eel which move upstream to spawn.

24. It appears that the major seabird nesting areas are already included in protected areas (15 sites) or are proposed for protection (10 sites). On Aldabra Atoll the coconut or robber crab is another well-protected marine species. But it requires conservation action elsewhere in the region -- particularly on the islands off the Tanzanian coast.

25. Green and hawksbill turtle nesting beaches have received fairly extensive protection. The major green turtle beaches (on Europa, Aldabra and Tromelin) have been declared reserves and apparently receive adequate management. However, there are important beaches in the Comoros, Mozambique and Mauritius which also require protection. Loggerhead and leatherback nesting beaches appear to be adequately protected in Mozambique. There are no protected nesting beaches for the olive ridley turtle.

26. It is also important to safeguard the turtle feeding grounds, such as those for loggerheads in northern Mozambique and Tanzania and for green turtles off Madagascar, to complement conservation of nesting beaches elsewhere in the region.

27. The most important dugong habitats in the region appear to be located in Mozambique. Dugong habitats are inadequately protected throughout East Africa. Dugong reserves designed specifically to safeguard breeding, calving and shelter areas and feeding grounds should be established in Kenya, Tanzania (Kilwa) and Mozambique (Bazaruto, Antonio Enes, Primeira and Segundo Islands).

28. Green snails, Triton's trumpets, giant clams and other marine molluscs receive their best protection in the Seychelles. They are totally protected at Aldabra and in the 4 special reserves for marine mollusc conservation (2 on Mahé Island, 1 on Praslin Island, and 1 on La Digue Island). Gathering of live molluscs is forbidden in Réunion.

29. Special reserves for endemic coastal species have only been declared in Seychelles and Mauritius, although many Mauritian endemic species receive little protection despite Endangered status (e.g. on Rodrigues Island).

EAST AFRICAN MARINE AND COASTAL PROTECTED AREAS

30. The establishment of the Indian Ocean Sanctuary for the conservation of whales is among the greatest achievements of its kind in marine conservation. It offers an example of what can be done to achieve regional co-operation in resource management and conservation.

31. There are only 40 protected marine areas in the region. The total area of the sea which is protected is less than 1,900 sq km, about 10 per cent of the area of Kenya's largest national park on land. This is less than 0.5 per cent of the total continental shelf area of the East African region and is a negligible fraction of the total Exclusive Economic Zone area for the included States. A further 42 sites are proposed for protection.

32. There is little to guide planners and managers of marine protected areas, so it is understandable that most of these areas suffer from small size, and inadequate design and management. Also, there are few trained personnel in the field of marine conservation in the East African region.

33. Coastal protected areas, being land-based, have inherited a vast body of experience, fit neatly into long-established institutional frameworks, and are often components of the terrestrial protected area programmes. Consequently, they are better designed and managed than marine protected areas.

34. There are only 23 protected coastal areas in the region and another 17 are proposed. Mozambique has 51 per cent of the total area and the greatest variety (7 out of 9) of protected coastal habitats. Kenya has 48 per cent of the area, while Madagascar, Mauritius and Seychelles share the final 1 per cent.

THE CONSERVATION NEEDS OF THE EAST AFRICAN REGION

35. The major problems that inhibit the progress of marine conservation in the Western Indian Ocean are listed below. This list defines the principal marine conservation needs of the region. It applies equally to individual States and to the region as a whole:

a) There is generally no specific national policy and no clear institutional responsibility for the conservation of marine and littoral habitats and species.

b) There are few trained personnel capable of planning and implementing conservation programmes in the marine and coastal environments.

c) Conservation related to tourism development has received greatest priority, whereas the safeguarding of subsistence and commercial fisheries is hardly considered.

d) Until now there has not been the mechanism to jointly manage marine resources shared among two or more States in the region.

36. Before the need for more marine protected areas can be addressed, it is necessary to train people in both planning and management of these areas. This raises an important point: marine conservation science must be taken as seriously as that of wildlife management and conservation on land. There must be serious attempts made to establish marine protected areas in the most ecologically, biologically, genetically, aesthetically, culturally and economically valuable sites, not merely where it is most convenient. Further, these protected areas must be designed and managed as viable units, taking into account ecological principles and patterns of human use. This requires that the area planners and managers have adequate training, legal and institutional support, equipment, funding and qualified staff.

37. There are three principal species conservation objectives in need of national action. These are:

a) protection of endemic species and their critical habitats (safeguarding of national heritage);

b) protection of the critical habitats and support systems of harvested species (securing continued benefits from resources); and

c) protection of the critical habitats of shared species (fulfilling the regional obligation toward safeguarding of regional heritage).

38. The concept of the Indian Ocean Sanctuary should be extended to other species of the region, including both threatened and commercial varieties, and to include protection of critical habitats and support systems.

39. Management plans and more effective forms of management should be developed for the Fisheries Reserves of Mauritius. These should then be used as models for the development of similar protected areas in all countries designed to safeguard critical habitats of fishery species.

40. Harvestable species have an obvious value. Nonetheless, they should not be allowed to eclipse other species whose values are more cultural than economic such as endemic and threatened species. For this reason it becomes important for emerging States to safeguard their national treasures and to rescue those depleted earlier.

41. Development priorities cannot ignore conservation of the support base for resources (i.e. nutrient sources and critical habitats). This is usually considered an action which has benefits developing in the long term, and hence is less urgent, whereas the needs are for more immediate benefits. However, this is a false assumption. Protection of the support systems helps to maximize and protect both short and long term benefits. Clearly, all States should make conservation of the critical habitats of harvestable species a highest priority action.

PART II: PRINCIPLES, CRITERIA AND GUIDELINES FOR THE SELECTION, ESTABLISHMENT AND MANAGEMENT OF MARINE AND COASTAL PROTECTED AREAS IN THE EAST AFRICAN REGION

INTRODUCTION

42. Principles, criteria and guidelines for the selection, establishment and management of coastal and marine protected areas in general are given comprehensive treatment elsewhere (Salm, 1983). However, the East African region has its specific problems and particular needs. It is these which are addressed in this report. Many of the more general concepts regarding site selection and design are not included but should be referred to in the document cited above.

43. This report starts with a statement of general principles relevant to marine conservation and their implications for management. This is followed by a listing of specific marine conservation problems and needs in the region. Following this each need is considered in detail, starting with a listing of guiding principles and ending with mechanisms for addressing these.

GENERAL MARINE CONSERVATION PRINCIPLES

The principle of linkage

44. A most important principle in the sea is that of linkage. Streams and rivers link activities far inland to the sea and surface runoff links those closer to the shore. Ocean currents, wind drifts and animal migrations linkparts of the ocean over vast geographic areas. Winds act in the same way to transport industrial pollutants and dust which may fall out in coastal zone habitats. These agents transport nutrients, food, propagules (eggs, larvae, seeds and young), organisms and pollutants across oceans, biogeographic provinces and national boundaries.

45. The management implication of linkage is that effective conservation of coastal and marine resources ideally requires integration with land use management, the management of vast areas, multinational treaties for the protection of shared resources and alliances for their conservation. This principle underlies the need for regional management of marine resources.

The principle of exploitability

46. Most of the species, communities, habitats and ecosystems that we are trying to conserve in the sea have harvest value and development potential. However, some species have already been over-exploited to the point of economic or local extinction. Several small island reserves, on the other hand, have been created in the style of terrestrial reserves to protect the last viable breeding population of a nearly extinct species (e.g. Round Island at Mauritius, Aldabra Atoll and Cousin Island in the Seychelles) or the last example of a disappearing habitat.

47. The exploitability of marine resources and their conservation for sustainable utilization have the following implications for management: it should be relatively

easy to demonstrate the benefits to people of conservation in the sea, to involve people in the implementation of conservation, to avoid conflicts between industry and conservation, and to integrate conservation and development.

The principle of invisibility

48. We cannot easily see most of what happens underwater. The sea is regarded as an inexhaustible source of food and a great convenience in which we can dispose of unlimited garbage. On land we see the effects of our activities, we are constantly reminded of the need for action, we can be embarrassed by our mistakes, and we can take remedial measures earlier. In the sea we have little awareness of our impact on submerged life and it is more difficult to investigate this. Boat-based and underwater research and monitoring studies are difficult and expensive. We know little of the functioning of ecosystems and the life cycles of species, so it is difficult to anticipate the influence of different activities on them, which demands that more time, energy and money be channelled for the study of the system.

49. The implications for conservation which the mysteries of the sea produce are that we lack a good biogeographic classification scheme from which to assess the adequacy of coverage of coastal and marine protected areas; we have generated a great deal of conservation theory but have few tested practical solutions; we are forced to speculate in our management decisions rather than to apply a proven method; and we often do not notice the gradual deterioration of a habitat, depletion of a stock or disappearance of a species until it is too late and the original community is replaced by another.

GENERAL MARINE AND COASTAL CONSERVATION PROBLEMS OF THE EAST AFRICAN REGION

50. It is from the list of principal problems below that the marine conservation needs arise. Terrestrial components of the coastal zone generally fall under the protection of already well-established land-oriented conservation institutions and traditions. Hence they are generally better managed than the marine components, to which the following discussion principally applies. The list below applies equally to individual States and to the region as a whole:

a) There is generally no defined national policy which is specific to the conservation of marine and littoral habitats and species.

b) There is no clear institutional structure to deal with marine and coastal resources.

c) There are very few trained personnel capable of planning and implementing marine and coastal conservation programmes.

d) Scarce financial resources are invested in activities which generate much-needed foreign exchange (export industries, tourism) and in social welfare (health care and education), so there is little if any local money dedicated to the development and implementation of marine conservation. Surprisingly, even conservation related to the safeguarding of subsistence and commercial fisheries has hardly been considered.

e) Several marine resources are shared among two or more States in the region, or are influenced by processes originating in neighbouring states. Until now there has not been the mechanism for joint management of these.

f) There is no accurate or complete classification scheme for the habitats of the region; there has been no attempt to analyze and identify biogeographic units.

g) There is exceedingly little knowledge of the smaller and less conspicuous taxa of marine and coastal organisms. There is most information on the larger and more fundable species, such as turtles. However, even this is incomplete and mainly limited to generalities, such as the location of nesting sites.

REGIONAL CONSERVATION NEEDS

51. The needs fall into three main categories: building the institutional base; building the information base; and establishment of protected areas. Most action has to be taken at the national level, but certain common needs, or multinational needs, could best be addressed at the regional level. For example, there are the needs for training, for technical assistance and for development of international legal instruments and protocols.

52. To help overcome the personnel shortage and lack of experience in the marine conservation field, there is the need for technical assistance. It is unlikely that this could be provided to individual States through UN development programmes as most country allocations of UNDP funds are already fully accounted for under existing projects. These are projects which have been identified as highest priority by the individual States.

53. Resolving the need for training is difficult. There is currently no institution which offers training in marine conservation. There is a new conservation training school under construction at Lake Naivasha in Kenya. Marine park personnel will receive part of their training at this school and part at a coastal field station. This might be a suitable location for a training programme. However, it would be preferable to have the school based on the coast in an area of diverse marine and coastal habitats. Alternate sites include the University of Dar es Salaam in conjunction with their Kunduchi Marine Station, and the Universidade Eduardo Mondlane in Maputo in conjunction with their marine biology research station on Inhaca Island. The Estaçao de Biologia Maritima on Inhaca is probably the most obvious choice from the point of view of facilities and location. The research station is well maintained. It has dormitories for trainees, individual rooms for instructors, ample laboratory space, library and museum facilities, a long history of research, and an excellent and comprehensive field guide to species and habitats of the area. It is located in a reserve system and offers good examples of a variety of habitats and management problems.

LOCAL CONSERVATION NEEDS: THE ROLE OF NATIONAL GOVERNMENTS

54. This section is arranged as steps which may be useful to guide the sequential development of national programmes in marine and coastal conservation. The first two steps are primarily concerned with institution building. While contributing further to this process, the remaining steps concentrate on building the information base necessary for site selection, design and management, and on establishment and management of protected areas. The information sought becomes progressively more specialized through the steps.

Step 1: Preparing for the programme

55. During this phase the principal institute and core cadre of programme advisers and administrators are identified and given the mandate to proceed. The principles to be used in this process are identified in the following paragraphs.

56. General programme objectives should be proposed through an interagency meeting.

57. A lead agency should be designated which has the primary responsibility for meeting programme objectives. It is easier to expand existing institutions than to create new ones. An existing agency may be designated as lead agency provided it can be motivated to carry out conservation, its objectives are modified and clearly stated, and it is given the responsibility, power and necessary administrative and technological resources.

58. Creation of new agencies should occur only where existing agencies cannot be adapted, motivated and empowered to carry out adequately the conservation task.

59. Other existing agencies with jurisdiction over marine activities should be involved by inter-agency agreement to the extent necessary and appropriate to meet the conservation objectives.

60. For major long-term programmes, creation of a new agency such as a joint authority (especially on a regional basis) may be desirable provided it has the government support, power and resources necessary to perform the function.

61. Existing staff and technical resources should be used wherever practicable, but where this is impossible, local personnel should be trained to take over within a finite, and short, period.

62. Planning and management phases of the programme can be undertaken by different agencies provided they are co-ordinated by the lead agency. This co-ordination is very important to prevent repetition and duplication of work.

63. It is generally more important for the lead agency to have its primary role in planning. If necessary, management of protected areas can be delegated to a suitable technical agency, such as the existing wildlife and national parks department or fisheries division.

64. When experience is lacking or expertise is spread among several institutions, the task of planning can be undertaken by a multi-agency task force of experts co-ordinated by the management authority.

65. The programme director/co-ordinator and key administrative assistants must be identified at the inception of this preparatory phase. Their participation throughout the programme preparation, initiation and implementation stages is essential to their training and understanding of their responsibilities.

66. The fledgling programme should be allocated office space and the core cadre assembled there as a unit. This helps to develop agency identity both within it and outside.

67. The use of proper mechanisms in carrying out Step 1 is of great importance. Inexperience is a problem affecting any agency when its resource management responsibilities are extended to include the conservation of marine or coastal areas. A land-based conservation agency that acquires a marine jurisdiction has to search for advice and information on the marine environment, and has to be open to

new management concepts. An agency whose responsibilities are extended from commercial resource management, say fisheries or forestry, to include the conservation of protected areas such as wetlands, reefs and turtle nesting beaches, also has to learn new principles of management and re-orient its approach.

68. The following approach is generally recommended for all countries of the region:

a) Responsibility. Existing institutions responsible for management of national parks and reserves on land should be expanded to manage marine and coastal protected areas. A department, division or section of marine conservation should be established in the appropriate agency and should have equal standing with its counterpart terrestrial division.

b) Initial recruitment. There will need to be the appointment of a Director of Marine Conservation who is subordinate only to the Director of Wildlife and National Parks (or equivalent organization). It is possible to begin the programme with just one high-ranking person, one assistant and one secretary; these are the minimum requirements in all countries. However, the requirements vary from country to country depending on the relative level of advancement in marine conservation, the diversity of species and habitats, the number of problems to be tackled, the conservation needs and the level of co-operation with related agencies (fisheries, universities).

c) Office facilities. As the programme develops so will the need for additional staff (heads of new subdivisions: planning, protected area management, finance and administration, training, interpretation and public relations, drafting and production, and all the assistants and secretaries), equipment (boats, motors, diving gear, vehicles, duplicating machines), workshop and library. All of these have to be accommodated somewhere. It is prudent to look ahead to the possible space needs; rather than having to change location every year or so as the programme outgrows its space, the department should be located in a site which enables expansion of underutilized space or by extension of existing buildings.

Step 2: Initiating the programme

69. In this phase parameters are defined which determine the course to be followed by the programme. Policy provides the conceptual foundation on which to build the programme and the direction it strives toward. Legislation provides the framework which binds the programme. Principles outlined in the following paragraphs concern policy and legislation.

70. Policy derives from a country's problems, needs and programme objectives, its regional or global commitments and obligations, and the limits placed on programme building by available funds and qualified personnel.

71. Policy on marine protected areas should be at the international level (see following principle), at the national level for the country programme as a whole, at any appropriate subnational level, and for each protected site.

72. It is essential that policy (and legislation) for marine and coastal protected areas take into account any international, regional or other multilateral treaties to which the country is a member (or considering membership). This is to ensure that policy and corresponding programmes are consistent with current multilateral commitments and obligations.

73. Policy at all levels should be based upon ecological fundamentals -- including the principle of managing the ecosystem as a whole -- in combination with economic, social and political factors, and should serve as an integral part of the comprehensive economic and development policy.

74. Policy should include co-ordination and intergovernmental planning of marine protected areas at three levels: the transnational level where areas are located at an international border, next to an international zone, or where species protected in one country naturally migrate to critical habitats inside other national boundaries; the national level for general co-ordination with other development plans and policy; and the level of the marine programme where each area may need to be co-ordinated with another.

75. Clearly defined objectives and purposes should be included in the policy on the marine and coastal protected area programme. This is to provide valuable guidance to those who must select, plan, manage and administer the areas. Ultimately, all activities must be judged according to whether they advance or defeat the objectives and purposes of both the programme and each protected area.

76. Where feasible, marine and adjacent terrestrial protected areas should be linked by integrated conservation management.

77. Public involvement and active participation in planning, establishment, management and continuous monitoring of a protected area is generally of key importance to its long range success.

78. Multiple use consistent with conservation is an important objective in marine protected area policy, especially where large areas are to be subject to regulation.

79. The form and content of legislation must depend on the legal, institutional and social practices and values of the States and peoples enacting and governed by the legislation.

80. The specific legislation for an area must be designed in such a way as to support and accomplish its objectives and purposes.

81. Unnecessary conflict should be avoided with existing legislation and administration.

82. The continuance of existing regulations and regulatory mechanisms should be considered when they are consistent with conservation objectives.

83. The legal status, ownership and use rights of the site to be designated a protected area is a critical and primary concern which may require different approaches in different countries. There may be public rights as well as private rights involved. The impacts of existing laws and rights must be recognized and, where necessary, dealt with through specific measures in the legislation, such as through appropriate acquisition or compensation procedures. Customary rights (e.g. for fishing) may need special recognition.

84. Legislation must designate a lead agency with primary responsibility for meeting the objectives of protected area legislation. This is important when different authorities have jurisdiction over different parts of a marine protected area or over different activities in it. The relationship between the lead agency and other concerned agencies must be clearly defined in legislation, particularly regarding potential conflict or overlap in different pieces of legislation. Processes for resolution of conflicts and for consultation between relevant agencies

legislation should follow these principles:

a) provide for conservation management over large areas, while maximizing use and enjoyment;

b) provide for different degrees of use and protection in different zones within the large areas;

c) provide for continued harvesting in some zones of living resources at sustainable levels;

d) set out the uses and activities which can proceed in each zone, and the conditions applying to such uses;

e) provide for multiple use;

f) allow existing legislation to continue to apply to the extent that it is not in conflict with the umbrella legislation;

g) provide formally for the establishment of a lead agency or joint authority and for co-ordination of decision-making and management by the various government and non-governmental agencies involved; and

h) provide formally for public and user involvement in planning and management.

93. The following discussion pertains mainly to policy aspects. A detailed report on the legal aspects has been published. See FAO/UNEP: Legal Aspects of Protecting and Managing the Marine and Coastal Environment of the East African Region, UNEP Regional Seas Reports and Studies No. 38. UNEP, 1983. As in Step 1, the use of proper mechanisms in carrying out Step 2 is of great importance. Conservation and utilization must be integrated to form a practical resource management plan which defines economic and social development objectives within the context of sound environmental management strategy. Formulation of the strategy requires identification of problems and needs pertaining to marine coastal resource management, including for example the maintenance of fisheries at sustainable levels as called for in the World Conservation Strategy (IUCN, 1980). To achieve this each nation needs to determine what is known about the distribution and extent of resources, their usefulness to people, and if and how they are threatened. It is from these needs that the programme objectives are determined.

94. As a guide to the formulation of programme objectives, those of the World Conservation Strategy (IUCN, 1980) are recommended, with the objectives stressed that best answer to each country's specific needs. The three objectives of the World Conservation Strategy are:

a) to maintain essential ecological processes and life support systems (such as the recycling of nutrients, maintenance of the water balance in estuaries, continued export of organic detritus from coastal wetlands to offshore feeding grounds of demersal species) on which human survival and development depend;

b) to preserve genetic diversity (the range of genetic material found in the world's organisms) on which depend the breeding programmes necessary for the protection and improvement of cultivated plants and domesticated animals (such as algae, molluscs, crustaceans and fishes), as well as much scientific advance, technical innovation, and the security of the many industries that use living resources; and

c) to ensure the sustainable utilization of species and ecosystems (notably fish and other aquatic life, mangrove forests and algal beds), which support coastal communities as well as major industries.

95. To ensure effective management of marine areas there will have to be control of activities in adjacent terrestrial environments and, most important, in linked watersheds. Integrated conservation management of land and sea areas can sometimes be achieved by extending the boundaries of marine protected areas landwards or of terrestrial protected areas into the marine environment. If possible the seaward boundary of a combined terrestrial - marine protected area should be far enough offshore to allow effective protection of the principal features of the marine area from such threats as pollution generated outside the protected area.

96. Establishment of marine and coastal protected areas includes the requirement that the legislation contain enough detail for proper implementation and compliance, delineation of boundaries, adequate authority, and resources for support of infrastructure to carry out the required tasks. To ensure permanence to coastal and marine protected areas so that lasting conservation of species and ecosystems is provided, it is necessary that full investigation of possible sites and maximum co-ordination on planning and designation be undertaken with the support of top levels of government.

97. Public involvement should be established as early as possible in the programme, consistent with avoiding premature publicity of proposals to establish protected areas where this is likely to lead to or facilitate land speculation by private interests, or other actions which are likely to threaten the protected area proposal. One means to encourage public participation at all levels is to establish this concept in the legislation and, wherever possible, specify the stages in the programme when the public is to participate. There should also be provisions for strong programmes in public education. Providing benefits locally through the operation of the protected area, and responding to local needs and cultural values are two means to address the public participation principle.

98. Alternative sources of income will generally need to be provided to people whose economic activities are displaced or reduced by the establishment of a marine protected area. The co-operation of customary or traditional users can and should be encouraged by providing enforcement responsibilities and necessary material benefits, such as reduced fishing competition or participation in economic activities associated with the protected area.

Step 3: Building the information base

99. The information base for identification, selection and management planning of marine and coastal protected areas is generally poor. There has been little research on non-commercial marine species and on the smaller taxa of coastal species. This step should begin at the earliest possible time and continues essentially indefinitely. It overlaps preceding and later steps. The basic principles of this step are outlined below.

100. A comprehensive knowledge of marine and coastal habitats and their associated species assemblages is a prerequisite to the formulation of an accurate biogeographic classification scheme at a scale which is useful for guiding national decisions.

101. Classification is the first step to ensure protection for a full range of habitats representative of the different types in the region. Each kind of ecosystem offers something of unique value, whether this is economic (fishery,

mineral deposit, timber), social and cultural (view, recreational attraction, historic feature, legend, religious site), biological (endemic, rare or endangered species) or scientific and educational (store of potentially useful species, specific community interactions, accessible examples of different habitats). To preserve these unique characteristics and genetic resources we need to protect examples of each.

102. Much information is already synthesized into the various UNEP Regional Seas Reports and Studies concerned with the East African region. These form a useful source of information from which to expand. The mechanisms to collect further data are outlined below.

103. Identify national (or other) experts in various related fields (e.g. those whose research has specialized in species or habitats of interest) and list their names and addresses.

104. Interview experts (or contact them by mail if now located in remote areas or outside the country) to obtain specific information and to locate published sources of information. Annexes I and II list the suggested formats for habitat and species information needs.

105. Conduct a literature search in libraries to locate and copy publications relevant to habitat and species conservation.

106. Follow up the literature surveys and interviews with field surveys in key areas.

107. Compile habitat and species data sheets (annexes I and II) and map all information collected in this way. Together these maps and supporting data sheets form the basic data files which should be continuously updated by new information, both published and personal observation.

108. A library should be assembled of books and other publications concerning ecology, biology and management of habitats and species, general conservation principles and practices, general oceanography and marine ecology, specific field guides, sample management plans from other protected marine and coastal areas, educational materials and other relevant documents (survey and research techniques, remote sensing and census methods, protected area techniques, equipment and maintenance manuals).

109. Each State should produce a classification and map of marine and coastal habitat types. This is discussed in part III of this report, "Marine and Coastal Habitats of the East African Region".

Step 4: Systems planning

110. During this phase potential conservation areas are identified, evaluated and selected on the basis of defined criteria. The following principles should be taken into account.

111. The regional and country programme objectives should determine the choice of criteria for site identification and selection. A country or certain of its provinces may be well suited to tourism or fisheries development, or petroleum or mineral extraction. The derived conservation and development objectives could be the development of national parks for tourism, the maintenance of critical habitats for fisheries, and the recovery of non-renewable resources without sacrificing other resources or uses. Clearly, criteria relating to tourism development (aesthetics,

safety, accessibility) will have little bearing on the choice of sites to preserve a fishery (value to species, value to fisheries).

112. Criteria help to define a consistent objective approach to site identification, evaluation and selection.

113. Marine protected areas should be selected on the basis of criteria defined to meet marine conservation objectives and not through convenience alone or proximity to a protected area on land. Seaward extensions of terrestrial protected areas are measures of convenience for the management of the land; they should not detract from the establishment of protected areas which have been selected solely on the basis of their value and contribution to the conservation of marine and coastal resources.

114. There are two functions of criteria. They initially serve to assess the eligibility of sites for protection -- the identification process. But their main function is to order eligible sites according to priority -- the selection process. The number of sites selected is determined by such factors as availability of financial resources and qualified personnel, national policy, the extent of international concern and assistance, and the urgency for action at each site.

115. The identification and selection process for protected area sites may be lengthy, but it is essential to give this phase the time it merits if there are not clear priorities. The mechanisms to be used are very important. Beginning with the identification of criteria, the degree to which a site fulfils each criterion is scored on a scale of, for example, 1 to 3 (low, medium, high value). Once each site has been assigned a score for each criterion, the scores are summed. The sites with highest scores have greatest priority. In the final analysis sites will still have to be chosen from among those with highest scores. The final choices should be made by a panel of people representing different interests.

116. It is possible to devise extremely complicated scoring and summing mechanisms which go beyond the time-frame and needs of country programmes in the region. The simple system presented here is intended to illustrate the ranking principle and seems suitable for application in the region. The simplest classifications, criteria and procedures for site identification, evaluation and selection are clearly the easiest to use. They are the most appropriate in countries which are beginning to develop a marine and coastal protected area programme.

117. Criteria for the identification and selection of marine coastal protected areas depend principally on the overall objective of the conservation programme. If, for example, the objectives lean toward social goals (recreation, research and education), the criteria would emphasize safety factors (such as absence of currents and large waves), presence of cultural or archaeological sites and accessibility. If economic goals (such as coastal protection, maintenance of fisheries, development of tourism and appropriate industries) are the primary concern, the criteria would emphasize intensity of resource exploitation, present and potential economic value of resources, and the degree of threat to them. If ecological goals (such as maintenance of genetic diversity, continuation of processes and species replenishment) are stressed, the criteria would primarily concern uniqueness, diversity and naturalness of sites.

118. Annex III lists specific criteria which could be used to decide priorities for protected areas whose goals are mostly social, economic or ecological. All three goals are compatible and can be achieved within a single large protected area. Thus the criteria could be used to select the site and to zone it according to specific

uses. Such a protected area would be the preferred alternative because:

a) It requires management of a single unit within which are a number of component zones. This reduces legal, administrative and implementation problems and logistics.

b) It enables management of larger units which are more likely to contain complete functional units, and hence are more ecologically self-sustaining.

c) It enables continuity of ecological linkages and processes, many of which may not have been identified, and enables uninterrupted flow of propagules and nutrients and movement of organisms among the component habitats.

Step 5: Management planning

119. It is intended that this section should help both the design of new marine and coastal protected areas and the evaluation of management status of existing ones. The principles of this step are listed below (see also annex IV).

120. Public participation is an important aspect of planning, both to indicate existing uses and areas of value to people and to avoid unnecessary interference with current social and economic activities.

121. Public relations early in protected area planning can reinforce efforts of management staff and gain local support.

122. The management plan for a new protected area identifies steps to the establishment of a protected area. As such it is an essential part of management.

123. The principal objective of the management plan is to preserve the natural resource value (seascape, species habitat, ecosystem) of an area, so all uses should reinforce that aim.

124. As far as possible, the management plan should aim to conserve the natural value, optimize current use and values, and integrate traditional uses. Through zoning it should attempt to separate incompatible activities, ensure that the different uses are permitted in suitable areas and prescribe sustainable levels of use.

125. The plan must derive directly from management objectives and must include legal, administrative and educational components along with the ecological and physical.

126. The plan should function to achieve inter-agency co-ordination and co-operation between different levels of government.

127. Site management should not be delayed until completion of a complex plan. In countries where lengthy bureaucratic procedures or other reasons draw out the process of plan finalization, an interim management document, the "preliminary" or "operational" plan, should be implemented.

128. Through the process of revision and review, plans provide a mechanism by which past successes and failures can guide future decisions.

129. Planning should examine the effects which establishment of marine or coastal protected areas will have on local people and find ways to maximize positive effects and avoid or reduce the negative effects.

130. Managers of protected areas should participate in the planning process, as planning is an essential skill for professional management.

131. Planning should be one of the means for training marine and coastal protected area personnel, and for communicating and strengthening the protected area management institutions.

132. There are many needs in the design of coastal and marine protected areas which must be addressed during the planning phase. They include such practical matters as siting of facilities, the types of boats and motors needed for surveillance, boundary demarcation when necessary, zoning of activities, recruitment and training of staff, and the development of budgets and schedules. Social and economic factors such as the analysis of visitor-use compatibilities and conflicts, identifying the identifying the sources of threat to habitats and species resulting from human conflicts between traditional or developing habitat uses on the part of local residents and industries, and ecological factors such as which habitats to include, how large the protected area and each of its zones should be, and where to recommend boundaries are some of the many considerations necessary in the design of coastal areas.

133. The planning process begins with site survey. This enables one to determine the following information:

a) the type and location of valuable habitats for conservation and such of their characteristics as species diversity, size, degree of naturalness, uniqueness, representativeness and the degree to which a species might depend on them (i.e., critical habitat);

b) the type, extent and location of human uses (recreational, commercial and subsistence activities), their effects on the biota and habitats of the site, the degree of dependence of local inhabitants on these uses, and possible alternatives for activities which degrade habitats and deplete species stocks below sustainable levels; and

c) present and potential threats to the site's resources from activities outside the immediate area of concern.

134. Based on this information, one is able to begin designing the protected area following the general guidelines outlined below. These guidelines are greatly simplified, but they contain the basic elements necessary for the design of coastal and marine protected areas. To simplify the illustration we will assume that we have located a site that meets all the criteria to qualify as a marinenational park.

135. Management objective: to maintain the ecological processes and support systems necessary to preserve the value of the area to tourism, to fisheries, to research, for interpretation and education, and for the conservation of the included biota, communities and habitats through the establishment of an active and appropriate management programme.

136. Method: Management zones must be identified. Activities within these zones are planned in accordance with the objective of the reserve. Certain zones may require intensive management while others require very little. Zoning enables protection of core areas, monitoring of the impact of different activities, and maximum efficiency in the deployment of management equipment, funds and personnel.

137. Sites which have high conservation value, are vulnerable to disturbances, and which cannot tolerate any forms of human use will qualify for strict protection.

These areas may be referred to as sanctuaries. They are equivalent to core zones and are managed as either IUCN categories I or IV (refer to annex XI of this report for definitions of categories).

138. The size of these zones can be of vital importance in their usefulness as sanctuaries and their prospects for survival. Small areas of habitat generally have fewer species than larger ones. For example, a 300 ha coral reef of the Chagos Archipelago in the Indian Ocean had 95 per cent of all the coral genera found there. Smaller reefs or sections of reefs had lower coral diversity. The number of coral genera decreased at a predictable rate as reef size decreased. Also, certain genera were found only on reefs larger than a certain minimum area which varied from genus to genus.

139. The first step in the design of a protected area should be to define the critical minimum area of each sanctuary. Unfortunately we do not have the tools or knowledge to do this easily or to make simple predictions. Criteria which may be helpful are:

a) the number of species/genera present in a given area (based on the Chagos study mentioned above, the minimum core area would be 300 ha);

b) the distance of the site from human settlements;

c) the migratory patterns of key species;

d) the feeding pattern and range of key species;

e) the distance to outside sources of propagules for replenishment; and

f) the finding of successful designs from apparently similar situations elsewhere.

140. The essential factor is to include an area which is judged to be sufficiently large to sustain a viable breeding population of key species and the support systems for key habitats.

141. Finally, designate the critical core zone such that it includes as many different habitats as possible.

142. Sites which have special conservation value and which can tolerate a moderate level of different types of human use or which are suitable locations for the installation of facilities are all eligible for inclusion in the protected area as different zones.

143. First determine the types and numbers of zones required to cater to the range of activities planned in the protected area (recreation, research, education and traditional fishing zones, headquarters site and additional administrative sites, and special conservation zones). Additional natural areas are zoned according to their proposed use and are included within the protected area boundary.

144. Finally, overlay a map showing different neighbouring habitats and extend the protected area boundary to include as many of these as is practical.

145. The buffer zone surrounds the protected area and is established to safeguard it from encroachment and to enable management of processes or activities which do or may affect the functioning of ecosystems within the protected area. Because of the transport of nutrients, pollutants and sediments over great distances by currents, buffer zones are exceedingly important in coastal and marine protected areas.

146. First, overlay maps showing watersheds, rivers, streams, lagoons and estuaries, wave action, cyclone damage, etc., as appropriate. If these open directly into the protected area as defined above, they must either be included in the buffer zone or must fall under some other management category. Next, overlay seasonal maps of currents and developments to identify upcurrent sources of potential stress, such as sewage outfalls, silt-laden streams and rivers, ports and dredged shipping lanes.

147. It may not be convenient to include these in the buffer zone. However, if the protected area is to flourish, or even survive, these current-linked areas must be managed according to stringent guidelines. In certain cases, such as for isolated oceanic islands or atolls, it is generally unnecessary to take such elaborate steps for the identification of buffer zone boundaries; indeed, in some cases there may be no need for buffer zones. Nevertheless, these steps are crucial for protected areas close to the mainland, island developments, oil and gas exploration and production sites, ocean dumping grounds, polluted rivers, harbours and shipping lanes.

148. Product: The process outlined above results in an area delineated to include a variety of representative habitat types that are important to community or species conservation. It comprises core areas and other zones to enable the simultaneous conservation of critical sites and the continued enjoyment and sustainable use of appropriate areas by people.

149. A management plan lays out a course of daily action in an explicit way to be followed by the manager. Also, it sets out a philosophy of management intended to guide managers in making decisions concerning actions not detailed in it.

150. Plans should identify their life span (3 to 5 years is the recommended period). It is of paramount importance that the plan never sets unattainable objectives in terms of management resources and authorities; to do so sets false expectations and almost certainly dooms the project to failure. Each plan should also include a mechanism for evaluation of effectiveness and consequent revision. Plans should contain enough flexibility to enable managers to modify certain activities based on experience and receipt of new data during the implementation phase.

151. An outline which should serve as a guide to the development of a marine or coastal protected area management plan is provided in annex IV. The sections of the plan outline are discussed below.

152. Executive Summary. This section should provide a concise statement of the site's major conservation interests and values, the problems, conservation needs, recommended action and a summary budget. Length should always be less than 2 pages, preferably 1. It is aimed at high-level decision makers, government administrators and politicians who often have little time to devote to scanning large reports. They should get the essential details (cost and justification) by glancing at the executive summary.

153. Introduction. This section is self-explanatory. It should contain an accurate, concise statement of the facts which define the foundation of the plan.

154. Regional Setting. This should include a brief background on the oceanographic-geographical, ecological-biological and socio-economic characteristics of the site. Included also should be its location relative to urban, research, educational and tourist centres, and the means of access.

155. Resources and Existing Uses. These sections should provide concise descriptions of area resources and past, present and planned uses. This material should be limited to only that which is relevant to management, i.e. used in the

evaluation of conservation value, needs and alternatives or the impact analyses, leading to the proposed management measures. The bulk of data collected during the earlier planning phase can be placed in appendices or made available in a separate report.

156. Existing Legal and Management Framework. Here all relevant legal instruments are listed and their relationship to the plan is discussed.

157. Threats and Implications for Management. This section presents the analysis of resource vulnerability in terms of existing and potential activities. Compatible and incompatible uses are identified, management solutions or mitigating measures for issues and problems are briefly outlined and the reader is directed to that specific section of the plan detailing such actions: boundary and zoning, new regulations, resources studies plan or interpretive plan.

158. The Plan. This is the most important section of the document. Each component category should be dealt with precisely and fully. A discussion of some of these categories follows.

159. Goals and Objectives. The use of these particular terms is not necessary as long as planning is carried out at the two levels. Management goals are long-term and somewhat open-ended, focusing on desired conditions rather than specific actions. Management objectives represent short-term, measureable steps toward fulfilling these goals. For example, a coral reef protected area goal might be to protect and maintain the integrity and natural quality of the coral reef system. One objective, then, might be to implement a specific programme to protect the benthic habitat from damage. Such a programme might include a boater's guide to safe anchoring procedures, reestablishing corals destroyed by visitor-related activities, placement of moorings at diving sites to prevent anchor damage and periodic closure of heavily used sites to enable recovery.

160. Advisory Committees. Such committees may or may not be appropriate to any given situation. They may be established at the beginning of the planning effort, prior to site selection, or they may not be called into play until a management plan is completed and ready for implementation. In some instances they are utilised only to evaluate the effectiveness of a plan of action after 1 to 3 years of implementation and to suggest appropriate revisions. The Seychelles National Environmental Commission is an example of one such advisory body. It comprises members from a range of related government departments, parastatal organizations and the private sector. The Commission advises on all matters concerning conservation and resource utilization.

161. Advisory committee members may be appointed by protected area management or elected from among the local community. In any case, they should represent the broad spectrum of key user groups. They serve a useful function because they ensure that the local populace will know, on a continuing basis, what is going on within the protected area and because they will very often provide the person-on-the-ground with useful information and recommendations. Once they become involved, the members also help to ensure support for the protected area since it tends to become "their" park. A word of caution: management must take care to be open and honest with committee members and always ensure that their advice is heeded and valued.

162. In some instances committees are established which will actually play an active role in management rather than serve in a purely advisory capacity. Such management committees, though good in theory since they represent the ultimate in public involvement, may be fraught with frustration and should be carefully evaluated before being suggested. Once established it is indeed poor public relations to

attempt to dissolve them and the project may suffer serious consequences. Such committees may tend to become immersed in day-to-day trivia and may paralyse needed actions and lose any national and/or international perspective.

163. Resource Studies Plan. Effective protected area management will depend heavily on data generated from research, monitoring and environmental assessment. A site-specific Studies Plan should first identify data gaps (i.e. data necessary for management decisions). For example, reef fish populations may be at very low levels and the manager suspects the cause to be fishing pressure. Rather than arbitrarily prohibit the activity without adequate data and thereby possibly alienate this user group, the Studies Plan would identify the information gap and present a study designed to provide the needed data. Such a study would focus first on monitoring of fishing activities (pressure points, activity levels, gear types, size of catch, species, economics). Ideally, a portion of the study area would be closed to fishing to enable monitoring of reef fish population recovery. Analysis of the data should enable the manager to propose and support any necessary controls on this activity.

164. The Studies Plan should rank the data gaps and studies in accordance with management needs and priorities. It should be emphasized that in most cases the managing agency will not be able to provide funding for all of these needed studies. It will fund those it can and seek other funding sources for the remainder. One relatively inexpensive way to obtain what is usually good data is to provide expenses to graduate students in return for their working on studies pertinent to the needs. A second method is to provide "seed" money (small grants) to university professors. This is often enough to allow them to undertake small discrete projects needed by managers. Also, once they have worked in an area they are more likely to spend other research money at the site which generates additional data of use to the manager.

165. Other management areas which might be covered in the Studies Plan could include:

a) carrying capacity of particular activities;

b) adequacy of buffer zones; and

c) status of resources.

166. Finally the plan should include mechanisms to enable the manager to co-ordinate and track other research which may be going on in the area and to review proposals and permit requests, and for stimulating information exchange and feeding data into the management and interpretive plans.

167. Interpretive Plan. The protected area movement stems from the need to manage human activities, particularly those which degrade the environment or deplete species stocks. Management of people through interpretation is generally one of the most important programmes for implementation in the protected area. It is through these programmes that one is able to enhance public awareness and understanding of the significance of different marine resources and the need for their conservation. An effective interpretive plan will greatly decrease the need for policing the protected area because once they understand the reasons for restrictions, people are more likely to comply with the regulations of their own free will. Interpretation is based on circumstances peculiar to a given site. For example, in designing the programme, primary consideration should be given to how and the extent to which an area can be used without damaging the very resources for which it was set aside. Considerations should also be given to whether the resources are more suitable to

direct visitor involvement (in the water) or indirect techniques of information (remote television, glassbottom boats, lectures, movies). The programme evaluates structured versus non-structured, active versus passive and consumptive versus non-consumptive techniques of informing the general public.

168. Interpretation can serve as a tool for translating research into information which is understandable and interesting to the public. It can be used to communicate the complexities of issues facing the manager of the protected area, such as user conflicts and the effects of pollution.

169. Administration. The administrative plan should be carefully co-ordinated with management goals and site objectives to ensure that these can be attained within the specified time-frames. Administrative development should be phased reasonably over the life-span of the management plan. Even where money is no object, it will generally take 2 or 3 years to reach optimal operation levels. The first year of operation often may be a one person effort. If so, this should be carefully stated in the short-term objectives in order to avoid raising false expectations and setting up the project for criticism and perhaps failure.

170. Surveillance and Enforcement. An enforcement programme is especially important in the early stages of development, even before the interpretive programme begins to take effect. Depending on the circumstances at each site and in each country, enforcement officers should initially employ the "soft-glove" approach if possible, with explanations and warnings for first offences. This section should describe, in phases if appropriate, the enforcement approach, the number of rangers and their stations, and the area and timing of their patrols. It should contain a statement on the enforcement policy.

171. Evaluation. Evaluation should be a continuous process which begins with implementation, if not before. It is the basis upon which managers make their day-to-day decisions and is one of the reasons for keeping plans flexible enough to enable necessary shifts in direction. In most instances a formal mechanism or procedure is desirable. One approach would be to require the advisory committee to conduct a major review of the effectiveness of the plan at the end of its lifetime and recommend revisions of management procedures. "Mini-evaluations" would be conducted at the end of each year if circumstances warrant them (e.g. where budget proposals have to be submitted annually). This will depend on the amount of detail contained in the original plan. The more detailed the plan, the more necessary it is to revise it. Broader management frameworks are less likely to require frequent revision.

172. Evaluation provides an excellent opportunity for public involvement, again depending on the particular circumstances of each country. It can reinforce the feeling that people have a role in management of an area; it allows the manager to see clearly how his/her efforts are perceived by the public; it enables formal suggestions from on-the-ground users; and it feeds back into the interpretive programme.

173. In addition to public involvement, the management agency may wish to set up an evaluation team consisting of managers from other protected areas to provide a more technical and objective review of management effectiveness. Whatever mechanism is utilized, it should be emphasized that the process of evaluation and revision is essential to a dynamic management system.

174. The implementation of these and other management tactics is discussed in greater detail in the following section.

Step 6: Implementing area management

175. The principles underlining this step are outlined below. In most cases successful implementation of management of coastal and marine protected areas will depend on the existence of a single agency with the power, motivation and resources to carry out the task, or to ensure that the task is carried out.

176. The lead or responsible agency must have clearly stated objectives, responsibilities and powers, administrative and technical expertise, and a clear definition of its relationships with other agencies.

177. Consultation between the lead or responsible agency and user groups and the public is essential in planning and management. Such consultation may be with the general community, or with community leaders where they traditionally have sole decision-making rights.

178. The lead or responsible agency should have the power and expertise to carry out or arrange for research and surveys relevant to planning and management.

179. The implementing agency must obtain control over the protected area. If legislation for control cannot be achieved, a special agreement between the owner and the responsible agency may allow the effective implementation of conservation management in an area.

180. Successful management of protected areas depends to a large extent on the degree to which it is possible to achieve control over adjacent areas.

181. Marine and coastal protected areas will often permit certain uses on a sustained basis. Management requires maintaining control over the different types of use by direct responsibility of a specified agency.

182. The revenues from certain types of use, notably tourism or fishing licences, can become an important source of income to protected areas. However, care should be taken that protected areas do not become excessively dependent on these revenues for their operation and management, since this could result in a conflict of objectives.

183. The success of management depends to a large degree on local and public support. This is because public support, which can be regarded as a sign of understanding and awareness of conservation objectives, leads to adherence to the protected area rules by the local population. Also, personnel contraints will often require the assistance of volunteers from the public. Local public support can be secured by providing benefits to the local people, for example by providing employment.

184. It is entirely within the concepts of certain categories of protected areas that the traditional fishing, hunting and other activities of local peoples should be protected. However, such activities can lead to considerable conflicts of interest.

185. Legislation is useless unless there are ways and means to ensure that its provisions are carried out.

186. Marking of marine protected area boundaries is usually difficult, unnecessary and expensive to achieve and maintain. However, strategically placed markers, signs or buoys can assist enforcement activities by restricting visitors to trails and reminding them of zoning regulations.

187. Management mechanisms do not need a plan to begin, but it does need one to develop. When circumstances (shortage of funds, time or personnel, all of which are real problems in the region) prevent the preparation of a plan, management of obvious activities in a protected area should begin at a low level. The management staff can begin to formulate the plan themselves, as a part of their brief.

188. A special agency, such as a marine park management authority, may be created for the management of marine and coastal protected areas. In the long term this can be effective, but it is usually expensive to set up and slow in its initial achievements. The nomination of a suitable existing agency (Wildlife and Conservation or National Parks Department), such as exist in all countries of the region except the Comores and possibly Somalia, to lead a co-operative management arrangement can be more efficient in terms of time, human resources and cost. But it needs to be given the required human, technical and financial resources and it has to have the motivation to carry out the conservation management function.

189. It is generally unnecessary that the lead or responsible agency carry out or fund all of the research. Establishment of consultative arrangements with research funding agencies can result in some of the necessary research being carried out at no cost to the lead agency. However, the responsible agency should undertake or fund necessary research and surveys which no one else will carry out.

190. Marine and coastal protected areas cannot be managed in isolation of their surrounding areas. Conflicting uses can be avoided if the protected area is part of an overall marine or coastal resources development plan, or if it is a multiple use area incorporating zones with different levels of use and protection. Establishment of mechanisms (such as management co-rdinating committees) for co-ordination of management of adjacent areas, one of which is the protected area, can contribute to compatible management.

191. It is desirable to achieve control through ownership or legislative control over bordering areas. If not already included in the plan, buffer zones can be established to assist achievement of control. These are areas in which certain activities are restricted and only those developments allowed that are considered to be compatible with protected area objectives. Thus dredging may be prohibited in the buffer zone of a coral reef reserve, or restricted to times of the year when currents carry turbid water away from the reefs. Similarly, polluting forms of industry may be prohibited in the buffer zone of an estuarine reserve, but certain forms of mariculture (oyster farming) may be considered compatible.

192. All areas that may have linkages with the protected area should be examined carefully and maintained regularly. Changes in remote areas can sometimes affect coastal or marine systems (e.g. deforestation leading to increased sedimentation, pollution by industries inland along major rivers).

193. To control the different types of use in a protected area, certain activities can be prohibited by legislation, or by agreement with owners where legislative control of the area is not established. Interpretive programmes will help users to understand why limitation and control of use is essential. Continuous monitoring of the impact of use is required to enable corrective measures.

194. Uses can be controlled by concessions and permits to users, or by gear limitations or catch limits. This applies in principle to both extractive uses (e.g. the recognition of exclusive fishing rights for local people) and non-extractive uses (e.g. concessions to charter operations to transport a limited number of visitors into protected areas). The impact of non-extractive uses can be controlled by the provision of facilities such as moorings, docks, walkways and others.

195. Local people can be involved in a protected area by creating job opportunities for them, both directly and indirectly, through employment in the protected area and through related facilities and services. If the local communities have traditionally managed their marine resources for sustained use, they can be given the responsibility for continued resource management. The village heads would become official law enforcement officers. There appear to be no examples of traditional resource management for sustainable harvest in the East African region. However, examples may arise as additional attention is paid to the marine environment.

196. Educational programmes can be used to create understanding of the need for conservation among local people. Special programmes directed at school children can be particularly beneficial. Film and video makers and publishers can be encouraged to produce material on the protected areas. The Seychelles government produces brochures for most of its protected areas. An excellent guide to the Malindi-Watamu Marine National Parks and Reserves has been published in Kenya. In addition, local tourist guides can be trained to become voluntary protected area interpreters in their communities.

197. The different traditions in each country require different techniques of law enforcement. In general, the major means should be public education and enlisting the help of user groups in management as discussed above. More indirect, subtle and less regimenting measures should be tried before using more regulatory or sanction-based actions. However, it is essential that regulations provide adequately for the powers of enforcement by protected area personnel and for penalities.

198. In the past throughout the region, it seems that the sterner methods of enforcement have been felt necessary. This is perhaps a perception inherited from previous administrations who paid too little attention to the need for working with local people during the establishment of a protected area. Public attention can be drawn to regulations through local news media, community leaders, visitor brochures and visitor information centres.

199. Protected area personnel need to be carefully trained to carry out law enforcement functions in ways which are effective but which do not cause unnecessary public antagonism. Consistent guidelines should be developed for them on how to respond to the type of offence encountered (e.g. cases where arrest would follow without exception, and cases where the giving of a warning is sufficient).

200. In most countries of the region, the concept of marine and coastal protected areas will be new. In such cases, community suspicion of the management authority may be high, especially if there has been little contact with local residents during the establishment phases of the protected area. Therefore, it is particularly important that the first enforcement action in the area be carried out under the highest professional standards. The first arrest (or other enforcement effort) will leave a lasting impression on the community and must be done so as to illicit respect, not resentment or animosity.

201. An important component of enforcement, particularly in the widespread island States, is inspection. The power of inspection can lead to marked improvements in compliance with regulations.

202. Enforcement may be aided by zone demarcation and signage. Mooring buoys provide a useful means of demarcating snorkelling and diving sites and preventing anchor damage. Refer to Salm and Robinson (1982) for information concerning mooring buoy designs, placement and maintenance.

203. Marking of marine protected area boundaries with buoys is an impractical undertaking. The ecological boundary of the site should be determined and its buffer zone or outermost boundary should be extended to 2 or more kilometres seawards of this to facilitate the control of poaching. Critical areas (e.g. boat channels, dangerous reefs), may be marked by colour-coded buoys.

PROSPECTS

204. Throughout the region there is the scope for tremendous advancement in marine and coastal conservation. If programmes are initiated in early 1984 following the steps outlined above, it is feasible that by 1994 each country will have established a comprehensive network of marine and coastal protected areas which meets both national and regional requirements.

205. The preparatory arrangements and development of appropriate legal and institutional frameworks (steps 1 and 2) should take less than 2 years. During this time systems planning (steps 3 and 4) can begin. This step should be complete by the end of year 3. Establishment (steps 5 and 6) should begin as soon as possible for proposed areas and areas of known conservation value; however, it begins formally in the fourth year, after the completion of the systems plan, and continues through the remaining years.

206. Targets, conforming to programme policy and objectives, should be set each year for the number of different protected areas to be identified, declared and established. As the latter activity is more time consuming and expensive, in the early years more sites will be declared than can be established. For example, the annual goal may be to declare 5 new areas; but establishment may begin with only 2 areas in year 2, and 3 areas in each of the third and fourth years, and so on.

207. Programme policy determines which 5 areas will be declared each year and the order in which they will be established. For example, in the first year there may be 2 fisheries reserves (1 coral reef and 1 estuary-mangrove), 1 for tourism (coral reef or bay), 1 scientific reserve (coral reef, mangrove or other for research, education or preservation of genetic and biotic resources), and 1 regionally important site (unique habitat or species, critical habitat of shared resources, high productivity area).

208. It would be advantageous initially to establish examples of protected areas with different objectives as show-case sites. These can be used experimentally to identify the kinds of management problems associated with each type of area, and to develop means of resolving them. Regional co-operation will help here: if efforts were co-ordinated so that each country undertook to establish a different type of protected area within an agreed time-frame, the difficulties and discoveries encountered could be shared and all countries would benefit from their collective experience. One means to share experience would be for formal arrangements to be made for the training of personnel of one country in an established protected area type of another.

209. The countries of the region clearly stand to benefit through co-operation. UNEP should continue to undertake a co-ordinating function in both the location and distribution of funds, the provision of advice and technical assistance drawn from appropriate sources, the development of a systems plan for the region, and in the convening of periodic workshops to review progress and share experience.

210. With so much yet to be done in the countries of the region, it is imperative to define priorities for funding. It is recommended that each country prepare a programme outline (based on the guidelines above) indicating the timing and quantity of required financial and technical assistance, and of the country contributions. Priority should be given to activities that achieve direct conservation action (e.g. assistance with design and establishment of protected areas), the purchase of necessary equipment, regional training tours for protected area personnel, and workshops designed to co-ordinate regional activities and to share knowledge and experience. The demands for technical advice are likely to be great, similar and from all countries. For this reason it would seem most effective for UNEP to establish a regional activity centre to provide the co-ordinating and advisory service.

PART III: COASTAL AND MARINE HABITATS OF THE EAST AFRICAN REGION

INTRODUCTION

211. Because so little is known about marine and coastal habitats and because of the complexities of managing areas which span so many jurisdictions (some wet, some dry), little progress has been made in the study and management of these environments relative to those further inland. Thus the first problem to be faced is the identification and classification of marine and coastal habitats, including their size and location and the study of their uses, values, threats and conservation needs. Next, there needs to be development of appropriate legal and institutional frameworks to manage these areas. Finally, the task can begin to select representative sites for protection and to implement management of them.

212. Brief introductory descriptions of the coastal zone environment are given in the UNEP Regional Seas Reports and Studies series Nos. 6, 8 and 10. The geography, geomorphology and geology of the coastal zone and marine environments, and a preliminary classification of the habitats with an introduction to their included biota, are provided in Report No. 11. This is repeated in summary form in Report No. 12, and is revised and expanded in the present document.

213. In response to requests by the national experts in the region, an attempt is made here to define the landward and seaward limits of the coastal zone for coastal and marine conservation purposes.

DEFINING THE LIMITS OF THE COASTAL ZONE

214. Definition of the limits of the coastal zone is a difficult task which is complicated by poorly understood ecological processes, unknown geological processes, and entrenched administrative institutions. Thus the challenge is to define both an ecological and manageable unit without compromising too much of one or the other.

215. If we were to take the broadest ecological interpretation of the coastal zone as that area which is influenced by or which influences the sea, we would inherit an impractically large range of habitats and species. Many of these have no obligate link with the sea, and are well protected, managed or accounted for under long-established traditions of totally land-based legal and administrative institutions.

216. To attempt to redefine these established institutions to achieve better ecological harmony with the coastal zone would almost certainly be counterproductive. It would seem more sensible for the scope of the East African Regional Seas Project to be defined by those portions of the national territories which traditionally have received least attention: namely, the seas, offshore islands, littoral and adjacent coastal habitats.

217. For the purposes of this report, the coastal habitats, species and resources of the East African region are confined to the following areas: the western Indian Ocean extending from 200 nautical miles east of the easternmost islands to the East African coast ending arbitrarily at the southern border of Mozambique and in the north of Somalia, and extending inland to include dunes and lowlands, estuaries and

swamps to the limit of salt water intrusion and measurable influence of salt spray. Inland lakes and salt pans which are not connected to the sea are excluded from the coastal zone as defined here. Freshwater marshes, other than reed beds and swamp forests in association dundes, estuaries or mangroves, are also excluded from the coastal zone.

218. The objectives of this definition are to stimulate action which complements rather than conflicts with established programmes and institutions, and to redress the relative lack of conservation action in the marine and littoral fringe environments. There is the distinct danger that a broader, perhaps more ecologically sound, definition would result in a course of action guided more by convenience than conscience: that is, efforts are likely to be concentrated inland where knowledge is greater, institutional arrangements less complex, action easier, and success more assured.

219. It is important to emphasize the link between inland areas and the coastal zone, and the susceptibility of habitats in the latter area to mismanagement of activities in upland areas. A classic example is flooding and siltation of estuaries, inshore waters and coral reefs caused by increased runoff and erosion in deforested areas of watersheds. The management requirements of coastal habitats must be considered case by case; where necessary, management should extend inland beyond the limits of this rather narrow definition.

CLASSIFICATION OF HABITATS

220. There are two general approaches to habitat classification. The first uses geomorphological characteristics to identify environments and biotic communities and to differentiate their habitats on the basis of the type of community. These environments and habitats may be repeated at other sites and in other biogeographic divisions. They are not necessarily unique. The component communities will have essentially similar compliments of species at different sites within a biogeographic province, but species may differ among provinces. This is the generic approach to classification.

221. The second, or genetic, approach uses biological and environmental criteria to identify discrete biogeographic units on the basis of their contained biota. The product is a map of biogeographic provinces and units, each of which has a unique set of species. This approach requires a thorough knowledge of the species composition of communities and their distribution throughout the region. This latter genetic approach is the one used to define terrestrial biogeographic provinces.

222. Many coastal zone habitats may be too small to enable mapping by the genetic approach at a reasonable regional scale. Besides, our knowledge is too scant to attempt this in most countries on a national, or even provincial, scale. Pragmatism and circumstance require that we use the generic approach to classify coastal zone habitats of the region, hoping that when more data become available the genetic approach will be applied.

223. A proposed classification of coastal and marine environments of the East Africa Regional Seas Programme area is presented in table 1. The countries in which each habitat type occurs is also indicated in the table. Detailed data sheets for each habitat type are appended in annex VI to this report.

CASE STUDY: A CLASSIFICATION SCHEME FOR COASTAL AND MARINE HABITATS OF MOZAMBIQUE

224. Tinley (1971) has attempted a thorough analysis of the coastal environment of Mozambique. This analysis focused on the littoral and adjacent terrestrial habitats and produced a comprehensive classification of these.

225. Tinley first describes the geology and geomorphology of the coast and from this develops a coarse-grained classification of three main natural regions: Northern (faulted, embayed coast with coral-rock cliffs and fringing coral reefs); Central (swamp and estuary barrier coast with simple or arcuate beaches); and Southern (parabolic dune coast with dune rock at intervals forming north-trending capes and large barrier lagoons and lakes). Associated with the Central swamp coast are the delta coasts at the mouths of the Zambezi and Save Rivers. These three regions correspond to three coastal environments:

a) coral coast (north);

b) swamp coast and deltas (central);

c) parabolic dune coast (south).

226. Next Tinley describes the natural systems and achieves a fine-grained classification for terrestrial systems extending to 40 km inland from the littoral. This classification, simplified to include littoral and adjacent habitats, illustrates the application at the national level of the classification scheme proposed in table 1 (annex V).

REGIONAL DISTRIBUTION OF HABITATS

227. Although incomplete due to lack of information, the coarse-grained classification offered in table 1 yields some obvious observations. A total of 13 (34 per cent) of the environments and habitats are found in all States of the region: sand beach, rocky and cliffed shores, bay, coastal plain, island, continental shelf soft bottom, continental slope, algal beds, seagrass beds, coastal shrublands, reef-associated lagoons and fringing coral reef. They probably all also have patch reefs, but the presence of these in Somalia needs to be confirmed. Estuaries and mangroves are found in almost all countries. However, these are very small and have a low diversity of species in Mauritius, Comoros and Seychelles. A total of 33 (87 per cent) of the habitats occur in Mozambique, including 2 of the 3 unique habitats (table 3).

228. The sabellariid reefs of Inhaca Island and Paisley Seamount, both in Mozambique, are the only examples of their kind in the region. The atoll is the third unique habitat type. It is well represented by both sea level and raised examples in the Seychelles.

229. A finer grain classification than that in table 1 would enable habitats (e.g forest types, fringing reefs, beaches, mangroves, algal and seagrass beds) to be subdivided by species assemblages as was done for Mozambique. This would almost certainly yield more examples of unique habitats or of those whose distribution is limited to one country.

SPECIAL INTEREST HABITATS

Habitats of regional importance

230. Habitats of regional importance include the critical habitats of shared resources. These would include sources of nutrients (organic detritus, dissolved organic compounds, fixed nitrogen and other essential minerals or compounds), propagules (eggs, larvae, juveniles) and the staging, feeding or breeding habitats of species (turtles, fishes) which move or are transported by currents across national boundaries. An example would be the estuaries and mangroves of western Madagascar which appear to function as important nurseries for shrimp caught off the adjacent Mozambique coast. The movements of organisms, but particularly of nutrients (and pollutants) and propagules, are essentially unknown.

231. A sample of critical habitats of regional importance include turtle nesting and feeding sites; dugong mating, calving, shelter and feeding sites; seabird nesting areas; shrimp, crab and fish spawning, nursery and feeding grounds. The significance of these critical habitats in the regional perspective has yet to be investigated and demonstrated.

232. Unique habitats should be considered to have regional importance. History has determined that the various unique habitats fall under the custody of two States: Mozambique and Seychelles. Along with these habitats the two States have inherited the regional obligation to mankind to ensure that the present and potential values (cultural, scientific and economic) of these unique areas are not lost or diminished.

233. Areas which are unique because of a concentration of interests include Aldabra Atoll (Seychelles) and Inhaca Island (Mozambique). Aldabra was declared a World Heritage Site in 1982 in recognition of its tremendous scientific value. Its complement of endemic species (including the Aldabra rail, which is the last survivor of several flightless bird species of the Indian Ocean, and the giant land tortoise), the large nesting populations of green turtles and seabirds, and its varied, abundant and essentially undisturbed marine life, all combine to make this the world's most scientifically interesting atoll. Inhaca Island is unique for its variety of coastal and intertidal habitats and the associated abundant and diverse biota. These include tropical, subtropical, temperate marine and brackish water (with occasional freshwater) representatives. The island is uniquely well-suited for biosphere reserve status. There is a well-maintained research station on the island with a long history of research. It would be difficult to exaggerate the value of the island and its research station for education and training.

Habitats of national importance

234. The most obvious of the nationally important habitats are the critical habitats of commercially valuable species. These merit highest priority for immediate conservation action. That fisheries are being developed without concern for the processes and habitats which sustain them, says much about our lack of informed concern for the sea.

235. With few minor exceptions we have shifted a terrestrial perception of wildlife management seawards to manage fishery stocks. But there should be differences in the principles governing management of stocks in such disparate environments. Terrestrial systems are more closed and self-contained; thus a rangeland is managed in such a way as to increase its carrying capacity, whereas fishery stocks are managed not to exceed it. A slight modification of this principle has been applied

in management of fish stocks. The "carrying capacity", i.e. the total potential yield under current ecological constraints, is estimated for a particular environment or habitat and the maximum sustainable yield is determined on this basis. But marine systems are open-ended: matter in the form of particulate and dissolved organic and inorganic nutrients and organisms pass through marine habitats. Through this process the habitats are linked into vast, poorly defined systems which are themselves linked by currents to neighbouring systems. Bearing in mind these principles of open-ended systems and linkage among them, it is inconceivable that a fishery stock can be effectively managed on the basis of catch limits in one area and at one phase in the life cycle of the species. Management must extend to the support systems of the stock. However, no attempts are being made to manage the underwater equivalent of "rangeland", or to safeguard the support systems. Not doing so is analogous to sitting at the end of a branch picking fruit while the forces of development are steadily sawing through the branch at its base. A crash is inevitable.

236. Estuaries, mangrove forests, coral reefs, seagrass beds, submarine banks, plateaux, rocky reefs and upwellings are all important habitats for fisheries. They all need conservation management. Dunes, seashore habitats and fringing reefs are important buffers against coastal erosion. They also should receive high priority for conservation.

ADDITIONAL CONSERVATION NEEDS

237. It is true throughout the region that there is little knowledge of marine habitats. Research has tended to focus more on the characteristics of the study site than on an analysis of its characteristics in the regional context. There is the need for classification of coastal and marine habitats at both the national and regional levels so that there can be an assessment of their representation in protected areas.

238. Following classification, there is the need for investigation of the role of different habitats in the Indian Ocean system and in sustaining both national and regional resources. It is a misconception to assume that resources with clear but limited national value have no regional importance; all resources which contribute to national economies ultimately contribute to regional stability through lessened dependence on imports.

239. Other obvious research questions that arise are:

a) which species characterize different environments, such as the continental slope, abyssal plains and Paisley Seamount?

b) can the western Indian Ocean be divided into distinct biogeographic units?

c) by which mechanisms can the resources of the deep marine habitats be investigated, conserved and harvested for the benefit of the States of the region?

240. The investigation of coastal and marine habitats and their included resources, their classification, conservation and management are fields that will require expertise, funds and equipment which simply do not exist everywhere or in sufficient quantity anywhere in the region. Thus there is the need for outside assistance in the form of funds and personnel.

241. Deep sea research and investigations are expensive to conduct and require specialized equipment; it is for this reason that the deep sea environments of the region remain unexplored and unlikely to be explored in detail for many years to come. At the moment, the need for action in the latter environments is considerably less than in the inshore and littoral areas.

242. The governments of the region need to recognize the value of the shallow coastal and littoral environments. Next, they need to commit themselves to a programme of sustainable development in these environments through implementation of effective conservation.

PART IV: MARINE AND COASTAL SPECIES OF THE EAST AFRICAN REGION

INTRODUCTION

243. There are species which roam throughout the Western Indian Ocean being harvested at different phases of their lives by the countries of the region. These are shared species which form part of the natural heritage resources of the region. At the other extreme, there are species whose entire populations are confined to small areas on an island or in a coastal forest. These are the endemic species which form part of the national natural heritage. However, as the unusual species of the region they may also be considered as contributing to the regional heritage. Some species are confined to specific coastal zone habitats but not to specific countries, while some are threatened by overexploitation or habitat encroachment and alteration, with consequent local or total extinction. Clearly, there are several categories of species which each have their own specific conservation problems and needs. But knowing the species in each category is the crux of the problem. Knowledge of marine species and the smaller taxa of littoral and adjacent habitats is so sparse, that many may follow the path of the dodo before they are discovered.

244. There is the obvious need to identify and prepare an inventory of species of the region and to determine their distributions, population sizes, values, threats and conservation needs. Wildlife and fisheries agencies of the region need to get together to locate the critical habitats of shared, threatened, commercial, endemic and over-exploited species. They also need to work together to manage these heritage resources.

245. Examples of marine species include those which are wholly marine (whales, marine fishes, seagrasses); those which move among marine, estuarine and freshwater habitats (dugongs, penaeid prawns, anadromus fishes); those which live in the sea but have a critical habitat on land (turtles); those which live in the intertidal zone (oysters, limpets, mangrove trees) or visit it to feed (shorebirds, the skink Ablepharus boutonii, littorinid snails); and those which live predominantly out of the sea but have a critical habitat there (seabirds, Madagascar sea eagle, mangrove kingfisher).

246. The definition of coastal species is less obvious, particularly as many species found in coastal habitats are not necessarily confined to the coast. In this report coastal species refers to those which are either obligate inhabitants of coastal habitats (i.e. confined to these areas) or those which have critical habitats (feeding, breeding, birthing, shelter or nursery sites) in estuaries, brackish coastal lagoons or terrestrial coastal habitats.

247. Examples of coastal species include obligate residents of coastal habitats (Zanzibar red colobus, coastal suni, plants of the seashore, dunes and salinas); those which are not confined to coastal habitats but have a critical habitat there (wattled crane and white pelican in Mozambique, butterflies which migrate seasonally to coastal forests); and those endemic to small islands (Round Island geckos and palms, Aldabra giant land tortoise and flightless rail, Seychelles brush warbler and magpie robin).

248. It is generally true that marine species have been little studied and we are ill-equipped with basic biological data to conserve them. However, the small and inconspicuous terrestrial species of the coastal zone (butterflies, and other insects, small mammals, reptiles, etc.) are probably even less known.

249. This report considers the following marine and coastal species of the East African region: those which are endemic to the area or parts of it; those which are listed in the IUCN Red Data Books under one of the several categories of threat, or are proposed for inclusion in the books; those which are migratory and have their critical habitats spread among two or more countries; those commercial species which are threatened by over-exploitation or habitat degradation; and other obligate coastal species.

ENDEMIC SPECIES

250. As expected, the island States have most of the endemic species (table 3). However, it is difficult to draw any conclusions from this table as our knowledge is so incomplete and differs greatly among the countries. Kenya apparently has more endemics than the other mainland countries, but this high number more certainly reflects the quality of research conducted through the Nairobi National Museum than it represents the comparative richness of endemic species. A list of known endemic marine and coastal species is presented in annex VII.

ENDANGERED, THREATENED OR RARE SPECIES

251. IUCN has compiled lists of threatened species under one of several categories in a series of Red Data Books. The Red Data Book categories are used to indicate the degree of threat to individual species in their wild habitats. They are used for both fauna and flora. The categories of threat used in this report are defined below.

Extinct (Ex)

252. This category is used only for species which are no longer known to exist in the wild after repeated searches of the type localities and other known or likely places. As interpreted by IUCN this includes species that are extinct in the wild but surviving in cultivation.

Endangered (E)

253. Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating. Included are taxa whose numbers have been reduced to a critical level or whose habitats have been so drastically reduced that they are deemed to be in immediate danger of extinction. This is interpreted to include species with populations so critically low that a breeding collapse due to lack of genetic diversity becomes a possibility, whether or not they are threatened by people.

Vulnerable (V)

254. Taxa believed likely to move into the Endangered category in the near future if causal factors continue operating. Included are taxa of which most or all the populations are decreasing because of over-exploitation, extensive destruction of habitat or other environmental disturbance; taxa with populations that have been seriously depleted and whose ultimate security is not yet assured; and taxa with populations that are still abundant but are under threat from several adverse factors throughout their range.

Rare (R)

255. Taxa with small world populations that are not at present Endangered or Vulnerable but are at risk. These taxa are usually localized within restricted geographical areas or habitats (e.g. endemic to small islands) or are thinly scattered over a more extensive range.

Indeterminate (I)

256. Taxa thought to be either Extinct, Endangered, Vulnerable or Rare but where there is not enough information to say which of the four categories is appropriate.

Insufficiently known (K)

257. Taxa that are suspected but not definitely known to belong to any of the above categories because of lack of information.

Commercially threatened (CT)

258. Taxa not currently threatened with extinction but most or all of whose populations are threatened as a sustainable commercial resource, or will become so unless their exploitation is regulated. As interpreted here this includes species which have, or are thought to have been overexploited to the point of local extinction.

259. The Red Data Book category, distribution and protection status of species of the East African region are listed in annex VIII. Annex X is a summary of data available for each species. Specific examples of species in each category can be found in annex VIII. However, extinct species (such as the dodo of Mauritius or the green parakeet Psittacula eupatria and chestnut-flanked white-eye Zosterops mayottensis semiflava of Seychelles) are not listed. Listed as "Ex" are those species which have local extinctions of populations (e.g. dugong and coconut crab).

260. There are 15 species in the region which are known to be Endangered. These include 2 whales (blue and humpback), 1 antelope (Zanzibar suni), 2 prosimians (aye aye and black lemur), 7 reptiles (green, hawskbill, ridley and leatherback turtles, Round Island boa, Round Island keel-scaled boa and Madagascar tortoise), and 3 birds (Seychelles magpie robin and turtle dove and Madagascar fish eagle).

261. There are 5 Vulnerable species, including 2 mammals (dugong and Coquerel's lemur), 1 bird (wattled crane) which is not confined to coastal habitats but nests in the Save River delta in Mozambique, 1 reptile (loggerhead turtle), and the Comoro graphium butterfly.

262. A total of 21 species are listed as Rare, including 2 mammals (Zanzibar red colobus and Nosy Be sportive lemur), 10 birds (4 from East Africa and 6 from Seychelles), 6 reptiles (3 geckos, 2 skinks, and Aldabra giant tortoise), and 3 invertebrates (triton's trumpet, coconut crab, and tenebrionid beetle).

263. Six species are Commercially Threatened: the commercial trochus and green snail, pearl oysters, spiny lobsters, and black and whip corals.

264. The remaining 9 species are listed as Indeterminate, Insufficiently Known or have not been assigned a category.

SHARED SPECIES

265. This category includes all migratory species (such as shorebirds, whales, tunas, billfishes, other pelagic fishes, many seabirds, turtles and dugongs). All of these species fall into one of the other groups. However, to emphasize the need for regional management of marine resources, it is worth repeating that many marine species move across national boundaries. They may even have their critical habitats spread between two or more States.

266. Dugongs evidently move along the coast, traversing country borders, but the species has been so little studied that the extent of its migrations is unknown. It is known that turtles breeding on Europa Island move to feed off western and southeastern Madagascar where they are hunted. Northern Mozambique and Tanzania are important feeding grounds for loggerhead turtles nesting in southern Africa.

267. It is highly likely that the East African Coastal Current, Mozambique Current and Madagascar Current influence the distribution of marine species in the East African region. They almost certainly transport quantities of nutrients, eggs, larvae, juveniles, organisms and pollutants from one country to the next.

SPECIES THREATENED BY OVER-EXPLOITATION, HABITAT DEGRADATION OR POLLUTION

268. The most obvious species in the over-exploited category are the large whales (blue, fin, humpback) spiny lobsters (Panulirus spp.) and seashells (particularly green snails, pearl oysters, large tritons, murexes, cones, cowries, helmets and conchs). Table 4 lists a typical range of shells sold in markets. There are probably several stocks of commercial fishery species threatened by over-exploitation.

269. Species threatened by habitat destruction and pollution include all species on Mauritius which live or breed in brackish water (notably Macrobrachium lar, penaeid prawns, mullets, oysters) because of periodic pollution of streams and rivers with industrial and agricultural wastes and chemicals. In Kenya, construction of a dam on the Tana River threatens to sever the migration of 3 species of Anguilla eel which move downstream to spawn.

270. The gallinule (Gallinula chloropus) and black marsh terrapin (Pelusios subniger) are threatened in Seychelles by the draining and filling of marshes for agricultural use or private land winning.

OTHER OBLIGATE COASTAL SPECIES

271. Included in this group are species which do not fall into any of the above categories, or taxa with species which do and others which do not qualify for one of the preceding categories (e.g. seabirds).

272. The lizard Abelpharus boutonii is an example of a common species which is confined to the coastal zone. It lives on rocky intertidal platforms behind reefs along the African mainland. The greater flamingo and white pelican are also included because certain populations nest and feed in coastal habitats.

273. A list of bird species which qualify for inclusion in this group is presented in annex IX.

THE CONCEPT OF CRITICAL HABITAT

274. Throughout all phases of its life an organism occupies a habitat. For some species this may not change from one phase to the next. For example, an organism like the Round Island boa may be conceived, grow, mate and finally die all in the same habitat. Others may move great distances in one phase and be totally sedentary in another, such as oysters with planktonic larvae or the Barringtonia tree whose seeds are dispersed by currents. Some species may deliberately move from one habitat to another at different phases of their lives to perform different functions. Thus a green turtle may move to a seagrass bed to feed around high tide or at night, wait off beaches to mate, and crawl onto them to lay its eggs.

275. Certain life functions require specific habitats. These are the "critical habitats," i.e. the specific feeding, mating, spawning, birthing, nursery, nesting, shelter or moulting sites, and migration routes. Species conservation requires more than the usual fisheries approach to stock management through catch and size limits, seasonal closures and control of harvest techniques. It requires protection of the full range of critical habitats used by a species.

CONSERVATION NEEDS FOR MARINE AND COASTAL SPECIES OF THE EAST AFRICAN REGION

276. Where conservation and wildlife management institutions have evolved, there has been, understandably, a concentration on the more visible terrestrial species. Studies of marine organisms have been sporadic, short-term, and under taken in the main by visiting scientists whose interest and expertise leave with them. There are few people resident in the region who have detailed knowledge of marine species and their conservation needs.

277. While almost non-existent in the other countries in the region, the knowledge of coastal species is fairly complete for some taxa in Kenya, Mauritius and Seychelles. Kenya is probably best equipped with institutions to conserve coastal species; because of the Nairobi National Museum, it is certainly the best suited to investigate these species.

278. Modern research has moved away from surveys for the inventory of species to the more detailed study of species associations and distributions within habitats or similar localized areas. The former task is relegated to museums (where they exist), which have suffered severe cuts in funds and personnel in recent years. Consequently, marine and coastal species continue to remain largely overlooked.

279. Arising from the disparities in knowledge, appropriate personnel and institutions among the East African States, some clear conservation needs have evolved for marine and coastal species. These will involve both national and co-operative regional action to:

a) survey marine and coastal environments;

b) determine the occurrence and distribution of marine and coastal species, including nearshore and pelagic species;

c) identify and protect the critical habitats of marine and coastal species; and

d) manage shared resources.

280. These needs are discussed briefly below and in greater detail in part II of this report. The management of critical habitats is important, in fact vital, in species conservation.

NATIONAL ACTION PRIORITIES

281. There are three principal conservation objectives in need of national action. These are:

a) protection of endemic species and their critical habitats (safeguarding of national heritage);

b) protection of the critical habitats and support systems of harvested species (securing continued benefits from resources); and

c) protection of the critical habitats of shared, endangered, threatened and rare species (fulfilling the regional obligation toward safeguarding of regional heritage).

282. Fisheries and wildlife agencies should collaborate to identify the critical habitats of endemic, threatened and commercial species. Development priorities cannot ignore conservation of the support base for resources (i.e., nutrient sources and critical habitats). Conservation is usually considered an action which has benefits developing in the long term, and hence is less urgent, whereas the needs are for more immediate benefits. However, this is a false assumption. Protection of the support systems helps to maximize and protect both short-term and long-term benefits. Clearly, all States should make conservation of the critical habitats of commercial species a highest priority action.

283. Commercial species have an obvious value. Nonetheless, they should not be allowed to eclipse other species whose values are more cultural than economic, or more subtle than merely monetary. To justify ignoring the mind by feeding the body is an outmoded tactic. Nurture of natural and cultural heritage can only help to develop national identity. Thus, the discarding of national inheritances (such as endemic species or those which are already rare because of earlier mismanagement) erodes natural heritage, weakens national identity and helps create an inspirational vacuum. For this reason it becomes important for States to safeguard their national treasures and to rescue those previously depleted.

PART V: MARINE AND COASTAL PROTECTED AREAS OF THE EAST AFRICAN REGION

INTRODUCTION

284. The maintenance and development of resource uses in marine and coastal environments requires that some areas be retained in their natural state. Safeguarding critical habitats for fish production, the preservation of genetic resources, the protection of scenic areas, coastal protection and the opportunity to enjoy natural heritage may require the rigorous management of natural areas. The most appropriate use of these areas is a suitable level of strict protection. In other areas limited uses (such as fishing, rotational tree felling for wood chip and charcoal production, use by tourists) may be permitted on a sustainable basis. While careful design and implementation of management can ensure continued benefits from natural areas, there are types of benefits which conflict with one another. For example, it is physically and ecologically impossible to remove timber from a mangrove and to study natural processes in the same site. But it is possible to preserve a representative ecosystem and in it to conduct appropriately designed research and monitoring studies. Thus management categories can be designed and implemented to address compatible sets of activities such that the pursuit of any one does not exclude the possibility of other benefits. A category which enables most options is the multiple use reserve.

285. Throughout the region the establishment of terrestrial protected areas clearly dominates achievements in conservation. Generally speaking, these protected areas on land are well designed and managed, having benefited from the application of ecological principles in the planning phases and from a vast body of practical experience. The few marine protected areas that exist have tended to suffer selection and design based on the disastrous "no waves" and "cookie-cutter" principles.

286. The selection of marine protected areas has been guided by the wish to avoid conflict (or "making waves") with local inhabitants, chiefly fishermen. The major criteria for site selection should have more ecological focus. Thus an area should be selected for protection if it is important enough to warrant such action. Resolving conflicts and integrating people's activities into different zones are part of the process of protected area design and management.

287. Existing marine protected areas in the region tend to be small. This appears to arise in part from the "no waves" principle, but results also from a general lack of understanding of the marine environment and certainly from an unwillingness to take on management of large areas of the sea.

288. Protected marine sites of special interest (e.g. an attractive section of coral reef or turtle nesting beaches) have been excised out of larger systems, without regard for their ecological boundaries. Their boundaries have been established on an arbitrary basis which is reminiscent of using a mould to cut cookies from rolled dough. Irrespective of the surrounding activities, the resources in such small reserves (designed on the basis of the "cookie cutter" principle) are expected to retain their integrity. Given the intimate interdependencies of marine habitats with their neighbouring and distant linked habitats, this is an unrealistic expectation.

289. There is little to guide planners and managers of marine protected areas, so it is understandable that most of these areas suffer from inadequate design and

management. Marine conservation, including the design of marine protected areas, has barely begun as a science. There is a relatively vast body of theory for terrestrial conservation but little for the seas, and even fewer tested management practices. Also, there are remarkably few trained personnel in the field of marine conservation anywhere in the world; they are particularly rare in the East African region.

DEFINITION OF MARINE AND COASTAL PROTECTED AREAS

290. Protection of an area should not be limited to the prohibition of the taking of any or all of the species contained in it. To qualify as a protected area there should also be control or prohibition of all activities which are likely to alter the area's ecological characteristics. These would include dredging, silting or any other disturbance of the seabed, as well as pollution and the mooring of ships. Protected areas should, therefore, be considered as marine or coastal areas where activities which may affect the characteristics of natural ecosystems are prohibited or controlled by legal provisions enforced by the management authority.

291. A marine protected area generally must have a marine aquatic element, but it may include coastal areas which are functionally linked to the sea, including those which influence or are influenced by the sea (mangroves, salinas, estuaries, beaches, cliffs and coral cays), and adjacent land areas which form an integral part of the coastal environment (dunes, alluvial banks, spits and barrier islands). It also may include adjoining land used for placement of site management and recreational facilities, and an inland buffer zone.

292. A coastal protected area is one without an aquatic component or, where this exists, one whose principal reasons for establishment lie in the terrestrial component. It comprises coastal environments above the water line and any marine habitats included by seaward extension of boundaries.

293. Any conservation area, regardless of its name, can be assigned by its management objectives to an internationally recognized category. Thus the local name for any type of protected area (marine or coastal zone park, national park, marine or nature reserve, wildlife conservation area or bird sanctuary, etc.), to be locally meaningful, should conform to national customs.

294. Management categories for protected areas have been developed by IUCN so that all such areas can be classified along internationally compatible lines. Selection criteria and management objectives for the different categories of protected area are defined in annex XI.

INVENTORY OF MARINE PROTECTED AREAS

295. Establishment of marine protected areas in all categories is an obvious need. There are only 40 protected marine areas in the region, and almost half of these are in one nation, Seychelles. Tanzania and Somalia have no marine protected areas. This is particularly surprising in Tanzania which has such a distinguished record of achievement in terrestrial conservation. The total area of the sea which is protected is less than 1,900 sq km, about 10% of the area of Kenya's largest national park on land. This is less than 0.5% of the total continental shelf area

of the East African region and is a negligible fraction of the total Exclusive Economic Zone area for the included nations.

296. The establishment of the Indian Ocean Sanctuary is among the greatest achievements of its kind in marine conservation. It was declared specifically for the conservation of whales through the prohibition of commercial whaling in the entire Indian Ocean. The sanctuary has its shortcomings: it does does extend protection to whale habitat; and it is a temporary measure subject to general review after 5 years by member nations of the International Whaling Commission. Nonetheless, it offers an example of what can be done to achieve regional co-operation in resource management and conservation in Territorial Waters and on the High Seas -- despite opposition from powerful industrialized nations interested in continued exploitation.

297. Tables 5 and 6 present a summary of the existing and proposed marine protected areas in the region. Detailed descriptions of marine protected areas are available for some sites in the region; these are included in annex XII of this report. Table 9 indicates which habitats are protected in each country.

INVENTORY OF COASTAL PROTECTED AREAS

298. Coastal protected areas, being land-based, have inherited a vast body of experience, fit neatly into long-established institutional frameworks, and are simply components or extensions of the terrestrial protected area programmes. Consequently, they are better designed and managed than marine protected areas. However, human population pressure and encroachment of remaining natural areas in the coastal zone have left few intact examples of habitats there. Thus selection of new coastal protected areas can only be determined by what is left, rather than by what is best.

299. There are only 23 protected coastal areas in the region (table 7). Mauritius has 8 of these, Mozambique and Seychelles each have 5, Kenya has 3 and there are 2 in Madagascar; Somalia, Tanzania, France (Réunion) and Comores have none. These numbers are misleading as 4 of the Mauritian reserves seem to be of marginal conservation value, whereas more important areas have not been declared there. The coastal protected areas of Mozambique and Kenya are vast relative to their island equivalents. Mozambique has 51% of the total area and the greatest variety (7 out of 9) of protected coastal habitats (table 9). Kenya has 48% of the area, while Madagascar, Mauritius and Seychelles share the final 1%.

PROTECTED AREA NEEDS IN THE EAST AFRICAN REGION

300. Before the need for more marine protected areas can be addressed, it is necessary to train people in both planning and management of these areas. This raises an important point: marine conservation science must be taken as seriously as that of wildlife management and conservation on land. There must be serious attempts made to establish marine protected areas in the most ecologically, biologically, genetically, aesthetically, culturally and economically valuable sites, not merely where it is most convenient. Further, these protected areas must be designed and managed as viable units, taking into account ecological principles and patterns of human use. This requires that the area planners and managers have adequate training, legal and institutional support, equipment, funding and qualified staff.

301. The concept of the Indian Ocean Sanctuary should be extended to other species of the region, including both threatened and commercial varieties. Means should be explored to achieve greater permanency and stronger international backing for the Indian Ocean Sanctuary; and to extend the objectives of the sanctuary beyond species protection to include protection of critical habitats and support systems.

302. The following discussion is based on an interpretation of tables 5 to 9 and on observations made by Bryceson (1981), Hughes (1971), Hughes and Oxley-Oxland (1971), Pertet (1982), Tinley (1971) and Tinley et al. (1974).

303. It appears that the major seabird nesting areas are already included in protected areas (15 sites) or are proposed for protection (10 sites). On Aldabra Atoll the coconut or robber crab is another well protected marine species; but it requires conservation action elsewhere in the region -- particularly on the islands off the Tanzanian coast.

304. Green and hawksbill turtle nesting beaches have received fairly extensive protection. The major green turtle beaches (Europa, Aldabra and Tromelin) have been declared reserves and apparently receive adequate management. However, there are important beaches in the Comores (Moheli) and Mozambique (Primeira and Segundo Islands) which also require protection. Loggerhead and leatherback beaches appear to be adequately protected in Mozambique, but the beaches north of Fort Dauphin in southeast Madagascar should be established as a reserve for loggerheads. There are no protected nesting beaches for the olive ridley turtle. These sites should be identified and established as reserves.

305. It is also important to safeguard the turtle feeding grounds. Future conservation work on turtles should emphasize protection of the full range of their critical habitats, particularly where this requires co-operative action by neighbouring states. Examples include the protection of loggerhead feeding areas in northern Mozambique and Tanzania to help safeguard stocks nesting on the beaches of the Maputo Reserve in southern Mozambique; and protection of green turtle feeding grounds off Madagascar to complement conservation of nesting beaches on Ile Europa and Ile Tromelin.

306. Dugong habitats are inadequately protected throughout East Africa. The most important dugong habitats in the region appear to be located in Mozambique. The Bazaruto National Park should be extended as proposed to include additional dugong feeding areas; and a dugong reserve should be established in the estuary at Antonio Enes and extending to include the coastal waters between the mainland and the Primeira and Segundo Islands. This reserve would function also as an important conservation area for turtles, seagrass habitat, fisheries, estuary, mangroves and dune forest. Additional dugong reserves designed specifically to safeguard breeding, calving and shelter areas and feeding grounds should be established in Kenya and Tanzania (Kilwa).

307. Management plans and more effective forms of management should be developed for the Fisheries Reserves of Mauritius. These should then be used as models for the development of similar protected areas in all countries, designed to control fisheries and other activities adjacent and linked to important fishing grounds and to safeguard critical habitats of fishery species.

308. Green snails, Triton's trumpets, giant clams and other marine molluscs receive their best protection in the Seychelles. They are totally protected at Aldabra, which is reputed to be a good green snail habitat, and in the 4 special reserves for marine mollusc conservation. These 4 reserves (2 on Mahé Island, 1 on Praslin Island, and 1 on La Digue Island) are the only ones of their kind in the region.

309. Special reserves for endemic coastal species have only been declared in Seychelles and Mauritius, although many Mauritian endemic species receive little protection despite endangered status (e.g. on Rodrigues Island).

310. The Sokoke-Arabuko forest in Kenya is a valuable coastal conservation area which should be seriously considered for establishment as a stricter category of reserve. It is currently a Forest Reserve under the jurisdiction of the Forest Department and receives no active management; it should be upgraded (possibly to IUCN Category I or IV) and transferred to the Wildlife Conservation and Management Department of the Ministry of Tourism and Wildlife. The site is a good example of maritime forest in which are found a number of endemic species and species whose range is now restricted to this forest. Other threatened or endangered coastal species are also found there.

311. Ganja, Marenji, Rombo, Gogoni and Buda are examples of coastal forests which form important links from the north of Kenya to equivalent forests in Tanzania. They are islands of habitat for intra-African bird migrants, such as the spotted ground thrush (Turdus fisheri) and African pitta (Pitta angolensis), and link populations of species including such coastal bird species as the green-headed oriole (Oriolus chlorocephalus), Amani sunbird (Anthreptes pallidigaster) and the Uluguru violet-backed sunbird (Anthreptes neglectus), the coastal colobus (Colobus angolensis palliatus) and elephant shrew (Rhynchocyon cirnei petersi). All 5 of these areas are forest reserves. They warrant upgrading to a stricter management category.

312. The proposed Ras Tenewi Coastal Zone National Park in Kenya would almost certainly be the most important marine conservation area in the country, particularly if it includes a significant portion of the Tana River delta. If it comes about, this proposed land-sea reserve would provide an extraordinary example of its kind and a model for other countries in the region.

313. The following are further general suggestions for the conservation of coastal and marine habitats.

314. All waters under national jurisdiction to the limit of the Exclusive Economic Zones should be considered the minimum management units and placed under some form of active control and zoning, such as Multiple Use Reserve (IUCN Category VIII).

315. The development of Coastal Zone Management Plans are encouraged as a means to integrate land use with multiple-use zoning of waters under national jurisdiction.

316. At least 10% of the area of all marine and coastal habitats should be included in a strict management category of protected area, such as Strict Nature Reserve (Category I), Managed Nature Reserve (Category IV) or Resource Reserve (Category VI).

317. The remaining 90% of these habitats should be zoned for different uses, including other protected area management categories, through the mechanisms recommended in paragraphs 314 and 315.

318. Representative samples of all habitats should be safeguarded in each country. Each nation's achievements and needs are clearly shown in table 9. Ideally every habitat shown in this table should be marked by a "P" where it occurs. As a first step it is recommended that the following important habitats which are poorly represented in protected areas should receive priority.

Bays and estuaries

319. The value of these habitats to fisheries, harbour development, recreation, tourism and wildlife is so high that these should be carefully zoned and managed, and critical habitats placed under strict protection in all countries. Specific areas of great importance include the Limpopo, Save, Rufiji and Tana River estuaries and those of western Madagascar.

Intertidal sand and mud flats

320. These habitats should be protected in all countries, particularly those known to be important feeding grounds for migratory shorebirds, the habitat of edible bivalves, and sites of nitrogen fixation.

Algal and seagrass beds

321. These are valuable nurseries for many harvested fish species, the feeding ground of the endangered dugong and green turtles, and a potential harvestable resource (e.g. for extraction of agar and other products from seaweeds, for human consumption, for fodder and for fertilizer production), and they should be protected in all countries.

Mangrove forests

322. In all countries these important habitats should be classified by their different values (such as nurseries for fishery species, potential for mariculture and forestry, wildlife habitat) and managed accordingly. Specific examples include those in association with the estuaries mentioned above. The probable role of mangroves in western Madagascar in supporting shrimp fisheries in the neighbouring mainland countries, makes these habitats particularly important for study and protection.

All coral reef types

323. In all countries (except possibly the granitic Seychelles, southern Mozambique and most of Kenya where representative reefs are protected) these areas should be classified by their value to fisheries, research, education, preservation of biotic diversity and tourism; and they should be zoned and managed appropriately. Specific examples include the reefs of the proposed Ras Tenewi Coastal Zone National Park; Grand Recif off Tulear in Madagascar; the reefs surrounding the bird sanctuary islands of Seychelles and Mauritius; reefs of northern Mozambique and improved enforcement of the protected reefs of Inhaca Island; and the proposed coral reef reserves and parks in Tanzania.

Dunes, coastal plain habitats and limestone caves

324. These habitats should be protected in all countries where they occur.

Continental shelf soft and hard bottom communities

325. All countries should protect these habitats.

Seamount

326. Paisley Seamount in Mozambique should be protected.

CONCLUSIONS

327. It is obviously in each State's best interest to achieve sustainable yield of its resources so that there is no reduction in the ability of a resource to renew itself. Sustainable exploitation means the wise use (development) and careful management (conservation) of individual species and communities together with the habitats and ecosystems on which they depend. There are two consequences of this achievement: maintenance of the biological potential and enhancement of the economic potential of living marine resources.

328. Use and perpetuation of living marine resources are possible for most forms of exploitation. But careful management procedures need to be observed. Resource management is required at two levels. There is the need for conservation of species stocks so that the breeding potential of populations is not destroyed by overharvesting. There is also the need for conservation of the support systems (nutrient inputs) and critical habitats (feeding, breeding, shelter, nursery and migration areas) of these species stocks in specially protected areas.

329. Conservation of currently harvested living resources and their support systems, through establishment of a carefully designed network of protected areas, aids development by maintaining the viability of existing related industries which support thousands of coastal inhabitants. Expanding conservation to safeguard representative samples of different habitats and species is another way protected areas can aid development by maintaining the option for the discovery of new applications of species, for technical innovation and for the protection and improvement of cultivated algae, fishes, crustaceans and molluscs.

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Table 1: Proposed classification of coastal and marine habitats of the East African region for conservation purposes

ENVIRON./HABITAT	SOM	KEN	TAN	MOZ	MAD	FRA	MAU	COM	SEY	Remarks
Coastal Environments										
Sand beach	x	x	x	x	x	x	x	x	x	
Rocky shore	x	x	x	x	x	x	x	x	x	
Cliffed shore	x	x	x	x	x	x	x	x	x	
Bay	x	x	x	x	x	x	x	x	x	
Estuary	x	x	x	x	x	-	x	-	x	very small in island nations
Brackish coastal (barrier) lagoon	-	-	-	x	x	-	-	-	-	connected by Pangalones Canal in Madagascar
Intertidal sand/ mud flat	x	x	x	x	x	-	x	x	x	
Delta	-	x	x	x	-	-	-	-	-	
Dune	x	x	x	x	x	x	-	-	-	best developed in Mozambique
Coastal plain	x	x	x	x	x	x	x	x	x	very limited in France, Comoros and Seychelles
Limestone caves	-	x	x	-	-	-	x	-	-	
Offshore Environments										
Island	x	x	x	x	x	x	x	x	x	
Rocky fringing reef	-	-	-	x	x	-	-	-	-	dune rock reefs
Alluvial bar/bank	-	x	x	x	x	-	-	-	-	
Continental shelf soft bottom	x	x	x	x	x	x	x	x	x	
Continental shelf hard bottom	-	x	x	x	x	x	x	x	x	in Réunion on volcanic base
Continental slope	x	x	x	x	x	x	x	x	x	
Submarine canyon	-	x	x	x	x	-	-	-	-	
Submarine plateau/ bank	-	-	-	x	-	-	x	-	x	
Abyssal plain	x	-	-	-	x	x	x	x	x	
Seamount	-	-	-	x	-	-	-	-	-	Paisley Seamount, unique to Mozambique
Ocean Trench	-	-	-	-	-	x	x	-	x	all minor trenches
Pelagic Environments										
Inshore eddies										not known whether occur
Offshore current gyres										not known whether occur
Upwellings	x	-	-	x	-	-	-	x	x	small upwellings probably occur seasonally throughout region

ENVIRON./HABITAT	SOM	KEN	TAN	MOZ	MAD	FRA	MAU	COM	SEY	Remarks
Coast-associated habitats										
Algal beds	x	x	x	x	x	x	x	x	x	
Seagrass beds	x	x	x	x	x	x	x	x	x	
Salina/Saline marsh	-	x	x	x	x	-	x	-	-	
Mangrove forest	x	x	x	x	x	-	-	x	x	very small area on islands other than Madagascar and Aldabra; Mauritius and France have small stands not forest
Maritime forest/ woodland	-	x	x	x	x	1	*	*	*	* = eliminated; 1 = small zone, remains at limit of lava (Réunion)
Coastal swamp forest	-	-	x	x	-	-	-	-	-	
Coastal shrubland	x	x	x	x	x	x	x	x	x	
Coastal grassland	-	x	-	x	-	-	-	-	x	
Coastal palm forest	-	x	-	x	-	-	-	-	-	
Living Reefs										
Reef-associated lagoon	x	x	x	x	x	x	x	x	x	
Coral atoll	-	-	-	-	-	-	-	-	x	unique to Seychelles
Barrier coral reef	-	-	x	-	x	-	x	x	-	
Fringing coral reef	x	x	x	x	x	x	x	x	x	
Patch reef	?	x	x	x	x	x	x	x	x	
Sabellariid reef	-	-	-	x	-	-	-	-	-	unique to Mozambique

x = occurs; - = does not occur; ? = probably occurs but needs confirmation

NB: In all tables and annexes:

SOM = Somalia
KEN = Kenya
TAN = Tanzania
MOZ = Mozambique
MAD = Madagascar
FRA = France (Réunion)
MAU = Mauritius
COM = Comoros
SEY = Seychelles

Table 2: Distribution of habitats among States of the East African region

COUNTRY	NO. OF HABITATS	% OF TOTAL	NO. OF UNIQUE HABITATS
Somalia	19	50	0
Kenya	27	71	0
Tanzania	27	71	0
Mozambique	33	87	2
Madagascar	27	71	0
France (Réunion)	18	47	0
Mauritius	23	61	0
Comoros	20	53	0
Seychelles	24	63	1

Table 3: Distribution of endemic marine and coastal species and subspecies in the East African region.

COUNTRY	NO. OF ENDEMICS	% OF TOTAL
Somalia	1	1
Kenya	11	.12
Tanzania	5	5
Kenya and Tanzania	6	6
Mozambique	1	1
Kenya-Tanzania-Mozambique	1	1
Madagascar	9	10
France (Réunion)	7	2
Mauritius	25	27
France (Réunion) and Mauritius	3	2
Comoros	3	3
Mauritius and Comoros	1	1
Seychelles	27	29
TOTAL	94	100

Note: Plants of Madagascar are not included as it is not known which of the numerous endemic species are coastal.

Table 4: Shells for sale at the Dar es Salaam fish market

Lambis arthritica
L. crocata
L. lambis
L. scorpius
L. truncata
Charonia tritonis
Ovula ovum
Cypraea annulus
C. arabica
C. caputserpentis
C. carneola
C. caurica
C. diliculum
C. erosa
C. helvola
C. hystrix
C. isabella
C. lamarckii
C. limacina
C. lynx
C. mappa
C. mauritiana
C. moneta
C. onyx
C. stolida
C. talpa
C. testudinaria
C. tigris
C. vitellus
Cassis cornuta
Bulla ampulla
Mitra episcopalis
Tonna galea
Harpa major
H. amouretta
Strombus x 4 spp.
S. gibberulus
S. lentiginosus
Bursa bubo
Chicoreus ramosus
Oliva sp.
Murex x 2 spp.
M. triremus
Architectonica maxima
Turbo marmoratus
T. petholatus
Drupa sp.
D. morum
Phalium x 3 spp.
Pleuroploca trapezium
Cymatium sp.
Volva volva
Trochus sp.
Thais sp.
Terebra x 2 spp.
T. maculata
Conus x 3 spp.
C. aulicus
C. betulinus
C. capitaneus
C. distans
C. ebraeus
C. imperialis
C. literatus
C. litoglyphus
C. lividus
C. marmoreus
C. miles
C. nussatella
C. rattus
C. striatus
C. textile
C. virgo
C. zeylanicus
Clanculus pharonium
Dentalium sp.
Tridacna maxima
T. squamosa
Pinctada sp.
P. margaritifera
Numerous bivalve spp.

Table 5: Existing marine protected areas of the East African Region

NAME OF AREA	AREA (Ha)	PRINCIPAL INTERESTS
SOMALIA		
(None)		
KENYA		
Category II (National Park)		
Kisite-Mpunguti NP	2,301	coral reefs, limestone islets with nesting seabirds
Malindi-Watamu NP	1,600	coral reefs and associated habitats
Category VI (Resource Reserve)		
Kiunga Marine National Reserve (MNR)	25,000	corals reefs, numerous islets with nesting seabirds, dugong, mangroves
Malindi-Watamu MNR	21,309	coral reefs and associated habitats, estuaries and mangroves
Category IX (Biosphere Reserve)		
Kiunga Biosphere Reserve (BR)	60,000	as for Kiunga NP and MNR
Malindi-Watamu BR	19,600	as for Malindi-Watamu NP and MNR
TANZANIA		
(None)		
MOZAMBIQUE		
Category II (National Park)		
Bazaruto NP	8,000	turtles, dugongs, coral reefs
Category IV (Managed Nature Reserve)		
Ilhas da Inhaca e dos Portugueses Marine Reserves	?	coral reefs, seagrass beds, varied intertidal habitats, mangroves, dunes, turtles, dugongs
MADAGASCAR		
Category ?I (Strict Nature Reserve for reproduction of marine turtles)		
Nosy Anambo	?	green and hawksbill turtles
Nosy Iranja	?	green and hawksbill turtles
Chesterfield	?	green and hawksbill turtles
Nosy Trozona	?	green and hawksbill turtles
Nosy Ve	?	green and hawksbill turtles

FRANCE (REUNION)

Category ?VI (Resource Reserve)

Ile Europa	2,020	nesting seabirds, green and hawksbill turtles
Iles Glorieuses	430	nesting green and hawksbill turtles, seabirds
Ile Juan de Nova	480	nesting turtles, birdlife
Ile Tromelin	80	nesting green and hawksbill turtles

MAURITIUS

Category VIII (Multiple Use Reserve)

Flacq Fishing Reserve (FR)	600	fishing grounds
Riviere du Rempart-Poudre d'Or FR	3,500	fishing grounds
Black River FR	900	fishing grounds
Grand Port-Mahebourg FR	2,200	fishing grounds
Port Louis FR	500	fishing grounds
Trou d'Eau Douce FR	700	fishing grounds

COMOROS

Category VIII (Multiple Use Reserve)

Mayotte lagoon	?	nesting seabirds, green turtles fishery reserve, mangrove, coral reef

SEYCHELLES

Category I (Strict Nature Reserve)

Aldabra Atoll Strict Nature Reserve	35,000	undisturbed coral atoll with many endemic birds, giant tortoise, large green turtle nesting population and important green snail population

Category II (National Park)

Ste Anne Marine National Park (MNP)	1,423	islands, coral reefs, seagrass beds
Port Launay MNP	158	sandy beach, coral reef, sheltered bay
Baie Ternay MNP	80	coral reef, algal flats
Curieuse MNP	1,370	coral reefs, deep sheltered sand

Category VI (Resource Reserve)

Ile Seche Nature Reserve (NR)	1.6	nesting seabirds
Ile aux Fous NR	small	nesting seabirds
Les Mamelles NR	8.8	nesting seabirds
Ile aux Vache Marines NR	5.2	nesting seabirds
Lamperiaire NR	small	nesting seabirds
Boudeuse NR	1.6	nesting seabirds, green and hawksbill turtles
Etoile NR	1.6	nesting seabirds, green and hawksbill turtles
Brûlée-Point au Sel Reserve	?	marine mollusc protection
Northeast Point Reserve	?	marine mollusc protection
La Passe-Grosse Roche Reserve	?	marine mollusc protection
Anse Boudin-Pointe Zanguilles Reserve	?	marine mollusc protection

Table 6: Proposed marine protected areas of the East African Region

NAME OF AREA	AREA (Ha)	PRINCIPAL INTERESTS
SOMALIA		
(None)		
KENYA		
Category II (National Park)		
Ras Tenewi Coastal Zone NP	35,000	combined land-sea area with coral reefs, gull and tern nesting islands, nesting turtles, historic ruins
Diani MNP Complex	?	land-sea reserve with limestone caves, cultural sites, interesting flora and fauna, important bird nesting site on Chale Is.
TANZANIA		
Category VI (Resource Reserve)		
Tanga Coral Gardens	?	coral reefs
Dar es Salaam Coral Gardens	?	coconut crab, coral reefs, limestone islands
Latham Island Reserve	?	nesting seabirds and green turtles
Mafia Island-Rufiji Delta Reserve	?	coral reefs, estuary, delta, mangrove, dugongs, turtles
Kilwa Reserve	?	dugong, turtles
MOZAMBIQUE		
Category II (National Park)		
Quirimba Islands NP	?	coral reefs
Primeira and Segundo Islands NP	?	coral reefs and cays, nesting green turtles, seagrass beds, dugong, dune forest and mangroves on mainland
Nacala-Mossuril MNP	?	islands, nesting seabirds, coral reefs
Category VI (Resource Reserve)		
Bazaruto Island Reserve	?	extension to Bazaruto NP, seagrass beds, turtles, dugongs
MADAGASCAR		
(None)		
FRANCE (REUNION)		
(None)		

MAURITIUS

Category I (Strict Nature Reserve)

Blue Bay/Le Chaland Marine Park	390	coral reef
Flat Island/Gabriel reef complex	420	coral reef
Serpent Island	31.2	nesting seabirds

Category IV (Managed Nature Reserve)

Le Morne Brabant	?	coral reef
Flic-en-Flac	?	coral reef
Arsenal/Pte aux Cannoniers	100	coral reef
Grand Baie	?	coral reef
Roches Noires/Poste Lafayette	?	coral reef
Trou Deau Douce	?	coral reef
Ile aux Cerfs	?	coral reef
Pearl Island	20.3	nesting turtles
Frigate Island/Ile Puit a Eau	30.4	nesting turtles and seabirds
Ile du Nord	20.3	nesting seabirds or turtles
Ile Paul	20.3	nesting seabirds
Ile Poulailler	12.2	nesting seabirds
Petit Capitaine	2.8	nesting seabirds
Grand Capitaine	4.1	nesting seabirds

Category VIII (Multiple Use Reserve)

Round Is NR seaward extension	?	buffer zone for NR to 20 m depth
Coin de Mire NR seaward extension	?	buffer zone for NR to 20 m depth

COMOROS

Category I (Strict Nature Reserve)

Ilots Nioumachoua (Wenefou & Boinaidi)	5	coral reefs, research

Category VII (Multiple Use Reserve)

Nioumachoua (Moheli)	?	coral reefs, mangroves, turtles, dugongs
Bangoi Kouni-Ivoini (N. Grande Comore)	?	artisanal fisheries
Chindini-Male (S. Grande Comore)	?	mangrove, artisanal fisheries
Chiroroni (Anjouan)	?	artisanal fisheries

SEYCHELLES

Category I (Strict Nature Reserve)

Ile aux Vaches	69.6	nesting seabirds
African Banks	32	nesting seabirds and hawksbill turtles
L'Ilot (Fregate)	small	nesting seabirds
La Plaine Mangrove Reserve	?	mangrove

Category II (National Park)

Aride Island MNP	?	extension to Aride Reserve, coral reefs
Ile Cocos MNP	?	coral reef

Category IV (Managed Nature Reserve)

Desnoeufs NR	34.4	nesting sooty terns and other seabirds

Category VIII (Multiple Use Reserve)

Cosmoledo	?	nesting turtles, birdlife

Table 7: Existing coastal protected areas of the East African Region

NAME OF AREA	AREA (Ha)	PRINCIPAL INTERESTS
SOMALIA		
(None)		
KENYA		
Category II (National Park)		
Dodori National Reserve (NaR)	87,739	coastal forest, coastal plain
Boni NaR	133,960	coastal forest, coastal plain
Category IV (Managed Nature Reserve)		
Arabuko-Sokoke NR	4,331	coastal forest with several endemic species
TANZANIA		
(None)		
MOZAMBIQUE		
Category IV (Managed Nature Reserve)		
Ilhas da Inhaca e dos Portugueses land reserve	?	dunes, dune forest, coastal shrubland
Category VI (Resource Reserve)		
Reserva Especial de Marromeu	150,000	Zambezi River delta and associated habitats, mangroves, coastal grasslands
Reserva de Pomene	20,000	estuary, mangroves, dugong, turtles, dunes, dune forest, coastal grasslands
Reserva Especial do Maputo	70,000	brackish lagoons, salinas, estuary, dunes, nesting turtles (loggerhead, leatherback) mangrove, dune forest, swamp forest
Reserve Florestais Baixa Pinda	?	maritime forest
MADAGASCAR		
Category I (Strict Nature Reserve)		
Reserve Naturelle Integrale de Lokobe	740	island, maritime forest
Category IV (Managed Nature Reserve)		
Nosy Mangabe	520	island, maritime forest
FRANCE (REUNION)		
(None)		

MAURITIUS

Category IV (Managed Nature Reserve)

Flat Island NR	253	
Round Island NR	159	several endemic and endangered species
Coin de Mire NR	76	nesting seabirds
Ilot Gabriel NR	42	plants of medicinal value
Ilot Mariannes NR	2	salt spray habitat
Ile aux Aigrettes	35	endemic plants
Ile aux Cocos	15	nesting seabirds
Ile aux Sables	8	nesting seabirds

COMOROS
(None)

SEYCHELLES

Category I (Strict Nature Reserve)

Cousin Island Special Reserve	28	endemic birds, seabirds, coral reef
Aride Island Special Reserve	70	nesting seabirds

Category IV (Managed Nature Reserve)

La Digue Veuve Reserve	8.3	Seychelles black paradise flycatcher

Category VI (Resource Reserve)

Cousine Nature reserve	25.2	nesting seabirds

Category VIII (Multiple Use Reserve)

Morne Seychellois NP	3,045	from rocky shore to 905 m altitude

Table 8: Proposed coastal protected areas of the East African Region

NAME OF AREA	AREA (Ha)	PRINCIPAL INTERESTS
SOMALIA		
(None)		
KENYA		
(None)		
TANZANIA		
(None)		
MOZAMBIQUE		
Category II (National Park)		
Gorongoza NP extension to sea	?	maritime forest, coastal grasslands
San Sebastian Peninsula NP	?	beach, dune, coastal plain, nesting turtles and flamingoes, dune forest
MADAGASCAR		
(None)		
FRANCE (REUNION)		
Category (not defined)		
(No name yet)	?	rocky seashore to volcano summit
Petite Ile and nearby rocky coast	?	about 30m from shore; seabird nesting rookery; only rocky island in Réunion
MAURITIUS		
Category IV (Managed Nature Reserve)		
Plaine Corail	?	endemic plants
several areas on Rodrigues -- not confirmed to be coastal	?	endemic plants
Serpent Island NR	31.2	nesting seabirds, endemic species
COMOROS		
(None)		
SEYCHELLES		
Category I (Strict Nature Reserve)		
Recifs NR	?	?
Police Bay Freshwater Marsh NR	?	freshwater marsh
La Digue Freshwater Marsh NR	?	freshwater marsh

Category II (National Park)

La Digue NP	?	Coastal plain

Category VIII (Multiple Use Reserve)

Felicite	268	birdlife and endemic flora
Fregate	201.6	Seychelles magpie robin

Table 9: Protected status of marine and coastal habitats in the East African Region

ENVIRON./HABITAT	SOM	KEN	TAN	MOZ	MAD	FRA	MAU	COM	SEY	Remarks
Coastal Environments										
Sand beach	x	s	x	P	s	P	s	x	P	generally turtle nesting sites
Rocky shore	x	s	x	s	x	x	s	x	P	both granitic and limestone in Seychelles
Cliffed shore	x	s	x	x	x	x	s	x	x	
Bay	x	s	x	s	x	x	x	x	P	
Estuary	x	s	x	P	x	-	x	-	x	
Brackish coastal (barrier) lagoon	-	-	-	s	x	-	-	-	-	
Intertidal sand/ flat	x	s	x	P	x	x	x	x	P	good example at Aldabra but not at granitic islands of Seychelles
Delta	-	x	x	P	-	-	-	-	-	partial protection of Zambezi River delta at Marromeu
Dune	x	x	x	P	x	-	-	-	-	
Coastal plain	x	P	x	P	x	x	x	x	s	
Limestone caves	-	x	x	-	x	-	x	-	-	protected by tradition because believed sacred in Kenya; no legal protection
Offshore Environments										
Island	x	P	x	P	P	P	P	x	P	representative variety of protected islands
Rocky fringing reef	-	-	-	P	x	-	-	-	-	
Alluvial bar/bank	-	s	x	s	x	-	-	-	-	
Continental shelf soft bottom	x	s	x	x	x	x	x	x	x	poor representation in protected areas
Continental shelf hard bottom	-	s	-	x	x	x	x	x	x	none protected
Continental slope	x	x	x	x	x	x	x	x	x	none protected
Submarine canyon	-	x	x	x	x	-	-	-	-	none protected
Submarine plateau/ bank	-	-	-	x	-	-	x	-	x	none protected
Abyssal plain	x	-	-	-	x	x	x	x	x	none protected
Seamount	-	-	-	x	-	-	-	-	-	unique example not protected
Ocean trench	-	-	-	-	-	x	x	-	x	none protected
Pelagic Environments										
Upwelling	x	-	-	x	-	-	-	x	x	none protected
Coast-associated habitats										
Algal beds	x	s	x	s	x	x	x	x	s	
Seagrass beds	x	s	x	s	x	x	x	x	s	
Salina/saline marsh	-	x	x	P	x	-	s	-	-	

ENVIRON./HABITAT	SOM	KEN	TAN	MOZ	MAD	FRA	MAU	COM	SEY	Remarks
Mangrove forest	x	s	x	P	x	-	-	x	P	good examples protected in Aldabra and Mozambique
Maritime forest-wood land	x	P	x	P	P	x	-	-	-	
Coastal swamp forest	-	-	s	s	-	-	-	-	-	
Coastal shrubland	x	x	x	s	x	s	x	x	P	
Coastal grassland	-	x	-	P	-	-	-	-	P	
Coastal palm forest	-	x	-	x	-	-	-	-	-	none protected
Living Reefs										
Reef-associated lagoon	x	P	x	s	x	x	s	P	P	
Coral atoll	-	-	-	-	-	-	-	-	P	most valuable example protected
Barrier coral reef	-	-	x	-	x	-	x	x	-	none protected
Fringing coral reef	x	P	x	P	x	s	x	x	P	southernmost African examples protected in Mozambique
Patch reef	?	s	x	s	x	x	x	x	s	
Sabellariid reef	-	-	-	P	-	-	-	-	-	unique example protected

P = principal reason for protection/good representative example
s = protected incidentally and of secondary interest/not necessarily good sample
x = occurs but not protected; - = does not occur; ? = occurrence probable but not confirmed

Annex II

Model Species Data Sheet

Maps of species distributions should be accompanied by a data sheet of supporting biological information compiled in the following format. This information should be collected as completely as possible before mapping is attempted.

1. Species (both scientific and common names)

2. Distribution (in territorial/regional* and neighbouring seas)

3. Location of national/regional* populations (location of each isolated population)

4. Estimate of national/regional* stocks (for each population)

5. Life history information

   a) Feeding grounds (general notes on feeding habitat and location of known feeding areas)

   b) Preferred food (list of usual food items)

   c) Breeding grounds (general notes on breeding habitat and location of known sites)

   d) Calving grounds (whales, dolphins, dugongs), nesting beaches (turtles, terns), spawning grounds (milk fish, mullets, groupers, shrimp, etc.), seabird cliffs/islands (boobies, frigates, terns)(general notes on habitat and location of known sites)

   e) Nursery sites (shrimp, fishes) (general notes on habitat and location of known sites)

   f) Resting beaches (turtles), shelters (dolphins, dugongs) roosts (seabirds)(general notes on habitat and location of known sites)

   g) Migration routes (general notes on migration habits and location of known routes)

6. Legal status (details of legislation which protects the species and its habitat, and which prohibits or controls trade in the species or its products)

7. Threats

   a) Natural threats (natural predators or causes of mortality)

   b) Man-related threats (specific forms of hunting/fishing or habitat encroachment and destruction)

   c) Potential threats (proposed developments or activities that may affect the organism or its habitat)

8. Specific conservation needs (including, for example, identification of areas for survey, protection and management, research requirements, necessary legislation and enforcement, and public awareness programmes)

9. Socio-economic problems of species protection (existing or potential conflicts between species and habitat protection and activities, such as mangrove cutting, which degrade habitat)

10. Persons contacted (list of knowledgeable people consulted for species or habitat information)

11. References (literature consulted)

* depends on whether the programme has national or regional focus.

Annex III

Criteria for the Selection of Marine and Coastal Protected Areas in the East African Region (adapted from Salm, 1983)

SOCIAL CRITERIA (Goal 1): these consider benefits to human welfare measured in social terms.

1. Social acceptance: the degree to which the support of the local people is assured.

When an area is already protected by local tradition or practice, this should be encouraged and the area should receive a higher rating; moreover, 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.

Protective status for contaminated areas such as shellfish beds or bathing beaches may result in reduction of 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 which benefit the local community by providing them with the opportunity to use, enjoy and learn about their local natural environment should receive high rating.

4. Cultural: the occurrence of religious, historic, artistic or other cultural values at the site.

Natural areas which also contain important cultural features should be given high rating as their protection may help to maintain the integrity of the adjacent ecosystem.

5. Aesthetic (seascape/landscape): the occurrence of areas of exceptional scenic beauty.

Natural areas which also contain features of natural beauty should be given a higher rating since such features depend upon the maintenance of the integrity of the adjacent coastal and marine systems. However, when species diversity and the biological conservation value are low, but the site is picturesque, photogenic and aesthetically pleasing, 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 it 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 minimize such conflicts.

7. Restorability: the degree to which the area may be returned to its former natural state.

Areas capable of having their productivity or value to important species and processes increase should receive a high rating.

Annex IV

Model Outline for Protected Area Management Plan

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 the facts pertinent to management

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. Threats existing and potential and implications for management (i.e., analysis of compatible/incompatible uses, solutions)

IV. The Plan

A. Goals and objectives
B. Management tactics

1) Advisory committees
2) Interagency agreements (or agreements with private organizations, institutions or individuals)
3) Boundary and zoning
4) New regulations
5) Resource studies plan
6) Interpretive plan

C. Administration (phased over life of plan, 3-5 yr)

1) Staffing
2) Training
3) Facilities and equipment
4) Budget

D. Surveillance and enforcement

E. Evaluation of plan effectiveness (monitoring uses, impacts etc.) and revision

V. References

VI. Appendices

Annex V

Coastal and marine habitats of Mozambique

Coastal Environments

Sand beach: simple and arcuate; quartz sand; black (ilmenite) sand; coral sand
Rocky shore
Cliffed shore; uplifted fossil coral reef forming shoreline cliffs of 3-8 metres
Bay
Estuary
Coastal brackish lagoon: barrier lagoons behind dunes
Intertidal sand and mud flats
Delta: Save and Zambezi Rivers
Dune: high parabolic dune formations
Coastal plain: sandy alluvium

Offshore Environments

Island: coral cays; erosional remnants of mainland peninsulas (chiefly dune rock)
Dune rock fringing reef
Alluvial bars and banks: sand and mud
Continental shelf soft bottom
Continental shelf hard bottom
Continental slope
Submarine canyons: associated with deeply embayed northern coast
Paisley Seamount

Pelagic Environments

Upwelling: north coast to 16°S

Coast-associated Habitats

Algal beds

Seagrass beds: Thalassodendron ciliatum, Cymodocea serrulata, C. rotundata, Halodule uninervis, Syringodium isoetifolium, Halophila ovalis, Thalassia hemprichii

Salina (saline marsh): Sporobolus virginicus, Anthrocnenum, Sesuvium portulaccastrum

Mangrove forest: Rhizophora mucronata, Bruguiera cylindrica, Avicennia marina, Ceriops tagal, Lumnitzera racemosa, Sonneratia alba, Xylocarpus granatum, Suriana maritima, Heritiera littoralis

Maritime forest-woodland:

Dune thicket and forest: Diospyros rotundifolia, Mimusops caffra, Sideroxylon inerme, Scolopia zeyheri, Euclea natalensis, Ochna natalitia Acacia robusta, Brachylaena discolor;

Northern dry littoral thicket: Guilbourtia schliebenii, Pseudoprosopis euryphylla, Baphia macrocalyx, Platysepalum inopinatum, Dialium mossambicense interspersed with thickets of Androstachys johnsonii;

Savanna/thicket mosaic -- savanna woodland: Brachystegia spiciformis, B. boehmii, B. allenii, Vulbernardia, Erythrophleum, Pterocarpus; tree and shrub savanna in low lying areas; Combretum spp., Acacia polyacantha, A. nigrescens, A. sieberana, Kigelia; Savanna/thicket mosaic (southern coast type): Brachystegia spiciformis savanna woodland and thicket with relic or secondary forest patches of Dialium schlechteri, Cordyla africana, Afzelia, Milletia caffra;

Alluvial formations: riverine thicket and savanna mosaic with Acacia spp., Borassus, Hyphaene, Piliostigma, Combretum.

Coastal shrubland: littoral dune strand plants and scrub with Scaevola thunbergii, Ipomoea pescaprae, Canavalia maritima, Sophora tormentosa, Launaea sarmentosa, Tournefortia argentea.

Coastal grassland: Setaria, Echinochloa, Panicum, Vetiveria, Cynodon, Digitaria.

Palm savanna: Borassus aethiopum, Hyphaene ventricosa, H. crinita, Phoenix reclinata -- thickets on giant termitaria in high water table grassland.

Living Reefs

Barrier reef possible in north -- needs confirmation
Fringing coral reef: principally along northern coast but includes southernmost fringing coral reef in the Indian Ocean
Patch reefs: particularly well developed in the Primeira and Segundo Archipelago.
Sabellariid reef: Inhaca Island.

Annex VI

Data Sheets for Habitats of the East African Region

Key to symbols: Y = yes; x = no; ? = not known but suspected

HABITAT TYPE: Sand Beach	SOM.	KEN.	TANZ.	MOZAM.	MADAG.	FRANCE (REUN).	MAURI.	COM.	SEY.	REMARKS
1. Does it occur?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Very little beach on Reunion
2. Total area?										5 sq km -- Mauritius Is.
3. Area protected?	x	Y	x	Y	Y	x	x	x	Y	Not available
4. % protected										
5. Area proposed for protection	x	Y	Y	Y	x	x	x	x	x	
6. Does enforcement exist?		Y		Y					Y	
7. Is it adequate?		Y		Y					Y	
8. Uses of habitats										
fishing			Y	Y	Y			Y	Y	Beach seine
urban development		Y	Y	Y	Y			Y		
resort development		Y	Y	Y			Y		Y	
tourism and recreation	Y	Y	Y	Y	Y	Y	Y	Y	Y	
sand mining			Y		Y	Y		Y	Y	
9.Threats										
domestic pollution	2,3			2	1	2	2,3	2,3	2,3	1=sewerage; 2=domestic waste dumping; 3=litter
industrial pollution	Y					1	Y,1			Industrial effluents; 1=pollution from "bagasse"
oil pollution	1	1	1	1	1	1	1	1,2	1	1=tar balls; 2=liquid oil discharged from tankers (dumping and spillage of oil along the east coast international tanker route is a major problem)
siltation		Y								
erosion			Y	Y		Y	Y	Y	Y	Principal causes include road and seawall construction and clearing of sand-binding vegetation from beaches and dunes

HABITAT TYPE: Rocky Shore	SOM.	KEN.	TANZ.	MOZAM.	MADAG.	FRANCE (REUN).	MAURI.	COM.	SEY.	REMARKS
1. Does it occur?	Y	Y	Y	Y	Y	Y	Y	Y	Y	
2. Total area?										0.5 sq km -- Mauritius
3. Area protected?	x	x	x	Y	x	x	Y	x	Y	Not available
4. % protected										
5. Area proposed for protection	x	Y	Y	Y	x	x	x	x	x	
6. Does enforcement exist?				x			Y		Y	
7. Is it adequate?				x			x		Y	
8. Uses of habitats										
urban development		Y				Y				
industrial development		Y				Y				
road construction						Y				
9. Threats										
harbour expansion						Y				
pollution	Y	Y	Y	Y	Y	Y	Y	Y	Y	No specific threats documented, although different forms of pollution (including siltation) could affect biota -- this has not been investigated. Oil and tar ball pollution almost certainly affect patches of rocky shores. Reunion has pollution related to sugar industry.

HABITAT TYPE: Cliffed Shore	SOM.	KEN.	TANZ.	MOZAM.	MADAG.	FRANCE (REUN).	MAURI.	COM.	SEY.	REMARKS
1. Does it occur?	Y	Y	Y	Y	Y	Y	Y	Y	Y	
2. Total area?										Not available
3. Area protected?	x	x	x	x	Y	x	Y	x	x	Not available; protection to cliffed shore incidental to other conservation objectives (Round and Serpent Islands)
4. % protected										
5. Area proposed for protection										None
6. Does enforcement exist?					Y		Y			
7. Is it adequate?					x		x			
8. Uses of habitats stone mining			Y							For building and lime production
9. Threats pollution	Y	Y	Y	Y	x	x	Y	Y	Y	No specific threats. Biota may be harmed by pollution - has not been investigated. Oil and tar ball pollution almost certainly affect patches of cliffed shores. Reunion has pollution related to sugar industry.

HABITAT TYPE: Bay	SOM.	KEN.	TANZ.	MOZAM.	MADAG.	FRANCE (REUN).	MAURI.	COM.	SEY.	REMARKS
1. Does it occur?	Y	Y	Y	Y	Y	Y	Y	Y	Y	
2. Total area?										13.6 sq km -- Mauritius
3. Area protected?	x	x	x	Y	x	x	x	x	Y	Not available (Baie Ternay, Port Launay, Curieuse in Seychelles)
4. % protected										
5. Area proposed for protection	x	Y	x	x	x	x	x	x	x	
6. Does enforcement exist?				x					Y	
7. Is it adequate?				x					x	
8. Uses of habitats										
fishing	Y	Y	Y	Y	Y		Y	Y	Y	
coral mining							Y	Y		
urban development	Y	Y	Y	Y	Y	Y	Y	Y	Y	Particularly suitable for harbour and marina development
recreation and tourism		Y		Y		Y	Y		Y	Sailing, fishing, swimming, waterskiing, etc.
9. Threats										
explosives fishing			Y				Y			
pollution	Y	Y	Y	Y	Y	Y	Y	Y	Y	Domestic, industrial and agricultural waste, pesticides, herbicides, fertilizers
siltation				Y	Y		Y	Y	Y	
dredging and blasting		Y		Y						To deepen access channels to harbour

HABITAT TYPE: Estuary	SOM.	KEN.	TANZ.	MOZAM.	MADAG.	FRANCE (REUN).	MAURI.	COM.	SEY.	REMARKS
1. Does it occur?	Y	Y	Y	Y	Y	x	Y	x	Y	Very small
2. Total area?										1·32 sq km -- Mauritius
3. Area protected?	x	1	x	2	x		x		x	Not available; 1=Kiunga; 2=Marromeu
4. % protected										
5. Area proposed for protection	x	Y	Y	x	x		x		x	
6. Does enforcement exist?		Y		Y						
7. Is it adequate?		Y		Y						
8. Uses of habitats										
fishing		Y	Y	Y	Y		Y			
timber extraction		Y	Y	Y	Y					From mangroves for poles and charcoal production
urban development				Y	Y					Harbour-related
industrial development				Y	Y					Harbour-related
agricultural development		Y	Y				Y			Chiefly mariculture
recreation and tourism		Y		Y						Sailing, fishing, swimming, waterskiing, etc.
9. Threats										
domestic pollution			Y	Y			Y			
agricultural pollution	Y	Y	Y	Y			Y			Pesticides, herbicides and fertilizers
industrial pollution		Y	Y	Y			Y			Includes wastes and chemicals from sugar industry on Mauritius
siltation					Y		Y		Y	
encroachment		Y		Y						
oil spill			Y	Y						
flooding			Y							Caused by increased deforestation and erosion in watershed (Rufiji River)

HABITAT TYPE: Delta	SOM.	KEN.	TANZ.	MOZAM.	MADAG.	FRANCE (REUN).	MAURI.	COM.	SEY.	REMARKS
1. Does it occur?	x	Y	Y	Y	x	x	x	x	x	Tana R. Delta (Kenya); Rufiji R. Delta (Tanzania); Save R. Delta and Zambezi R. Delta (Mozambique)
2. Total area?										Not available
3. Area protected?		x	x	Y						Marromeu
4. % protected										
5. Area proposed for protection		Y	Y	x						
6. Does enforcement exist?				Y						
7. Is it adequate?				Y						
8. Uses of habitats mariculture		Y	Y							
9. Threats flooding			Y							Flooding caused by increased deforestation and erosion in the watershed of the Rufiji R.
dams on rivers		Y	Y	Y						Dams alter hydrological regimes causing drying of freshwater swamps and intrusion of salt water.

HABITAT TYPE: Dune	SOM.	KEN.	TANZ.	MOZAM.	MADAG.	FRANCE (REUN).	MAURI.	COM.	SEY.	REMARKS
1. Does it occur?	Y	Y	Y	Y	Y	Y	x	x	x	Low dunes found associated with many windward beaches in most nations
2. Total area?						x				Not available; 5 sq km at Etang Salé fenced by pines (Reunion)
3. Area protected?	x	x	x	Y	x	x				Not available; Maputo Game Reserve; Etang Salé, Reunion
4. % protected										
5. Area proposed for protection	x	x	x	Y	x	x				
6. Does enforcement exist?				Y						
7. Is it adequate?				Y						
8. Uses of habitats										
timber extraction				Y						
settlement				Y	Y					
urban development				Y						Construction of roads and buildings
agriculture	Y			Y		Y				Crops and grazing
9. Threats										
destruction of critical veg	Y			Y	Y					Sand-binding vegetation helps prevent wind erosion
erosion	Y			Y						Resulting from inappropriate activities

HABITAT TYPE: Coastal Plain	SOM.	KEN.	TANZ.	MOZAM.	MADAG.	FRANCE (REUN).	MAURI.	COM.	SEY.	REMARKS
1. Does it occur?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Very limited in Reunion, Comoros and Seychelles
2. Total area?										Not available
3. Area protected?	x	1	?	2	x	x	x	x	x	1=Dodori and Bone Reserves; 2=Maputo Game Reserve
4. % protected										
5. Area proposed for protection										None
6. Does enforcement exist?		Y		Y						
7. Is it adequate?		Y		Y						
8. Uses of habitats										
airstrips						Y			Y	
settlement	Y		Y	Y						
urban development	Y	Y	Y	Y	Y	Y	Y	Y	Y	
industrial development	Y	Y	Y	Y		Y	Y			
sand mining							Y	Y	Y	
agricultural development	Y	Y	Y	Y	Y	Y	Y	Y	Y	
9. Threats										
encroachment		Y	Y	Y		Y	Y	Y	Y	

HABITAT TYPE: Limestone Cave	SOM.	KEN.	TANZ.	MOZAM.	MADAG.	FRANCE (REUN).	MAURI.	COM.	SEY.	REMARKS
1. Does it occur?	x	Y	Y	x	Y	x	Y	x	x	Called Kayas in Kenya and situated in forest groves with endemic plants and animals
2. Total area?										not known
3. Area protected?		Y	x							Protected by tradition because believed sacred burial, refuge and homestead of Mjikenda tribes
4. % protected										
5. Area proposed for protection		Y	x							Diani Beach
6. Does enforcement exist?		?								
7. Is it adequate?		x								
8. Uses of habitats										
timber extraction		Y								
limestone mining							Y			
9. Threats										

HABITAT TYPE: Island	SOM.	KEN.	TANZ.	MOZAM.	MADAG.	FRANCE (REUN).	MAURI.	COM.	SEY.	REMARKS
1. Does it occur?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Includes major islands of island nations, coral cays and limestone islands
2. Total area?										1865 sq km -- Mauritius; 118.4 sq km -- other Mauritian Iss.;444 sq km -- Seychelles Iss.
3. Area protected?	x	Y	x	Y	Y	Y	Y	x	Y	Not available; numerous small island reserves
4. % protected										
5. Area proposed for protection	x	Y	Y	Y	Y	x	x	x	x	
6. Does enforcement exist?		Y		Y	x	x	Y		Y	
7. Is it adequate?		Y		x	x	x	x		x	Difficult to enforce protection on remote islands
8. Uses of habitats										
fishing	Y	Y	Y	Y	Y	Y	Y	Y	Y	Used as a base by itinerant fishermen
timber extraction							Y	Y	Y	
urban development		Y	Y	Y				Y	Y	
industrial development								Y		
agriculture development		Y	Y	Y	Y	Y	Y	Y	Y	Chiefly coconut on small coral cays
resort development		Y	Y	Y	Y		Y		Y	
settlement by itinerants		Y				Y				
sand mining		Y								
recreation and tourism		Y	Y	Y	Y	Y	Y		Y	
guano mining									Y	
9. Threats										
introduced exotic species							Y		Y	
erosion			Y							Caused by destruction or reefs and vegetation

HABITAT TYPE: Rock Fringing Reef	SOM.	KEN.	TANZ.	MOZAM.	MADAG.	FRANCE (REUN).	MAURI.	COM.	SEY.	REMARKS
1. Does it occur?	x	x	x	Y	Y	x	x	x	x	
2. Total area?										Not available
3. Area protected?				Y	x					Not available; east coast Inhaca Island
4. % protected										
5. Area proposed for protection										None
6. Does enforcement exist?										
7. Is it adequate?										
8. Uses of habitats fishing				Y	Y					
9. Threats spearfishing				Y						No immediate or obvious threats

HABITAT TYPE: Alluvial Bar/Bank	SOM.	KEN.	TANZ.	MOZAM.	MADAG.	FRANCE (REUN).	MAURI.	COM.	SEY.	REMARKS
1. Does it occur?	x	Y	Y	Y	Y	x	x	x	x	
2. Total area?										not known
3. Area protected?										None
4. % protected										None
5. Area proposed for protection										None
6. Does enforcement exist?										
7. Is it adequate?										
8. Uses of habitats sand mining		Y								
9. Threats										No immediate or obvious threats

HABITAT TYPE: Continental Shelf Soft Bottom (0-200m)	SOM.	KEN.	TANZ.	MOZAM.	MADAG.	FRANCE (REUN).	MAURI.	COM.	SEY.	REMARKS
1. Does it occur?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Areas include soft and hard bottom
2. Total area (sq km)	1	2	3	4	5	6	7	8	9	1=35-40,000; 2=13,215; 3=18,508; 4=71,190; 5=111,800; 6=700; 7=83,586; 8=1,800(includes Mayotte); 9=48,334.
3. Area protected?										None. Marine protected areas include small sandy areas, but these are considered not to qualify
4. % protected										None
5. Area proposed for protection										None
6. Does enforcement exist?										
7. Is it adequate?										
8 Uses of habitats fishing	Y	Y	Y	Y	Y	Y	Y	Y	Y	Principally shallow inshore areas
9. Threats										
explosives fishing			Y				Y			
pollution		Y								
oil exploration	Y	Y	Y	Y	Y		Y		Y	

HABITAT TYPE: Continental Shelf Hard Bottom (0-200m rocky substrates)	SOM.	KEN.	TANZ.	MOZAM.	MADAG.	FRANCE (REUN).	MAURI.	COM.	SEY.	REMARKS
1. Does it occur?	x	x	x	Y	Y	Y	Y	Y	Y	
2. Total area?										Not available
3. Area protected?		Y		x	x	x	x	x	x	Kisite - Mpunguti
4. % protected										
5. Area proposed for protection										None
6. Does enforcement exist?		Y								
7. Is it adequate?		Y								
8 Uses of habitats fishing		Y		Y	Y	Y	Y	Y	Y	
9. Threats										No immediate or obvious threats

HABITAT TYPE: Continental Slope	SOM.	KEN.	TANZ.	MOZAM.	MADAG.	FRANCE (REUN).	MAURI.	COM.	SEY.	REMARKS
1. Does it occur?	Y	Y	Y	Y	Y	Y	Y	Y	Y	
2. Total area (sq km)										Not available
3. Area protected?										None
4. % protected										None
5. Area proposed for protection										None
6. Does enforcement exist?										
7. Is it adequate?										
8 Uses of habitats fishing					Y					Deep water trawls
9. Threats										No immediate or obvious threats

HABITAT TYPE: Submarine Canyon	SOM.	KEN.	TANZ.	MOZAM.	MADAG.	FRANCE (REUN).	MAURI.	COM.	SEY.	REMARKS
1. Does it occur?	x	Y	Y	Y	Y	x	x	x	x	
2. Total area (sq km)										Not available
3. Area protected?										None
4. % protected										None
5. Area proposed for protection										None
6. Does enforcement exist?										not applicable
7. Is it adequate?										
8 Uses of habitats										Currently not utilized
9. Threats										No immediate or obvious threats

HABITAT TYPE: Submarine Plateau/ Bank	SOM.	KEN.	TANZ.	MOZAM.	MADAG.	FRANCE (REUN).	MAURI.	COM.	SEY.	REMARKS
1. Does it occur?	x	x	x	Y	x	x	Y	x	Y	Hawkins, Soudan, Nazareth and St. Brandon, Saya da Malha Banks (Mauritius) Seychelles and Amirante Plateaus, Constant, Platte and La Perle Banks (Seychelles); St Lazarus and Almirante Leite Banks (Mozambique)
2. Total area (sq km)				?			1		2	1=22,696; 2=42,950
3. Area protected?										None
4. % protected										None
5. Area proposed for protection										None
6. Does enforcement exist?										Not applicable
7. Is it adequate?										Not applicable
8 Uses of habitats fishing				Y			Y		Y	
9. Threats oil exploration									Y	

HABITAT TYPE: Abyssal Plain	SOM.	KEN.	TANZ.	MOZAM.	MADAG.	FRANCE (REUN).	MAURI.	COM.	SEY.	REMARKS
1. Does it occur?	Y	x	x	x	Y	Y	Y	Y	Y	Outside Territorial Sea but within EEZ
2. Total area?										Not available
3. Area protected?										None
4. % protected										None
5. Area proposed for protection										None
6. Does enforcement exist?										Not applicable
7. Is it adequate?										Not applicable
8 Uses of habitats										Potential for manganese nodule exploration and mining
9. Threats										No immediate or obvious threats

HABITAT TYPE: Seamount	SOM.	KEN.	TANZ.	MOZAM.	MADAG.	FRANCE (REUN).	MAURI.	COM.	SEY.	REMARKS
1. Does it occur?	x	x	x	Y	x	x	x	x	x	
2. Total area?										Not available
3. Area protected?										None
4. % protected										None
5. Area proposed for protection										None
6. Does enforcement exist?										Not applicable
7. Is it adequate?										Not applicable
8 Uses of habitats fishing				Y						
9. Threats										No immediate or obvious threats

HABITAT TYPE: Ocean Trench	SOM.	KEN.	TANZ.	MOZAM.	MADAG.	FRANCE (REUN).	MAURI.	COM.	SEY.	REMARKS
1. Does it occur?	x	x	x	x	x	Y	Y	x	Y	Mauritus Trench (Mauritius and Reunion); Amirante Trench (Seychelles); all are minor trenches
2. Total area?										Not available
3. Area protected?										None
4. % protected										None
5. Area proposed for protection										None
6. Does enforcement exist?										
7. Is it adequate?										
8 Uses of habitats										Currently none
9. Threats										No immediate or obvious threats

HABITAT TYPE: Upwelling Zone	SOM.	KEN.	TANZ.	MOZAM.	MADAG.	FRANCE (REUN).	MAURI.	COM.	SEY.	REMARKS
1. Does it occur?	1	x	x	2	x	x	x	3	3	1=NE Somali Coast; 2=N coast to 16°S; 3=seasonal small upwellings which probably also occur off other countries
2. Total area?										Variable
3. Area protected?										None
4. % protected										None
5. Area proposed for protection										None
6. Does enforcement exist?										
7. Is it adequate?										
8 Uses of habitats fishing	Y			Y						
9. Threats										No immediate or obvious threats but over-fishing is a potential threat

HABITAT TYPE: Algal Beds	SOM.	KEN.	TANZ.	MOZAM.	MADAG.	FRANCE (REUN).	MAURI.	COM.	SEY.	REMARKS
1. Does it occur?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Probably in all countries
2. Total area?										Not available
3. Area protected?	x	Y	x	Y	x	x	x	x	Y	Some included in marine reserves; area not available
4. % protected										
5. Area proposed for protection	x	Y	Y	Y	x	x	x	x	x	
6. Does enforcement exist?		Y		Y					Y	
7. Is it adequate?		Y		x					Y	
8 Uses of habitats										Not known
9. Threats										
siltation									Y	
landfill and waste disposal									Y	
eutrophication									Y	From sewerage outfalls and garbage tip

HABITAT TYPE: Seagrass Beds	SOM.	KEN.	TANZ.	MOZAM.	MADAG.	FRANCE (REUN).	MAURI.	COM.	SEY.	REMARKS
1. Does it occur?	Y	Y	Y	Y	Y	Y	Y	Y	Y	
2. Total area?										Not available
3. Area protected?	x	1	x	2	x	x	x	x	3	1=Watamu-Malindi; Kisite-Mpunguti; Kiunga; 2=Inhaca Is; Bazaruto; 3=Ste Anne; Port Launay; Curieuse; Baie Ternay; area not available
4. % protected										
5. Area proposed for protection	x	Y	Y	Y	x	x	x	x	x	The proposed extension to Bazaruto N.P. would include the region's largest and most important seagrass beds
6. Does enforcement exist?		Y		1					Y	1=only at Inhaca Island
7. Is it adequate?		Y		x					Y	
8 Uses of habitats										
fishing	Y	Y	Y	Y	Y		Y	Y	Y	
9. Threats										
seine netting	Y		Y	Y	Y		Y	Y	Y	Physically damages seagrasses
pollution			Y							Gypsum dumped by fertilizer factory at Tonga
siltation		Y	Y	Y	Y			Y	Y	
poisons								Y		extracted from Tephrosia candida for fishing (wrasses, snappers, barracudas)

HABITAT TYPE: Salina	SOM.	KEN.	TANZ.	MOZAM.	MADAG.	FRANCE (REUN).	MAURI.	COM.	SEY.	REMARKS
1. Does it occur?	x	Y	Y	Y	Y	x	Y	x	x	
2. Total area?										Not available
3. Area protected?										None
4. % protected										None
5. Area proposed for protection										None
6. Does enforcement exist?										
7. Is it adequate?										
8 Uses of habitats salt pans			Y	Y						Not known
9. Threats encroachment		Y	Y	Y	Y					Agriculture; settlement

HABITAT TYPE: Mangrove Forest	SOM.	KEN.	TANZ.	MOZAM.	MADAG.	FRANCE (REUN).	MAURI.	COM.	SEY.	REMARKS
1. Does it occur?	Y	Y	Y	Y	Y	x1	x1	Y1	Y1	1=few species; small stands on Mauritius (1-2 sq km total area) and Reunion, not forest; not in Reunion
2. Total area?	?	1	2	3	4		5	5	5	1=587; 2=500; 3=850; 4=3,207; 5=very small area
3. Area protected?	x	1	x	Y	x		Y	x	Y	1=Kiunga; Watamu - Malindi; Kisite - Mpunguti; commercial exploitation prohibited but local use allowed in Kenya
4. % protected										
5. Area proposed for protection	x	Y	Y	x	x		x	x	x	
6. Does enforcement exist?		Y		Y					Y	
7. Is it adequate?		Y		Y					Y	
8 Uses of habitats										
fishing		Y	Y	Y	Y		Y		Y	
timber extraction	Y	Y	Y	Y	Y			Y		
urban development			Y	Y					Y	
industrial development			Y							
agricultural development				Y	Y				Y	
settlement by itinerants		Y								
resort development			Y						Y	Africana Village (Tanzania); La Reserve (Praslin, Seychelles)
mariculture		Y	Y				Y			
salt production			Y	Y					Y	
9. Threats										
industrial pollution		Y	Y	Y			Y			
oil pollution	Y	Y	Y	Y	Y		Y			Near harbours
waste disposal					Y		Y		Y	
sewerage		Y							Y	
siltation					Y			Y		
reclamation		Y	Y	Y	Y		Y	Y	Y	
dam construction	Y	Y	Y	Y						Altered hydrological regime, drying of creeks, salination
clearing/deforestation	Y	Y	Y	Y				Y	Y	

HABITAT TYPE: Maritime Forest-Woodland	SOM.	KEN.	TANZ.	MOZAM.	MADAG.	FRANCE (REUN).	MAURI.	COM.	SEY.	REMARKS
1. Does it occur?	x	Y	Y	Y	Y	xl	xl	xl		xl l=eliminated by uses listed below; a small patch on coast of Grand Brute (Reun)
2. Total area?										Not available
3. Area protected?	x	Y	?	Y	x					
4. % protected										
5. Area proposed for protection										None
6. Does enforcement exist?		Y		Y						
7. Is it adequate?		Y		Y						
8 Uses of habitats										
timber extraction		Y	Y	Y	Y		Y	Y	Y	
urban development		Y					Y	Y	Y	
industrial development		Y					Y		Y	
agricultural development		Y	Y	Y	Y		Y	Y	Y	
settlement by itinerants		Y	Y	Y	Y		Y			
9. Threats										
encroachment		Y	Y	Y	Y		Y	Y	Y	
burning (quemara)				Y						

HABITAT TYPE: Coastal Swamp Forest	SOM.	KEN.	TANZ.	MOZAM.	MADAG.	FRANCE (REUN).	MAURI.	COM.	SEY.	REMARKS
1. Does it occur?	x	x	Y	Y	x	x	x	x	x	
2. Total area?										Not available
3. Area protected?			Y	Y						Jozani Forest Reserve on Zanzibar and Maputo Reserve in Mozambique; area not available
4. % protected										
5. Area proposed for protection										None
6. Does enforcement exist?			x	Y						
7. Is it adequate?			x	Y						
8 Uses of habitats										
timber extraction			Y	x						
agricultural development			Y	x						
9. Threats										
encroachment			Y	x						

HABITAT TYPE: Coastal Shrubland	SOM.	KEN.	TANZ.	MOZAM.	MADAG.	FRANCE (REUN).	MAURI.	COM.	SEY.	REMARKS
1. Does it occur?	Y	Y	Y	Y	Y	Y	Y	Y	Y	
2. Total area?										Not available
3. Area protected?	x	?	x	1	?	x	x	x	2	1=Maputo; Bazaruto; Inhaca Is; 2=Aldabra; Ste Anne
4. % protected										
5. Area proposed for protection										None
6. Does enforcement exist?				Y		x			Y	
7. Is it adequate?				1		x			Y	1=Maputo only
8. Uses of habitats										
timber extraction	Y			Y						Brushwood for shelters, firewood
urban development		Y	Y	Y					Y	
industrial development		Y								
agricultural development		Y	Y			Y			Y	
settlement by itinerants		Y	Y							
resort development		Y	Y	Y		Y			Y	
9. Threats										
dumping of garbage		Y								
encroachment		Y	Y	Y					Y	
burning (quemara)				Y		Y				

HABITAT TYPE: Coastal Grassland

		SOM.	KEN.	TANZ.	MOZAM.	MADAG.	FRANCE (REUN).	MAURI.	COM.	SEY.	REMARKS
1.	Does it occur?	x	Y	x	Y	x	x	Y	x	1	1.Aldabra
2.	Total area?										Not available
3.	Area protected?		?		Y					Y	Maputo reserve and Aldabra; area not available
4.	% protected										
5.	Area proposed for protection										None
6.	Does enforcement exist?				Y					Y	
7.	Is it adequate?				Y					Y	
8	Uses of habitats										
	agricultural development		Y		Y						
	settlement by itinerants		Y								
9.	Threats										
	encroachment		Y		Y					Y	

should be defined in the legislation. It should specify that, in relation to marine conservation and area protection, the lead agency should have ultimate authority.

85. Legislation for the establishment and management of marine protected areas should explicitly recognize the linkage between sustainable use of living resources and protection of ecological processes and conditions. Ecological principles should be recognized, such as the transfer by water movements of larvae, nutrients and pollutants, and the life cycles of marine animals.

86. Marine protected legislation should require that zoning or management plans or both be prepared for each site, and should specify the constituent elements and essential considerations for any plan. The legislation should require periodic revision of zoning and management plans, and should require scientific survey, research and monitoring of relevant ecological and socio-economic conditions and processes in establishing protected areas and in the periodic revision of zoning and management plans.

87. Without deviating from the principal conservation objectives, legislation should be as flexible and cost-effective as possible, adhering to the following principles:

a) unnecessary conflict with existing legislation and administration should be avoided;

b) the continuance of existing regulations and regulatory mechanisms should be considered when they are consistent with conservation objectives; and

c) regulations, zoning plans and management plans for protected areas should be as simple as practicable.

88. Establishment of any marine or coastal protected area should be empowered by law, with approval and any subsequent changes, including abolition, being subject to endorsement by the highest body responsible for legislative matters in the country or region.

89. The legislation must provide authority for adequate provision of regulations in order that activities can be controlled or if necessary prohibited.

90. Legislation must provide for adequate enforcement duties and powers, including as many incentives as practicable for self-enforcement of rules and regulations by the people locally involved with using and benefitting from the area. Special attention should be given to providing for effective enforcement in Exclusive Economic Zones in accordance with international law. Legislation should provide for strict penalties in cases of serious breach of regulations.

91. Financing for marine and coastal protected areas should be identified or referenced in the legislation according to general practice. In addition, possibilities should be investigated for establishing special funds whereby revenue from these areas, for example from tourism, might be applied directly back into the protected area programme or into projects for local area peoples.

92. Umbrella legislation (i.e. serving several objectives simultaneously) based on sustainable use of large marine areas should be seriously considered in all countries. Such legislation can be justified on the grounds that world-wide experience has shown that piecemeal protection of small marine areas together with conventional fisheries management in unprotected areas usually leads to the overexploitation of the resources and to the collapse of fish stocks. Umbrella

HABITAT TYPE: Coastal Palm Forest	SOM.	KEN.	TANZ.	MOZAM.	MADAG.	FRANCE (REUN).	MAURI.	COM.	SEY.	REMARKS
1. Does it occur?	x	Y	x	Y	Y	x	Y	x	x	
2. Total area?										Not available
3. Area protected?										None
4. % protected										None
5. Area proposed for protection										None
6. Does enforcement exist?										
7. Is it adequate?										
8 Uses of habitats timber extraction		Y								
9. Threats										Not known

HABITAT TYPE: Coral Atoll

	SOM.	KEN.	TANZ.	MOZAM.	MADAG.	FRANCE (REUN).	MAURI.	COM.	SEY.	REMARKS
1. Does it occur?	x	x	x	x	x	x	x	x	Y	Providence, Cosmoledo, Aldabra, Astove, Assumption, Farquhar, Desroches
2. Total area?										Not available
3. Area protected?									Y	Aldabra (350 sq km)
4. % protected										
5. Area proposed for protection									x	
6. Does enforcement exist?									Y	
7. Is it adequate?									Y	
8 Uses of habitats										
fishing									Y	Includes turtling and harvest of green snail and other shells
agricultural development									Y	Principally coconut
guano mining									Y	
tourism									Y	
research									Y	Research station maintained on Aldabra
9. Threats										Not known

HABITAT TYPE: Barrier Coral Reef	SOM.	KEN.	TANZ.	MOZAM.	MADAG.	FRANCE (REUN).	MAURI.	COM.	SEY.	REMARKS
1. Does it occur?	x	x	Y	x	Y	x	Y	Y	x	
2. Total area?										Not available
3. Area protected?										None
4. % protected										None
5. Area proposed for protection										None
6. Does enforcement exist?										
7. Is it adequate?										
8 Uses of habitats fishing			Y		Y		Y	Y	Y	
9. Threats explosive fishing			Y							

HABITAT TYPE: Fringing Coral Reef	SOM.	KEN.	TANZ.	MOZAM.	MADAG.	FRANCE (REUN).	MAURI.	COM.	SEY.	REMARKS
1. Does it occur?	Y	Y	Y	Y	Y	Y	Y	Y	Y	
2. Total area? (sq km)										790 -- Mauritian Iss.; 12 - Reunion; Aldabra, Tromelin etc., area unknown
3. Area protected?	x	1	x	2	x	x	x	x	3	1=Malindi-Watamu; Kisite-Mpunguti; Kiunga; 2=Inhaca Is; Bazaruto; 3=Ste Anne; Port Launay; Baie Ternay; Curieuse; Aldabra; Glorieuses, Tromelin, Bassas de India
4. % protected										
5. Area proposed for protection	x	Y	Y	Y	x	x	x	x	x	
6. Does enforcement exist?		Y		1		Y			Y	1=Inhaca Is only
7. Is it adequate?		Y		x		x			x	Lack of staff and equipment
8 Uses of habitats										
fishing		Y	Y	Y	Y	Y	Y	Y	Y	Y
coral mining		Y			Y			Y	1	1=proposed
tourism/recreation		Y	Y	Y	Y	Y	Y	Y	Y	
research				Y		Y			Y	
9. Threats										
habitat removal		Y			Y			Y		Through coral mining
anchor damage	Y	Y	Y	Y	Y	Y	Y	Y	Y	
explosive fishing		Y	Y			Y	Y			
overexploitation		Y		1	1					1=includes stripping of organisms from reef-flats at low tide and overturning of coral rock
ornamental trade	Y	Y	Y	Y	Y		Y	Y	Y	Collection of coral and shells for export or sale to tourists
spearfishing		Y	Y	Y	Y	Y	Y	?	1	Banned in Tanzania, Mauritius, Seychelles; 1=very little
sewerage pollution		Y	Y				Y		Y	
industrial pollution			Y						Y	
agricultural pollution							Y			
siltation		Y		Y	Y			Y	Y	

HABITAT TYPE: Patch Reef	SOM.	KEN.	TANZ.	MOZAM.	MADAG.	FRANCE (REUN).	MAURI.	COM.	SEY.	REMARKS
1. Does it occur?	?	Y	Y	Y	Y	Y	Y	Y	Y	
2. Total area?										Not available
3. Area protected?	x	Y	x	Y	x	x	x	x	Y	In marine reserves; area not available
4. % protected										
5. Area proposed for protection	x	Y	Y	Y	x	x	x	x	x	
6. Does enforcement exist?		Y		Y					Y	
7. Is it adequate?		Y		x					x	Lack of staff and equipment
8 Uses of habitats										
fishing			Y	Y	Y	Y		Y	Y	Y
coral mining		Y			Y			Y	1Y	1=proposed
9. Threats										
habitat removal		Y					Y			Coral mining
anchor damage							Y		Y	
explosive fishing		Y	Y				Y			
overexploitation		Y								
ornamental trade		Y	Y	Y	Y		Y	Y	Y	Collection of coral and shells for export or sale to tourists
spearfishing		Y	Y	Y	Y		Y Y	?	1Y	Banned in Tanzania, Mauritius, Seychelles; 1=very little
sewerage pollution		Y	Y				Y		Y	
industrial pollution			Y				Y		Y	
agricultural pollution							Y	Y		
siltation		Y			Y		Y	Y	Y	

HABITAT TYPE: Sabellariid Reef	SOM.	KEN.	TANZ.	MOZAM.	MADAG.	FRANCE (REUN).	MAURI.	COM.	SEY.	REMARKS
1. Does it occur?	x	x	x	Y	x	x	x	x	x	
2. Total area?										Not known
3. Area protected?				Y						Not known
4. % protected										
5. Area proposed for protection										
6. Does enforcement exist?				x						
7. Is it adequate?				x						
8 Uses of habitats										No current uses (formerly education)
9. Threats										No immediate or obvious threats

Annex VII

Known endemic marine and coastal species and subspecies of the East African region

SOMALIA

Birds:	Obbia lark Ealandrella obbiensis

KENYA

Mammals:	Striped bush squirrel Funisciurus paraxerus flavivittis
	Coastal red-legged sun squirrel Heliosciurus rufobrachium undulatus
	Giant cane rat Thyronomyx swinderianus
	Thomas's silvery mole rat Heliophobius spalax
	Golden-rumped elephant shrew Rhynchocyon cirnei chrysopygus
	Coastal suni Neotragus moschatus kirchenpaueri
Birds:	Tana River cisticola Cisticola restricta
	Malindi pipit Anthus melindae
	Sokoke scops owl Otus ireneae
	Clarke's weaver Ploceus golandi
Plants:	Euphorbia Euphorbia wakefieldii

TANZANIA

Mammals:	Zanzibar red colobus Colobus badius kirkii
	Zanzibar suni Neotragus moschatus moschatus
Birds:	Pemba scops owl Otus rutilus pembaensis
	Pemba green pigeon Treron australis pembaensis
	Pemba white-eye Zosterops senegalensis vaughani

KENYA AND TANZANIA

Mammals:	Ader's duiker Cephalophus adersi
Birds:	Amani sunbird Anthreptes pallidigaster
	Sokoke pipit Anthus sokokensis
	East coast akalat Sheppardia gunningi sokokensis
	Spotted ground thrush Turdus fischeri fisheri
Reptiles:	Caecilian Schistometopum gregorii

MOZAMBIQUE

Birds:	East coast akalat Sheppardia gunningi gunningi

KENYA, TANZANIA AND MOZAMBIQUE

Birds:	Plain-backed sunbird Anthreptes reichenowi

MADAGASCAR

Mammals:	Aye aye Daubentonia madagascariensis
	Black lemur Lemur macaco
	Nosy Be sportive lemur Lepilemur mustelinus dorsalis
	Coquerel's mouse lemur Microcebus coquereli
Birds:	Madagascar fish eagle Haliaeetus vociferoides
	Madagascar green-backed heron Butorides striatus rutenbergi
Reptiles:	Madagascar tortoise/angonoka Geochelone yniphora
Amphibians:	Anton-guille frog Dyscophus antongili
Molluscs:	Volute Lyria delessertiana (may extend to Seychelles)

FRANCE (Réunion)

Birds:	Storm petrel Pterodroma baraiu
	Storm petrel Pterodroma aterrima
Reptiles:	Phelsuma ornata inexpectata

MAURITIUS

Mammals:	Mauritius flying fox Pteropus niger
Birds:	Rodrigues fody Foudia flavicans
	Rodrigues brush warbler Bebrornis rodericana
Reptiles:	Serpent Island gecko Cyrtodactylus serpensinsula
	Round Island day gecko Phelsuma guentheri
	Round Island skink Leiolopisma telfairii
	Round Island boa Bolyeria multocarinata
	Round Island keel-scaled boa Casarea dussumieri
	Skink Gongylomorphus bojerii fontenayi
Molluscs:	Imperial harp Harpa costata
	Violet spider conch Lambis violacea
	Cone Conus timorensis
Polychaetes:	Bristle worm Leptonereis zebra
Ascidians:	Sea squirt Pseudodistoma mauritiana
	Sea squirt Polycarpa nigricans
Plants:	Screw pine Pandanus vandermeerschii
	Bottle palm Hyoporbe lagenicaulis
	Ebony Diospyros eggrettarum
	Fan palm Latania loddigesii
	Bois de fer Sideroxylon boutonianum
	Lomatophyllum tormentorii
	Nesogenera decumbens
	Zanthoxylum paniculatum
	Antirrhoa frangulacea
	Hurricane palm Dictyosperma album var. conjugatum

Euphorbia vividella
Euphorbia goliana
Delosperma napilorme
Latania lontaroides

FRANCE AND MAURITIUS

Crustaceans: Macrobrachium hierimanus

Molluscs: Crib cowrie Cypraea cribellum
Esontropia cowrie Cypraea esontropia

COMOROS

Birds: Comoros green-backed heron Butorides striatus rhizophorae

Insects: Comoro graphium butterfly Graphium levassori

SEYCHELLES

Mammals: Seychelles flying fox Pteropus seychellensis
Seychelles sheath-tailed bat Coleura seychellensis

Birds: Roseate tern Sterna dougallii arideensis
Dimorphic little egret Egretta garzetta dimorpha
Seychelles cattle egret Bubulcus ibis sechellarum
Seychelles green-backed heron Butorides striatus degens
Outer islands green-backed heron Butorides striatus crawfordi
Seychelles magpie robin Copsychus sechellarum
Seychelles fody Foudia sechellarum
Seychelles black paradise flycatcher Terpsiphone corvina
Seychelles brush warbler Acrocephalus sechellensis
Seychelles turtle dove Streptopelia picturata rostrata
Seychelles gallinule Gallinula chloropus seychellarum
Aldabra turtle dove Streptopelia picturata coppingeri
Aldabra nightjar Caprimulgus madagascariensis aldabrensis
Aldabra bulbul Hypsipetes madagascariensis rostratus
Aldabra fody Foudia eminentissima aldabrana
Aldabra coucal Centropus toulou insularis
Aldabra white-throated rail Dryolimnas cuvieri aldabranus
Aldabra brush warbler Nesillas aldabranus
Aldabra drongo Dicrurus aldabranus
Aldabra sacred ibis Threskiornis aethiopica abbotti
Aldabra kestrel Falco newtoni aldabranus

Reptiles: Aldabra giant tortoise Geochelone gigantea
Amirantes day gecko Phelsuma abbotti

Insects: Tenebrionid beetle Pulposipus herculeanus

Plants: Screw pine Pandanus balfourii

Annex VIII

Threatened marine and coastal species of the East African region (Ex = Extinct; E = Endangered; V = Vulnerable; R = Rare; I = Indeterminate; K = Insufficiently known; CT = Commercially threatened; x = status not assigned; ? = occurrence suspected but not confirmed; areas with no symbols require further investigation).

SPECIES:	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY
MAMMALS									
Zanzibar red colobus Colobus badius kirkii			R						
Zanzibar suni Neotragus moschatus moschatus			E						
Dugong Dugong dugon	V	V	V	V			Ex		Ex
Humpback whale Megaptera novaeangliae				E					
Blue whale Balaenoptera musculus			E	E	E				
Black lemur Lemur macaco					E				
Nosy Be Sportive lemur Lepilemur mustelinus dorsalis					R				
Coquerel's mouse lemur Microcebus coquereli					V				
Aye aye Daubentonia madagas-cariensis					E				
BIRDS									
Sokoke pipit Anthus sokokensis		x	x						
Sokoke scops owl Otus ireneae			x						
Amani sunbird Anthreptes pallidigaster		R	R						
East coast akalat Sheppardia gunningi gunningi				R					
East coast akalat S. g. sokokensis		R	R						
Pemba scops owl Otus rutilus pembaensis			x						
Wattled crane Bugeranus carun-culatus				V					
Clarke's weaver Ploceus golandi		x							
Spotted ground thrush Turdis fisheri fisheri		R	R						

SPECIES:	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY
Aldabra white-throated rail Dryolimnas cuvieri aldabranus									R
Aldabra brush warbler Nesillas aldabranus									I
Aldabra drongo Dicrurus aldabranus									x
Aldabra sacred ibis Threskiornis aethiopica									R
Aldabra kestrel Falco newtoni aldabranus									R
Seychelles magpie robin Copsychus sechellarum									E
Seychelles fody Foudia sechellarum									R
Seychelles black paradise flycatcher Terpsiphone corvina									R
Seychelles brush warbler Acrocephalus sechellensis									R
Seychelles turtle dove Streptopelia picturata rostrata									E
Madagascar fish eagle Haliaeetus vociferoides					E				
Pterodroma aterrima						I			
REPTILES									
Green turtle Chelonia mydas	E	E	E	E	E	E	E	E	E
Hawksbill turtle Eretmochelys imbricata	E	E	E	E	E	E	E	E	E
Olive ridley turtle Lepidochelys olivacea			E	E	E				
Loggerhead turtle Caretta caretta		V	V	V	V				
Leatherback turtle Dermochelys coriacea				E					E
Serpent Island gecko Cyrtodactylus serpensinsula							R		
Round Island day gecko Phelsuma guentheri							R		
Round Island skink Leiolopisma telfairii							R		

SPECIES:	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY
Skink Gongylomorphus bojerii fontenayi							R		
Round Island boa Bolyeria multocarinata							E		
Round Island keel-scaled boa Casarea dussumieri							E		
Aldabra giant tortoise Geochelone gigantea									R
Madagascar tortoise/angonoka Geochelone yniphora					E				
Phelsuma ornata inexpectata						R			
MOLLUSCS									
Triton's trumpet Charonia tritonis		R	R	R	R	R	R	R	R
Commercial trochus Trochus niloticus					CT				
Green snail Turbo marmoratus	?	CT	CT	CT	CT		CT	CT	CT
Fluted giant clam Tridacna squamosa	?	I	I	I	?	I	I	?	I
Small giant clam Tridacna maxima	?	K	K	K	?	K	K	?	K
Horse's hoof clam Hippopus hippopus							?		
Pearl oyster Pinctada spp.	CT	CT	CT	CT	CT		CT	CT	CT
CRUSTACEANS									
Coconut crab Birgus latro			R		?		R/Ex	R	R/Ex
Spiny lobsters Panulirus spp.	CT	CT	CT	CT	CT	CT	CT	CT	CT
CNIDARIANS									
Black coral Antipathes dichotoma	?	?	?	?	?		CT	?	CT
Whip coral Cirrhipathes spp.	?	?	?	?	?	CT	CT	?	CT
INSECTS									
Tenebrionid beetle Pulposipus herculeanus									R
Comoro graphium butterfly Graphium levassari								V	

Annex IX

Additional marine and coastal species of the East African region

SPECIES	KNOWN CRITICAL HABITATS OF THE COASTAL ZONE
Greater flamingo Phoenicopterus ruber	Mozambique: Inhaca, San Sebastian peninsula (nesting, feeding) Seychelles: Aldabra (feeding, moulting)
White pelican Pelecanus onocrotalus	Mozambique: Marromeu - Zambezi R. delta (feeding, nesting)
Lesser frigate bird Fregata ariel	Seychelles: Aride, Aldabra, Cosmoledo (nesting, feeding) Mauritius: St. Brandon (Albatross, Paul, Grande Capitaine, Ile Longue)(nesting, feeding)
Greater frigate bird Fregata minor	Seychelles: Aldabra, Cosmoledo, (nesting, (feeding) Mauritius: St. Brandon (Albatross, Paul, Grande Capitaine, Ile Longue)(nesting, feeding)
Red-tailed tropic bird Phaethon rubricauda	Mauritius: Round, Serpent, Coin de Mire (nesting) Seychelles: Aride, Aldabra, Cosmoledo (nesting)
White-tailed tropic bird Phaethon lepturus	Mauritius: Round, Serpent, Coin de Mire (nesting) Seychelles: Aride and other small granitic islands Aldabra (nesting)
Masked booby Sula dactylatra melanops	Seychelles: Cosmoledo, Boudeuse, Desnoeufs (nesting, feeding) Mauritius: Serpent, St. Brandon (nesting, feeding) France (Réunion): Tromelin (nesting, feeding)
Brown booby Sula leucogaster	Seychelles: Desnoeufs, Farquhar (nesting, feeding)
Red-footed booby Sula sula rubipes	Seychelles: Farquhar, Cosmoledo, Aldabra (nesting, feeding) France (Réunion): Tromelin (nesting, feeding)

NOTE: destruction of indigenous forest and its replacement with coconut plantations, and predation by people (especially in Seychelles) has caused the total elimination of Abbott's booby Sula abbotti in the western Indian Ocean and a large decline in the populations of all other booby species.

Audubon's shearwater Puffinus lherminieri nicolae	Seychelles: Cousin, Cousine, ?Aride, Aldabra, ?Astove, Cosmoledo, ?Desnoeufs (nesting, feeding)
Wedge-tailed shearwater Puffinus pacificus chlororhynchus	Seychelles: Cousin, Cousine, Aride, Desnoeufs, Desroches (nesting, feeding) Mauritius: Round Island (nesting, feeding)
Trinidad Island petrel Pterodoma arminjoniana	Mauritius: Round Island (nesting, feeding)
Bridled tern Sterna anaethetus	Kenya: islets off Kiunga, Ras Tenewi (nesting, feeding) Seychelles: Recif, Cousin, Cosmoledo, (nesting, feeding)
Sooty tern Sterna fuscata	Seychelles: Aride, Bird, Desnoeufs, African Banks, Astove, Cosmoledo, Farquhar (nesting, feeding) France (Réunion): Ile du Lys (Glorieuse) (nesting, feeding) Mauritius: St. Brandon islets (nesting, feeding)
Roseate tern Sterna dougallii	Kenya: islets off Kiunga, Ras Tenewi (nesting, feeding) Seychelles: Aride, Mamelles, Recif, small islets off Mahé and Praslin, African Banks (nesting, feeding) Mauritius: St. Brandon (Petit Raphael, Ile Torture aux Ile Longue (feeding, nesting)
Black-naped tern Sterna sumatrana	Seychelles: African Banks, Astove, Aldabra, Providence, Farquhar (nesting, feeding)
Little tern Sterna albifrons	Seychelles: granitic islands, Amirantes, Aldabra (feeding only - shallows at edge of the sea)
Damara tern Sterna balaenarum	Seychelles: Bird, African Banks (?nesting, feeding)
White-cheeked tern Sterna repressa	Kenya: islets off Kiunga, Ras Tenewi (nesting, feeding)
Fairy tern Gygis alba	Seychelles: Marie Louise, Cousin, numerous granitic islands, Assumption, Aldabra (nesting, feeding) Mauritius: Ile Coco, Ile aux Sable, St. Brandon islets (nesting, feeding)
Lesser noddy Anous tenuirostris	Seychelles: Cousin, Cousine, Aride (nesting, feeding) Mauritius: Serpent Island, Ile de Cocos, Ile Sable, St. Brandon islets (feeding, nesting)

Common noddy Anous stolidus	Kenya: islets off Ras Tenewi (nesting, feeding) Seychelles: Cousin, Aride, African Banks, Desnoeufs, Aldabra (nesting, feeding) France (Réunion): Ile du Lys (Glorieuse) (nesting, feeding) Mauritius: Serpent Island, Rodrigues (Ile aux Cocos, Ile aux Sables, St. Brandon islets) (feeding, nesting)
Crested tern Thalasseus bergii	Seychelles: African Banks, Aldabra, ?Astove (nesting, feeding); granitic islands (feeding - in shallows over seagrass)
Lesser crested tern Thalasseus bengalensis	East African mainland: (nesting, feeding) Seychelles: Aldabra (feeding - lagoon)
Gull-billed tern Gelochelidon nilotica	Seychelles: granitic islands (feeding - very shallow water)
Caspian tern Hydropogne caspia	Seychelles: Aldabra, ?Astove (nesting, feeding) Cosmoledo (feeding)
Sooty gull Larus hemprichii	Kenya: islets off Kiunga, Ras Tenewi (nesting, feeding)
Black-headed gull Larus brunnicephalus	Seychelles: rare visitor
Lesser black-backed gull Larus fuscus	Seychelles: rare visitor
Great skua Catharacta skua	Seychelles: rare visitor

Annex X

Summary data for Threatened East African Species

SPECIES: Humpback whale (Megaptera novaeangliae)
RED DATA BOOK CATEGORY: Endangered

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
1. Does it occur?	x	x	x	Y	?	?	?	?	x	
2. Population size?				?						
3. Does it breed?				?						
4. Are the eggs collected?				nr						nr = not relevant
5. Is it hunted/fished?				x						
6. Is it traded locally?				x						
7. Is it traded internationally?				x						
8. Are nesting/breeding sites protected?				x						
9. Is protection for sites proposed?				x						
10. Are feeding areas protected?				x						
11. Is protection of areas proposed?				x						
12. Are adults, their young and eggs protected?				Y						In Indian Ocean Sanctuary, and by quotas outside

SPECIES: Humpback whale (Megaptera novaeangliae)
RED DATA BOOK CATEGORY: Endangered

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
13. Is protection for these proposed?				Y						Through the International Whaling Commission
14. Is harvest of eggs/adults controlled?				Y						
15. Does enforcement exist?				Y						Through the International Whaling Commission quotas
16. Is it adequate?				?						Apparently yes
17. Is the country a CITES member?				Y						
18. Has a reservation been lodged for this species?				x						
19. Does the country honour CITES?				Y						for this species
20. Is there currently research on this species?				x						
21. Does ranching exist?				nr						
22. Is it proposed?				nr						
23. Do hatcheries exist/ proposed?				nr						

SPECIES: Dugong (Dugong dugon)
RED DATA BOOK CATEGORY: Vulnerable

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
1. Does it occur?	Y	Y	Y	Y	Y	X	Ex	Y	Ex1	1=may occur at Cosmoledo & Aldabra, but very rare
2. Population size?										
3. Does it breed?	Y	Y	Y	Y	Y			Y		
4. Are the eggs collected?	nr	nr	nr	nr	nr			nr		
5. Is it hunted/fished?	?	Y	Y	Y	Y			Y		
6. Is it traded locally?	?	?	?	Y	Y			Y		
7. Is it traded internationally?	x	x	x	x	x			x		
8. Are nesting/breeding sites protected?	x	x	x	1	x			x		1=some protection in the Inhaca and Bazaruto Reserve
9. Is protection for sites proposed?	x	Y	Y	Y	x			x		
10. Are feeding areas protected?	x	x	x	1	x			x		1=some protection in Inhaca and Bazaruto Reserve
11. Is protection of areas proposed?	x	Y	Y	Y	x			x		
12. Are adults, their young and eggs protected?	?	?	?	?	?			x		

SPECIES: Dugong (Dugong dugon)
RED DATA BOOK CATEGORY: Vulnerable

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
13. Is protection for these proposed?	?	?	?	?	?					
14. Is harvest of eggs/adults controlled?	x	x	x	x	x			x		
15. Does enforcement exist?	x	x	x	x	x			nr		
16. Is it adequate?	x	x	x	x	x			x		
17. Is the country a CITES member?	x	Y	Y	Y	Y			x		
18. Has a reservation been lodged for this species?	nr	x	x	x	x			x		
19. Does the country honour CITES?	nr	Y	Y	Y	Y			nr		for this species
20. Is there currently research?	x	x	x	x	x			x		
21. Does ranching exist?	x	x	x	x	x			x		
22. Is it proposed?	x	x	x	x	x			x		
23. Do hatcheries exist/ proposed?	nr	nr	nr	nr	nr			nr		

SPECIES: Zanzibar red colobus (Colobus badius kirkii)
RED DATA BOOK CATEGORY: Rare

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
1. Does it occur?	x	x	Y	x	x	x	x	x	x	Endemic to Jozani forest, Zanzibar
2. Population size?			150-200							
3. Does it breed?			Y							
4. Are the eggs collected?			nr							
5. Is it hunted/fished?			Y							under pretext of crop protection
6. Is it traded locally?			x?							probably not
7. Is it traded internationally?			x							
8. Are nesting/breeding sites protected?			Y							Jozani declared a Forest Reserve in 1960
9. Is protection for sites proposed?			nr							
10. Are feeding areas protected?			Y							Jozani declared a Forest Reserve in 1960
11. Is protection of areas proposed?			nr							
12. Are adults, their young and eggs protected?			Y							fully protected under Tanzania Wild Animals Protection Act; Appendix 1 of CITES, class A of 1969 African Wildlife Convention

SPECIES: Zanzibar red colobus (Colobus badius kirkii)
RED DATA BOOK CATEGORY: Rare

INFORMATION CATEGORY	SOM KEN TANZ MOZ MAD FRA MAUR COM SEY	REMARKS
13. Is protection for these proposed?	nr	
14. Is harvest of eggs/adults controlled?	Y	
15. Does enforcement exist?	Y	
16. Is it adequate?	x	There is habitat encroachment at edge of Jozani forest
17. Is the country a CITES member?	Y	
18. Has a reservation been lodged for this species?	x	
19. Does the country honour CITES?	Y	for this species
20. Is there currently research on this species?	x	most recent census by Oxford Univ Expedition to Zanzibar of 1972
21. Does ranching exist?	x	
22. Is it proposed?	x	
23. Do hatcheries exist/ proposed?	nr	

SPECIES: Zanzibar suni (Nesotragus moschatus moschatus)
RED DATA BOOK CATEGORY: Endangered

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
1. Does it occur?	x	x	Y	x	x	x	x	x	x	endemic to Zanzibar
2. Population size?			?							
3. Does it breed?			nr							
4. Are the eggs collected?										
5. Is it hunted/fished?			?							
6. Is it traded locally?			?							
7. Is it traded internationally?			x							
8. Are nesting/breeding sites protected?			?							
9. Is protection for sites proposed?			?							
10. Are feeding areas protected?			?							
11. Is protection of areas proposed?			?							
12. Are adults, their young and eggs protected?			x							

SPECIES: Zanzibar suni (Nesotragus moschatus moschatus)
RED DATA BOOK CATEGORY: Endangered

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
13. Is protection for these proposed?			x							
14. Is harvest of eggs/adults controlled?			x							
15. Does enforcement exist?			nr							
16. Is it adequate?			nr							
17. Is the country a CITES member?			Y							
18. Has a reservation been lodged for this species?			x							
19. Does the country honour CITES?			Y							for this species
20. Is there currently research on this species?			x							
21. Does ranching exist?			x							
22. Is it proposed?			x							
23. Do hatcheries exist/ proposed?			nr							

SPECIES: Black lemur (Lemur macaco)
RED DATA BOOK CATEGORY: Endangered

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
1. Does it occur?	x	x	x	x	Y	x	x	x	x	endemic to Madagascar
2. Population size?										not known but declining
3. Does it breed?					Y					
4. Are the eggs collected?					nr					
5. Is it hunted/fished?					Y					
6. Is it traded locally?					?					
7. Is it traded internationally?					x					
8. Are nesting/breeding sites protected?					Y					some in Lokobe Reserve, Tsaratanana Reserve
9. Is protection for sites proposed?					x					
10. Are feeding areas protected?					Y					some in Lokobe and Tsara-Reserves
11. Is protection of areas proposed?					x					by law, locally by taboo, CITES Appendix I
12. Are adults, their young and eggs protected?					Y					

SPECIES: Black lemur (Lemur macaco)
RED DATA BOOK CATEGORY: Endangered

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
13. Is protection for these proposed?					nr					
14. Is harvest of eggs/adults controlled?					Y					
15. Does enforcement exist?					Y					
16. Is it adequate?						x				insufficient enforcement officers
17. Is the country a CITES member?					Y					
18. Has a reservation been lodged for this species?					x					
19. Does the country honour CITES?					Y					for this species
20. Is there currently research on this species?					x					
21. Does ranching exist?					nr					
22. Is it proposed?					nr					
23. Do hatcheries exist/ proposed?					nr					

SPECIES: Nosy Be sportive lemur (Lepilemur mustelinus dorsalis)
RED DATA BOOK CATEGORY: Rare

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
1. Does it occur?	x	x	x	x	Y	x	x	x	x	Endemic to Madagascar
2. Population size?										
3. Does it breed?					Y					
4. Are the eggs collected?					nr					
5. Is it hunted/fished?					x					
6. Is it traded locally?										
7. Is it traded internationally?					x					
8. Are nesting/breeding sites protected?										
9. Is protection for sites proposed?										
10. Are feeding areas protected?										
11. Is protection of areas proposed?										
12. Are adults, their young and eggs protected?					Y					

SPECIES: Nosy Be sportive lemur (Lepilemur mustelinus dorsalis)
RED DATA BOOK CATEGORY: Rare

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
13. Is protection for these proposed?					nr					
14. Is harvest of eggs/adults controlled?					Y					
15. Does enforcement exist?					Y					
16. Is it adequate?					x					insufficient enforcement officers
17. Is the country a CITES member?					Y					
18. Has a reservation been lodged for this species?					x					
19. Does the country honour CITES?					Y					for this species
20. Is there currently research on this species?					x					
21. Does ranching exist?					nr					
22. Is it proposed?					nr					
23. Do hatcheries exist/ proposed?					nr					

SPECIES: Coquerel's mouse lemur (Microcebus coquereli)
RED DATA BOOK CATEGORY: Vulnerable

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
1. Does it occur?	x	x	x	x	Y	x	x	x	x	endemic to Madagascar
2. Population size?										
3. Does it breed?					Y					
4. Are the eggs collected?					nr					
5. Is it hunted/fished?					?					
6. Is it traded locally?					?					
7. Is it traded internationally?					x					
8. Are nesting/breeding sites protected?					Y					privately by M. de Heaulene; Analabe and Bemaraha Reserves
9. Is protection for sites proposed?					x					
10. Are feeding areas protected?					Y					privately by M. de Heaulene; Analabe and Bemaraha Reserves
11. Is protection of areas proposed?					x					
12. Are adults, their young and eggs protected?					Y					

SPECIES: Coquerel's mouse lemur (Microcebus coquereli)
RED DATA BOOK CATEGORY: Vulnerable

INFORMATION CATEGORY	SOM KEN TANZ MOZ MAD FRA MAUR COM SEY	REMARKS
13. Is protection for these proposed?	nr	
14. Is harvest of eggs/adults controlled?	Y	
15. Does enforcement exist?	Y	
16. Is it adequate?	x	insufficient enforcement officers
17. Is the country a CITES member?	Y	
18. Has a reservation been lodged for this species?	x	
19. Does the country honour CITES?	Y	for this species
20. Is there currently research on this species?	x	
21. Does ranching exist?	nr	
22. Is it proposed?	nr	
23. Do hatcheries exist/ proposed?	nr	

SPECIES: Aye aye (Daubentonia madagascariensis)
RED DATA BOOK CATEGORY: Endangered

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
1. Does it occur?	x	x	x	x	Y	x	x	x	x	Endemic to Madagascar
2. Population size?										Possibly extinct-very low numbers if survives
3. Does it breed?					?					may if survives
4. Are the eggs collected?					nr					
5. Is it hunted/fished?					x					
6. Is it traded locally?					x					
7. Is it traded internationally?					x					
8. Are nesting/breeding sites protected?					Y					Mahambo Reserve, Nosy Mangabe Reserve
9. Is protection for sites proposed?					x					
10. Are feeding areas protected?					Y					Mahambo and Nosy Mangabe Reserves
11. Is protection of areas proposed?					x					
12. Are adults, their young and eggs protected?					Y					

SPECIES: Aye aye (Daubentonia madagascariensis)
RED DATA BOOK CATEGORY: Endangered

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
13. Is protection for these proposed?					nr					
14. Is harvest of eggs/adults controlled?					Y					
15. Does enforcement exist?					Y					
16. Is it adequate?					?					
17. Is the country a CITES member?					Y					
18. Has a reservation been lodged for this species?					x					
19. Does the country honour CITES?					Y					for this species
20. Is there currently research on this species?					x					
21. Does ranching exist?					nr					
22. Is it proposed?					nr					
23. Do hatcheries exist/ proposed?					nr					

SPECIES: Sokoke pipit (Anthus sokokensis)
RED DATA BOOK CATEGORY: not assigned

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
1. Does it occur?	x	Y	Y	x	x	x	x	x	x	thought endemic to Arabuko-Sokoke forest in Kenya, but may also occur in Tanzania
2. Population size?										localized, probably small
3. Does it breed?		Y	Y							
4. Are the eggs collected?		x	x							probably not
5. Is it hunted/fished?		x	x							probably not
6. Is it traded locally?		x	x							probably not
7. Is it traded internationally?		x	x							
8. Are nesting/breeding sites protected?		1	2							1= Arabuko-Sokoke Forest Reserve; 2= Pugu Forest Reserve
9. Is protection for sites proposed?		x								
10. Are feeding areas protected?		1	2							1= Arabuko-Sokoke Forest Reserve; 2= Pugu Forest Reserve
11. Is protection of areas proposed?		x	x							

SPECIES: Sokoke pipit (Anthus sokokensis)
RED DATA BOOK CATEGORY: not assigned

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
12. Are adults, their young and eggs protected?		x	x							
13. Is protection for these proposed?		x	x							
14. Is harvest of eggs/adults controlled?		x	x							
15. Does enforcement exist?		x	x							no enforcement officers at Arabuko-Sokoke
16. Is it adequate?		x	x							
17. Is the country a CITES member?		Y	Y							
18. Has a reservation been lodged for this species?		x	x							
19. Does the country honour CITES?		Y	Y							for this species
20. Is there currently research on this species?		x	x							
21. Does ranching exist?		nr	nr							
22. Is it proposed?		nr	nr							
23. Do hatcheries exist/ proposed?		nr	nr							

SPECIES: Sokoke scops owl (Otus ireneae)
RED DATA BOOK CATEGORY: not assigned

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
1. Does it occur?	x	Y	x	x	x	x	x	x	x	endemic to Arabuko-Sokoke forest
2. Population size?										probably very small
3. Does it breed?		Y								
4. Are the eggs collected?		x								probably not
5. Is it hunted/fished?		x								probably not
6. Is it traded locally?		x								probably not
7. Is it traded internationally?		x								
8. Are nesting/breeding sites protected?		Y								in Arabuko-Sokoke Forest Reserve
9. Is protection for sites proposed?		x								
10. Are feeding areas protected?		Y								in Arabuko-Sokoke Forest Reserve
11. Is protection of areas proposed?		x								
12. Are adults, their young and eggs protected?		x								

SPECIES: Sokoke scops owl (Otus ireneae)
RED DATA BOOK CATEGORY: not assigned

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
13. Is protection for these proposed?		x								
14. Is harvest of eggs/adults controlled?		x								
15. Does enforcement exist?		x								There are no enforcement officers at Arabuko-Sokoke
16. Is it adequate?		x								
17. Is the country a CITES member?		Y								
18. Has a reservation been lodged for this species?		x								
19. Does the country honour CITES?		Y								for this species
20. Is there currently research on this species?		x								
21. Does ranching exist?		nr								
22. Is it proposed?		nr								
23. Do hatcheries exist/ proposed?		nr								

SPECIES: Amani sunbird (Anthreptes pallidigaster)
RED DATA BOOK CATEGORY: Rare

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
1. Does it occur?	x	Y	Y	x	x	x	x	x	x	
2. Population size?										
3. Does it breed?		Y	Y							
4. Are the eggs collected?		x	x							probably not
5. Is it hunted/fished?		x	x							probably not
6. Is it traded locally?		x	x							probably not
7. Is it traded internationally?		x	x							
8. Are nesting/breeding sites protected?		Y	Y							in Forest Reserves
9. Is protection for sites proposed?		x	x							
10. Are feeding areas protected?		Y	Y							in Forest Reserves
11. Is protection of areas proposed?		x	x							
12. Are adults, their young and eggs protected?		Y	x							

SPECIES: Amani sunbird (Anthreptes pallidigaster)
RED DATA BOOK CATEGORY: Rare

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
13. Is protection for these proposed?		x	x							
14. Is harvest of eggs/adults controlled?		Y	x							
15. Does enforcement exist?		x	x							
16. Is it adequate?		x	x							
17. Is the country a CITES member?		Y	Y							
18. Has a reservation been lodged for this species?		x	x							
19. Does the country honour CITES?		Y	Y							for this species
20. Is there currently research on this species?		x	x							
21. Does ranching exist?			nr							
22. Is it proposed?			nr							
23. Do hatcheries exist/ proposed?			nr							

SPECIES: East coast akalat (Sheppardia gunningi)
RED DATA BOOK CATEGORY: Rare

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
1. Does it occur?	x	Y	Y	Y	x	x	x	x	x	subspecies S.g.gunningi endemic to Mozambique; subsp. S.g.sokokensis endemic to Tanzania and Kenya
2. Population size?										not known but low
3. Does it breed?		Y	Y	Y						
4. Are the eggs collected?		x	x	x						probably not
5. Is it hunted/fished?		x	x	x						probably not
6. Is it traded locally?		x	x	x						probably not
7. Is it traded internationally?		x	x	x						
8. Are nesting/breeding sites protected?		1	2	3						1=Sokoke-Arabuko Forest Reserve; 2=Pugu Forest Reserve 3=Inhamitandra Forest Reserve
9. Is protection for sites proposed?		x	x	x						
10. Are feeding areas protected?		1	2	x						1;Sokoke-Arabuko Forest Reserve; 2=Pugu Forest Reserve
11. Is protection of areas proposed?		x	x	x						

SPECIES: East coast akalat (Sheppardia gunningi)
RED DATA BOOK CATEGORY: Rare

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
12. Are adults, their young and eggs protected?		x	x	x						
13. Is protection for these proposed?		x	x	x						
14. Is harvest of eggs/adults controlled?		x	x	x						
15. Does enforcement exist?		x	x	x						The forest reserves have no enforcement officers
16. Is it adequate?		x	x	x						All reserves suffer illegal cutting
17. Is the country a CITES member?		Y	Y	Y						
18. Has a reservation been lodged for this species?		x	x	x						
19. Does the country honour CITES?		Y	Y	Y						for this species
20. Is there currently research on this species?		x	x	x						
21. Does ranching exist?		nr	nr	nr						
22. Is it proposed?		nr	nr	nr						
23. Do hatcheries exist/ proposed?		nr	nr	nr						

SPECIES: Pemba scops owl (Otus rutilus pembaensis)
RED DATA BOOK CATEGORY: Not listed

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
1. Does it occur?	x	x	Y	x	x	x	x	x	x	endemic to Pemba Island
2. Population size?										common throughout island
3. Does it breed?			Y							
4. Are the eggs collected?			x							probably not
5. Is it hunted/fished?			x							probably not
6. Is it traded locally?			x							probably not
7. Is it traded internationally?			x							
8. Are nesting/breeding sites protected?			?							
9. Is protection for sites proposed?			?							
10. Are feeding areas protected?			?							
11. Is protection of areas proposed?			?							
12. Are adults, their young and eggs protected?			x							

SPECIES: Pemba scops owl (Otus rutilus pembaensis)
RED DATA BOOK CATEGORY: Not listed

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
13. Is protection for these proposed?		x								
14. Is harvest of eggs/adults controlled?		x								
15. Does enforcement exist?		x								
16. Is it adequate?		x								
17. Is the country a CITES member?		Y								
18. Has a reservation been lodged for this species?		x								
19. Does the country honour CITES?		Y								for this species
20. Is there currently research on this species?		x								
21. Does ranching exist?		nr								
22. Is it proposed?		nr								
23. Do hatcheries exist/ proposed?		nr								

SPECIES: Spotted ground thrush (Turdus fischeri fischeri)
RED DATA BOOK CATEGORY: Rare

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
1. Does it occur?	x	Y	Y	?	x	x	x	x	x	endemic to coastal forests of Kenya, Tanzania and Mozambique
2. Population size?										not known but small
3. Does it breed?		x	x	?						coastal forests of N. Mozambique proposed as most likely nesting site
4. Are the eggs collected?		nr	nr	x						probably not
5. Is it hunted/fished?		x	x	x						probably not
6. Is it traded locally?		x	x	x						probably not
7. Is it traded internationally?		x	x	x						
8. Are nesting/breeding sites protected?		nr	nr	x						
9. Is protection for sites proposed?		nr	nr	x						
10. Are feeding areas protected?		Y	Y	x						incidental protection in coastal forest reserves
11. Is protection of areas proposed?		x	x	x						
12. Are adults, their young and eggs protected?		x	x	x						

SPECIES: Spotted ground thrush (Turdus fischeri fischeri)
RED DATA BOOK CATEGORY: Rare

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
13. Is protection for these proposed?		x	x	x						
14. Is harvest of eggs/adults controlled?		x	x	x						
15. Does enforcement exist?		nr	nr	nr						
16. Is it adequate?		nr	nr	nr						
17. Is the country a CITES member?		Y	Y	Y						
18. Has a reservation been lodged for this species?		x	x	x						
19. Does the country honour CITES?		Y	Y	Y						for this species
20. Is there currently research on this species?		x	x	x						
21. Does ranching exist?		nr	nr	nr						
22. Is it proposed?		nr	nr	nr						
23. Do hatcheries exist/ proposed?		nr	nr	nr						

SPECIES: Aldabra white-throated rail (Dryolimnas cuvieri aldabranus)
RED DATA BOOK CATEGORY: Not listed

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
1. Does it occur?	x	x	x	x	x	x	x	x	Y	endemic to Aldabra
2. Population size?										7000-9000
3. Does it breed?									Y	
4. Are the eggs collected?									x	
5. Is it hunted/fished?									x	
6. Is it traded locally?									x	
7. Is it traded internationally?									x	
8. Are nesting/breeding sites protected?									Y	Aldabra World Heritage Site
9. Is protection for sites proposed?									nr	
10. Are feeding areas protected?									Y	Aldabra World Heritage Site
11. Is protection of areas proposed?									nr	
12. Are adults, their young and eggs protected?									Y	

SPECIES: Aldabra white-throated rail (Dryolimnas cuvieri aldabranus)
RED DATA BOOK CATEGORY: Not listed

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
13. Is protection for these proposed?									nr	
14. Is harvest of eggs/adults controlled?									Y	
15. Does enforcement exist?									Y	
16. Is it adequate?									Y	
17. Is the country a CITES member?									Y	
18. Has a reservation been lodged for this species?									x	
19. Does the country honour CITES?									Y	for this species
20. Is there currently research on this species?									Y	A university expedition took place July-September 1982
21. Does ranching exist?									nr	
22. Is it proposed?									nr	
23. Do hatcheries exist/ proposed?									nr	

SPECIES: Aldabra brush warbler (Nesillas aldabranus)
RED DATA BOOK CATEGORY: Indeterminate

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
1. Does it occur?	x	x	x	x	x	x	x	x	Y	endemic to Aldabra
2. Population size?										11 maximum
3. Does it breed?									Y	
4. Are the eggs collected?									x	
5. Is it hunted/fished?									x	
6. Is it traded locally?									x	
7. Is it traded internationally?									x	
8. Are nesting/breeding sites protected?									Y	Aldabra World Heritage Site
9. Is protection for sites proposed?									nr	
10. Are feeding areas protected?									Y	Aldabra World Heritage Site
11. Is protection of areas proposed?									nr	
12. Are adults, their young and eggs protected?									Y	

SPECIES: Aldabra brush warbler (Nesillas aldabranus)
RED DATA BOOK CATEGORY: Indeterminate

INFORMATION CATEGORY	SOM KEN TANZ MOZ MAD FRA MAUR COM SEY	REMARKS
13. Is protection for these proposed?	nr	
14. Is harvest of eggs/adults controlled?	Y	
15. Does enforcement exist?	Y	
16. Is it adequate?	Y	
17. Is the country a CITES member?	Y	
18. Has a reservation been lodged for this species?	x	
19. Does the country honour CITES?	Y	for this species
20. Is there currently research on this species?	x	
21. Does ranching exist?	nr	
22. Is it proposed?	nr	
23. Do hatcheries exist/ proposed?	nr	

SPECIES: Aldabra drongo (Dicrurus aldabranus)
RED DATA BOOK CATEGORY: Not listed

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
1. Does it occur?	x	x	x	x	x	x	x	x	Y	endemic to Aldabra
2. Population size?										
3. Does it breed?									Y	
4. Are the eggs collected?									x	
5. Is it hunted/fished?									x	
6. Is it traded locally?									x	
7. Is it traded internationally?									x	
8. Are nesting/breeding sites protected?									Y	Aldabra World Heritage Site
9. Is protection for sites proposed?									nr	
10. Are feeding areas protected?									Y	Aldabra World Heritage Site
11. Is protection of areas proposed?									nr	
12. Are adults, their young and eggs protected?									Y	

SPECIES: Aldabra drongo (Dicrurus aldabranus)
RED DATA BOOK CATEGORY: Not listed

INFORMATION CATEGORY	SOM KEN TANZ MOZ MAD FRA MAUR COM SEY	REMARKS
13. Is protection for these proposed?	nr	
14. Is harvest of eggs/adults controlled?	Y	
15. Does enforcement exist?	Y	
16. Is it adequate?	Y	
17. Is the country a CITES member?	Y	
18. Has a reservation been lodged for this species?	x	
19. Does the country honour CITES?	Y	for this species
20. Is there currently research on this species?	x	
21. Does ranching exist?	nr	
22. Is it proposed?	nr	
23. Do hatcheries exist/ proposed?	nr	

SPECIES: Aldabra sacred ibis (Threskiornis aethiopica abbotti)
RED DATA BOOK CATEGORY: Not listed

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
1. Does it occur?	x	x	x	x	x	x	x	x	Y	endemic to Aldabra
2. Population size?										around 200
3. Does it breed?									Y	
4. Are the eggs collected?									x	
5. Is it hunted/fished?									x	
6. Is it traded locally?									x	
7. Is it traded internationally?									x	
8. Are nesting/breeding sites protected?									Y	Aldabra World Heritage Site
9. Is protection for sites proposed?									nr	
10. Are feeding areas protected?									Y	Aldabra World Heritage Site
11. Is protection of areas proposed?									nr	
12. Are adults, their young and eggs protected?									Y	

SPECIES: Aldabra sacred ibis (Threskiornis aethiopica abbotti)
RED DATA BOOK CATEGORY: Not listed

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
13. Is protection for these proposed?									nr	
14. Is harvest of eggs/adults controlled?									Y	
15. Does enforcement exist?									Y	
16. Is it adequate?									Y	
17. Is the country a CITES member?									Y	
18. Has a reservation been lodged for this species?									x	
19. Does the country honour CITES?									Y	for this species
20. Is there currently research on this species?									x	
21. Does ranching exist?									nr	
22. Is it proposed?									nr	
23. Do hatcheries exist/ proposed?									nr	

SPECIES: Aldabra kestrel (Falco newtoni aldabranus)
RED DATA BOOK CATEGORY: Not listed

INFORMATION CATEGORY	SOM KEN TANZ MOZ MAD FRA MAUR COM SEY	REMARKS
13. Is protection for these proposed?	nr	
14. Is harvest of eggs/adults controlled?	Y	
15. Does enforcement exist?	Y	
16. Is it adequate?	Y	
17. Is the country a CITES member?	Y	
18. Has a reservation been lodged for this species?	x	
19. Does the country honour CITES?	Y	for this species
20. Is there currently research on this species?	x	
21. Does ranching exist?	nr	
22. Is it proposed?	nr	
23. Do hatcheries exist/ proposed?	nr	

SPECIES: Aldabra kestrel (Falco newtoni aldabranus)
RED DATA BOOK CATEGORY: Not listed

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
1. Does it occur?	x	x	x	x	x	x	x	x	Y	endemic to Aldabra
2. Population size?										around 100
3. Does it breed?									Y	
4. Are the eggs collected?									x	
5. Is it hunted/fished?									x	
6. Is it traded locally?									x	
7. Is it traded internationally?									x	
8. Are nesting/breeding sites protected?									Y	Aldabra World Heritage Site
9. Is protection for sites proposed?									nr	
10. Are feeding areas protected?									Y	Aldabra World Heritage Site
11. Is protection of areas proposed?									nr	
12. Are adults, their young and eggs protected?									Y	

SPECIES: Seychelles magpie robin (Copsychus sechellarum)
RED DATA BOOK CATEGORY: Endangered

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
1. Does it occur?	x	x	x	x	x	x	x	x	Y	endemic to Seychelles
2. Population size?										around 24 survive on Fregate Island only; possibly 1 on Aride
3. Does it breed?									Y	
4. Are the eggs collected?									x	
5. Is it hunted/fished?									x	
6. Is it traded locally?									x	
7. Is it traded internationally?									x	
8. Are nesting/breeding sites protected?									x	
9. Is protection for sites proposed?									x	
10. Are feeding areas protected?									x	
11. Is protection of areas proposed?									x	
12. Are adults, their young and eggs protected?									Y	

SPECIES: Seychelles magpie robin (Copsychus sechellarum)
RED DATA BOOK CATEGORY: Endangered

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
13. Is protection for these proposed?									nr	
14. Is harvest of eggs/adults controlled?									Y	
15. Does enforcement exist?									Y	
16. Is it adequate?									Y	
17. Is the country a CITES member?									Y	
18. Has a reservation been lodged for this species?									x	
19. Does the country honour CITES?									Y	for this species
20. Is there currently research on this species?									Y	A WWF study was completed in 1980. ICBP has contributed to the elimination of cats.
21. Does ranching exist?									nr	
22. Is it proposed?									nr	
23. Do hatcheries exist/ proposed?									nr	

SPECIES: Seychelles fody (Foudia sechellarum)
RED DATA BOOK CATEGORY: Rare

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
1. Does it occur?	x	x	x	x	x	x	x	x	Y	endemic to Seychelles
2. Population size?										1000-2000 on Cousin, Cousine and Fregate Islands
3. Does it breed?									Y	
4. Are the eggs collected?									x	
5. Is it hunted/fished?									x	
6. Is it traded locally?									x	
7. Is it traded internationally?									x	
8. Are nesting/breeding sites protected?									Y	Cousin Island Special Reserve
9. Is protection for sites proposed?									x	
10. Are feeding areas protected?									Y	Cousin Island Special Reserve
11. Is protection of areas proposed?									x	
12. Are adults, their young and eggs protected?									Y	

SPECIES: Seychelles fody (Foudia sechellarum)
RED DATA BOOK CATEGORY: Rare

INFORMATION CATEGORY	SOM KEN TANZ MOZ MAD FRA MAUR COM SEY	REMARKS
13. Is protection for these proposed?	nr	
14. Is harvest of eggs/adults controlled?	Y	
15. Does enforcement exist?	Y	
16. Is it adequate?	Y	
17. Is the country a CITES member?	Y	
18. Has a reservation been lodged for this species?	x	
19. Does the country honour CITES?	Y	for this species
20. Is there currently research on this species?	Y	on Cousin
21. Does ranching exist?	nr	
22. Is it proposed?	nr	
23. Do hatcheries exist/ proposed?	nr	

SPECIES: Seychelles black paradise flycatcher (Terpsiphone corvina)
RED DATA BOOK CATEGORY: Rare

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
1. Does it occur?	x	x	x	x	x	x	x	x	Y	endemic
2. Population size?										70-80, most on La Digue
3. Does it breed?									Y	
4. Are the eggs collected?									x	
5. Is it hunted/fished?									x	
6. Is it traded locally?									x	
7. Is it traded internationally?									x	
8. Are nesting/breeding sites protected?									Y	La Digue Veuve Reserve
9. Is protection for sites proposed?									x	
10. Are feeding areas protected?									Y	La Digue Veuve Reserve
11. Is protection of areas proposed?									x	
12. Are adults, their young and eggs protected?									Y	

SPECIES: Seychelles black paradise flycatcher (Terpsiphone corvina)
RED DATA BOOK CATEGORY: Rare

INFORMATION CATEGORY	SOM KEN TANZ MOZ MAD FRA MAUR COM SEY	REMARKS
13. Is protection for these proposed?	nr	
14. Is harvest of eggs/adults controlled?	Y	
15. Does enforcement exist?	Y	
16. Is it adequate?	Y	
17. Is the country a CITES member?	Y	
18. Has a reservation been lodged for this species?	x	
19. Does the country honour CITES?	Y	for this species
20. Is there currently research on this species?	Y	A WWF study was completed in 1980. Breeding data being collected
21. Does ranching exist?	nr	
22. Is it proposed?	nr	
23. Do hatcheries exist/ proposed?	nr	

SPECIES: Seychelles brush warbler (Acrocephalus seychellensis)
RED DATA BOOK CATEGORY: Rare

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
1. Does it occur?	x	x	x	x	x	x	x	x	Y	endemic to Seychelles
2. Population size?										less than 300 Cousin only
3. Does it breed?									Y	
4. Are the eggs collected?									x	
5. Is it hunted/fished?									x	
6. Is it traded locally?									x	
7. Is it traded internationally?									x	
8. Are nesting/breeding sites protected?									Y	Cousin Island Special Reserve
9. Is protection for sites proposed?									nr	
10. Are feeding areas protected?									Y	Cousin Island Special Reserve
11. Is protection of areas proposed?									nr	
12. Are adults, their young and eggs protected?									Y	

SPECIES: Seychelles brush warbler (Acrocephalus seychellensis)
RED DATA BOOK CATEGORY: Rare

INFORMATION CATEGORY	SOM KEN TANZ MOZ MAD FRA MAUR COM SEY	REMARKS
13. Is protection for these proposed?	nr	
14. Is harvest of eggs/adults controlled?	Y	
15. Does enforcement exist?	Y	
16. Is it adequate?	Y	
17. Is the country a CITES member?	Y	
18. Has a reservation been lodged for this species?	x	
19. Does the country honour CITES?	Y	for this species
20. Is there currently research on this species?	Y	On Cousin (breeding and census)
21. Does ranching exist?	nr	
22. Is it proposed?	nr	
23. Do hatcheries exist/ proposed?	nr	

SPECIES: Seychelles turtle dove (Streptopelia picturata rostrata)
RED DATA BOOK CATEGORY: Not listed

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
1. Does it occur?	x	x	x	x	x	x	x	x	Y	endemic to Seychelles
2. Population size?										Rare: possibly all interbred with introduced S.p. picturata
3. Does it breed?									Y	
4. Are the eggs collected?									x	
5. Is it hunted/fished?									x	
6. Is it traded locally?									x	
7. Is it traded internationally?									x	
8. Are nesting/breeding sites protected?									x	
9. Is protection for sites proposed?									x	
10. Are feeding areas protected?									x	
11. Is protection of areas proposed?									x	
12. Are adults, their young and eggs protected?									Y	

SPECIES: Seychelles turtle dove (Streptopelia picturata rostrata)
RED DATA BOOK CATEGORY: Not listed

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
13. Is protection for these proposed?									nr	
14. Is harvest of eggs/adults controlled?									Y	
15. Does enforcement exist?									?	
16. Is it adequate?									?	
17. Is the country a CITES member?									Y	
18. Has a reservation been lodged for this species?									x	
19. Does the country honour CITES?									Y	for this species
20. Is there currently research on this species?									x	
21. Does ranching exist?									nr	
22. Is it proposed?									nr	
23. Do hatcheries exist/ proposed?									nr	

SPECIES: Madagascar fish eagle (Haliaeetus vociferoides)
RED DATA BOOK CATEGORY: Endangered

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
1. Does it occur?	x	x	x	x	Y	x	x	x	x	endemic to Madagascar
2. Population size?										around 10 pairs
3. Does it breed?					Y					
4. Are the eggs collected?										
5. Is it hunted/fished?										
6. Is it traded locally?					x					probably not
7. Is it traded internationally?					x					
8. Are nesting/breeding sites protected?					x					
9. Is protection for sites proposed?					x					
10. Are feeding areas protected?					x					
11. Is protection of areas proposed?					x					
12. Are adults, their young and eggs protected?					x					

SPECIES: Madagascar fish eagle (Haliaeetus vociferoides)
RED DATA BOOK CATEGORY: Endangered

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
13. Is protection for these proposed?					x					
14. Is harvest of eggs/adults controlled?					x					
15. Does enforcement exist?					nr					
16. Is it adequate?					nr					
17. Is the country a CITES member?					Y					
18. Has a reservation been lodged for this species?					x					
19. Does the country honour CITES?					Y					for this species
20. Is there currently research on this species?					x					Project proposal under review by IUCN/WWF
21. Does ranching exist?					nr					
22. Is it proposed?					nr					
23. Do hatcheries exist/ proposed?					nr					

SPECIES: Green turtle (Chelonia mydas)
RED DATA BOOK CATEGORY: Endangered

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
1. Does it occur?	Y	Y	Y	Y	Y	Y	Y	Y	Y	
2. Population size?										
3. Does it breed?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Europa and Tromelin and Aldabra are the most important nesting sites
4. Are the eggs collected?	Y	Y	Y	Y	Y	1	Y	Y	2	1=hatchlings collected for ranching on Reunion; 2=some taken on outer islands
5. Is it hunted/fished?	Y	Y	Y	Y	Y	x	Y	Y	Y	
6. Is it traded locally?	Y	?	Y	?	Y	nr	Y	Y	Y	
7. Is it traded internationally?	Y	x	x	?	?	1	x	?	x	1=ranch-reared
8. Are nesting/breeding sites protected?	x	1	x	1	3	Y	x	x	2	1=some; 2=some but includes most important; 3=some but apparently forgotten
9. Is protection for sites proposed?	x	Y	Y	Y	x	nr	x	x	x	
10. Are feeding areas protected?	x	Y	Y	1	x	x	x	x	1	1=some, but vast areas not protected
11. Is protection of areas proposed?	x	Y	Y	Y	x	x	x	x	x	

SPECIES: Green turtle (Chelonia mydas)
RED DATA BOOK CATEGORY: Endangered

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
12. Are adults, their young and eggs protected?	x	Y	x	Y	Y	Y	Y	x	Y	
13. Is protection for these proposed?	x	nr	x	nr	nr	nr	nr	x	nr	
14. Is harvest of eggs/adults controlled?	x	x	x	x	x	Y	x	x	Y	
15. Does enforcement exist?	nr	x	nr	x	x	x	x	nr	1	1=partial only; not in outer islands
16. Is it adequate?	nr	x	nr	x	x	x	x	nr	x	
17. Is the country a CITES member?	x	Y	Y	Y	Y	Y	Y	x	Y	
18. Has a reservation been lodged for this species?	nr	x	x	x	x	Y	x	nr	x	
19. Does the country honour CITES?	nr	Y	Y	Y	?	?	Y	nr	Y	for this species
20. Is there currently research on this species?	x	x	x	x	x	1	x	x	Y	1=relating to ranch
21. Does ranching exist?	x	x	x	x	x	Y	x	x	x	
22. Is it proposed?	x	x	x	x	x	nr	Y	x	x	
23. Do hatcheries exist/ proposed?	x	x	x	x	x	x	x	x	x	

SPECIES: Hawksbill turtle (Eretmochelys imbricata)
RED DATA BOOK CATEGORY: Endangered

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
1. Does it occur?	Y	Y	Y	Y	Y	Y	Y	Y	Y	
2. Population size?										
3. Does it breed?	Y	Y	Y	Y	Y	Y	Y	Y	Y	
4. Are the eggs collected?	Y	?	?	?	?	?	?	Y	1	1=some taken on outer islands
5. Is it hunted/fished?	Y	Y	Y	Y	Y	?	Y	Y	Y	
6. Is it traded locally?	Y	Y	Y	Y	Y	?	Y	Y	Y	
7. Is it traded internationally?	Y	1	1	?	Y	?	?	?	1	1=through tourist trade;bellies and hoofs to Japan
8. Are nesting/breeding sites protected?	x	?	?	x	1	Y	x	x	2	1=some but apparently forgotten;2=some, probably includes most important. Poivre and Coetivy Is. both very important are still not protected (Sey)
9. Is protection for sites proposed?	x	Y	Y	Y	x	nr	x	x	x	
10. Are feeding areas protected?	x	Y	x	Y	x	x	x	x	Y	some, but not most important
11. Is protection of areas proposed?	x	Y	Y	Y	x	x	x	x	x	

SPECIES: Hawksbill turtle (Eretmochelys imbricata)
RED DATA BOOK CATEGORY: Endangered

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
12. Are adults, their young and eggs protected?	x	Y	x	Y	Y		Y	x	Y	
13. Is protection for these proposed?	x	nr	x	nr	nr		nr	Y	nr	
14. Is harvest of eggs/adults controlled?	x	x	x	x	x		x	x	Y	
15. Does enforcement exist?	nr	x	nr	x	x	?	x	nr	1	1=partial only, not on outer islands
16. Is it adequate?	nr	x	nr	x	x	?	x	nr	x	
17. Is the country a CITES member?	x	Y	Y	Y	Y	Y	Y	x	Y	
18. Has a reservation been lodged for this species?	nr	x	x	x	x	Y	x	nr	x	
19. Does the country honour CITES?	nr	x	x	?	?	?	?	nr	x	for this species
20. Is there currently research on this species?	x	x	x	x	x	x	x	x	Y	
21. Does ranching exist?	x	x	x	x	x	x	x	x	1	1=some kept privately
22. Is it proposed?	x	x	x	x	x	x	x	x	1	1=under discussion
23. Do hatcheries exist/ proposed?	x	x	x	x	x	x	x	x	x	

SPECIES: Olive ridley turtle (Lepidochelys olivacea)
RED DATA BOOK CATEGORY: Endangered

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
1. Does it occur?	x	Y	Y	Y	Y	x	x	x	x	may turn up in countries marked x, but unusual
2. Population size?										
3. Does it breed?		?	Y	Y	Y					N. Mozambique most important in region
4. Are the eggs collected?		?	?	Y	Y					
5. Is it hunted/fished?		Y	?	Y	Y					
6. Is it traded locally?		Y	?	?	?					
7. Is it traded internationally?		x	x	x	x					
8. Are nesting/breeding sites protected?			x	x	x					
9. Is protection for sites proposed?			x	x	x					
10. Are feeding areas protected?		x	x	x	x					
11. Is protection of areas proposed?		x	x	x	x					
12. Are adults, their young and eggs protected?		x	x	Y	?					

SPECIES: Olive ridley turtle (Lepidochelys olivacea)
RED DATA BOOK CATEGORY: Endangered

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
13. Is protection for these proposed?		x		x	nr	?				
14. Is harvest of eggs/adults controlled?		x		x	x	x				
15. Does enforcement exist?		x		x	x	x				
16. Is it adequate?		x		x	x	x				
17. Is the country a CITES member?		Y		Y	Y	Y				
18. Has a reservation been lodged for this species?		x		x	x	x				
19. Does the country honour CITES?		Y		Y	Y	Y				for this species
20. Is there currently research on this species?		x		x	x	x				
21. Does ranching exist?		x		x	x	x				
22. Is it proposed?		x		x	x	x				
23. Do hatcheries exist/ proposed?		x		x	x	x				

SPECIES: Loggerhead turtle (Caretta caretta)
RED DATA BOOK CATEGORY: Vulnerable

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
1. Does it occur?	x	Y	Y	Y	Y	x	x	x	Y	
2. Population size?										
3. Does it breed?		x	x	Y	Y				x	
4. Are the eggs collected?		nr	nr	Y	Y				nr	
5. Is it hunted/fished?		?	?	Y	Y				1	1=avoided in some areas
6. Is it traded locally?		?	?	Y	Y				Y	
7. Is it traded internationally?		x	x	x	x				x	
8. Are nesting/breeding sites protected?		nr	nr	Y	x				nr	some
9. Is protection for sites proposed?		nr	nr	Y	x				nr	
10. Are feeding areas protected?		x	x	x	x				Y	where these occur in an existing reserve (e.g. Aldabra)
11. Is protection of areas proposed?		x	x	x	x				x	
12. Are adults, their young and eggs protected?		x	x	Y	Y				x	

SPECIES: Loggerhead turtle (Caretta caretta)
RED DATA BOOK CATEGORY: Vulnerable

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
13. Is protection for these proposed?		x	x	nr	nr				x	
14. Is harvest of eggs/adults controlled?		x	x	x	x				x	
15. Does enforcement exist?		x	x	x	x				x	
16. Is it adequate?		x	x	x	x				x	
17. Is the country a CITES member?		Y	Y	Y	Y				Y	
18. Has a reservation been lodged for this species?		x	x	x	x				x	
19. Does the country honour CITES?		Y	Y	Y	Y				Y	for this species
20. Is there currently research on this species?		x	x	x	x				Y	
21. Does ranching exist?		x	x	x	x				x	
22. Is it proposed?		x	x	x	x				x	
23. Do hatcheries exist/ proposed?		x	x	x	x				x	

SPECIES: Leatherback turtle (Dermochelys coriacea)
RED DATA BOOK CATEGORY: Endangered

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
1. Does it occur?	x	Y	Y	Y	x	x	x	x	Y	
2. Population size?										
3. Does it breed?		x	l	Y					2	l=previously on Zanzibar, 2=very rarely
4. Are the eggs collected?		nr	nr	Y					x	
5. Is it hunted/fished?		?	?	?					l	l=allegedly not, but caught apparently accidentally
6. Is it traded locally?		?	?	?					l	l=shared among fishermen that caught it
7. Is it traded internationally?		x	x	x					x	
8. Are nesting/breeding sites protected?		nr	nr	Y					x	some
9. Is protection for sites proposed?		nr	nr	Y					x	
10. Are feeding areas protected?		x	x	x					x	
11. Is protection of areas proposed?		x	x	x					x	

10. Are feeding areas pro-

Y Aldabra

SPECIES: Aldabra giant tortoise (Geochelone gigantea)
RED DATA BOOK CATEGORY: Rare

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
12. Are adults, their young and eggs protected?									Y	The Wild Animals (Giant Land Tortoises) Protection Regulations, 1974 (SI 59/1974)
13. Is protection for these proposed?									nr	
14. Is harvest of eggs/adults controlled?									Y	
15. Does enforcement exist?									Y	
16. Is it adequate?									Y	
17. Is the country a CITES member?									Y	
18. Has a reservation been lodged for this species?									x	
19. Does the country honour CITES?									Y	for this species
20. Is there currently research on this species?									Y	has been much research and is continuing long-term study through Royal Society
21. Does ranching exist?									Y	in several small privately owned breeding groups
22. Is it proposed?									Y	on Curieuse Island
23. Do hatcheries exist/ proposed?									x	

SPECIES: Madagascar tortoise/Angonoka (Geochelone yniphora)
RED DATA BOOK CATEGORY: Endangered

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
1. Does it occur?	x	x	x	x	Y	x	x	x	x	endemic to Madagascar
2. Population size?										less than 500
3. Does it breed?					Y					
4. Are the eggs collected?					x					
5. Is it hunted/fished?					Y					
6. Is it traded locally?					Y					possibly some local trade continues
7. Is it traded internationally?					x					no longer
8. Are nesting/breeding sites protected?					x					
9. Is protection for sites proposed?					x					
10. Are feeding areas protected?					x					
11. Is protection of areas proposed?					x					
12. Are adults, their young and eggs protected?					Y					by law; by taboo against local use for food; CITES Appendix I, Category A of 1968 African Conservation Convention

SPECIES: Madagascar tortoise/Angonoka (Geochelone yniphora)
RED DATA BOOK CATEGORY: Endangered

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
13. Is protection for these proposed?					nr					
14. Is harvest of eggs/adults controlled?										
15. Does enforcement exist?										
16. Is it adequate?										
17. Is the country a CITES member?					Y					
18. Has a reservation been lodged for this species?					x					
19. Does the country honour CITES?					Y					for this species
20. Is there currently research on this species?					x					
21. Does ranching exist?					x					
22. Is it proposed?					x					
23. Do hatcheries exist/ proposed?					x					

SPECIES: Serpent Island gecko (Cyrtodactylus serpensinsula)
RED DATA BOOK CATEGORY: Rare

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
1. Does it occur?	x	x	x	x	x	x	Y	x	x	endemic to Mauritius (Serpent, Round, Coin de Mire)
2. Population size?										
3. Does it breed?							Y			
4. Are the eggs collected?							x			
5. Is it hunted/fished?							x			
6. Is it traded locally?							x			
7. Is it traded internationally?							x			
8. Are nesting/breeding sites protected?							x			Round Island and Coin de Mire Nature Reserves
9. Is protection for sites proposed?							Y			Serpent Island Nature Reserve in process of establishment
10. Are feeding areas protected?							x			Round Island and Coin de Mire Nature Reserves
11. Is protection of areas proposed?							Y			Serpent Island NR in process of establishment

SPECIES: Serpent Island gecko (Cyrtodactylus serpensinsula)
RED DATA BOOK CATEGORY: Rare

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
12. Are adults, their young and eggs protected?							Y			
13. Is protection for these proposed?							nr			
14. Is harvest of eggs/adults controlled?							Y			
15. Does enforcement exist?							Y			
16. Is it adequate?							x			difficult oversea access
17. Is the country a CITES member?							Y			
18. Has a reservation been lodged for this species?							x			
19. Does the country honour CITES?							Y			for this species
20. Is there currently research on this species?							x			
21. Does ranching exist?							nr			
22. Is it proposed?							nr			
23. Do hatcheries exist/ proposed?							nr			

SPECIES: Round Island day gecko (Phelsuma guentheri)
RED DATA BOOK CATEGORY: Rare

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
1. Does it occur?	x	x	x	x	x	x	Y	x	x	endemic to Round Island
2. Population size?										
3. Does it breed?							Y			
4. Are the eggs collected?							x			
5. Is it hunted/fished?							x			
6. Is it traded locally?							x			
7. Is it traded internationally?							x			
8. Are nesting/breeding sites protected?							Y			Round Island Nature Reserve
9. Is protection for sites proposed?							nr			
10. Are feeding areas protected?							Y			Round Island Nature Reserve
11. Is protection of areas proposed?							nr			
12. Are adults, their young and eggs protected?							Y			

SPECIES: Round Island day gecko (Phelsuma guentheri)
RED DATA BOOK CATEGORY: Rare

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
13. Is protection for these proposed?							nr			
14. Is harvest of eggs/adults controlled?							Y			
15. Does enforcement exist?							Y			
16. Is it adequate?							x			difficult oversea access
17. Is the country a CITES member?							Y			
18. Has a reservation been lodged for this species?							x			
19. Does the country honour CITES?							Y			for this species
20. Is there currently research on this species?							x			
21. Does ranching exist?							nr			
22. Is it proposed?							nr			
23. Do hatcheries exist/ proposed?							nr			

SPECIES: Round Island Skink (Leiolopisma telfairii)
RED DATA BOOK CATEGORY: Rare

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
1. Does it occur?	x	x	x	x	x	x	Y	x	x	endemic to Round Island
2. Population size?										
3. Does it breed?							Y			
4. Are the eggs collected?							x			
5. Is it hunted/fished?							x			
6. Is it traded locally?							x			
7. Is it traded internationally?							x			
8. Are nesting/breeding sites protected?							Y			Round Island Nature Reserve
9. Is protection for sites proposed?							nr			
10. Are feeding areas protected?							Y			Round Island Nature Reserve
11. Is protection of areas proposed?							nr			
12. Are adults, their young and eggs protected?							Y			

SPECIES: Round Island Skink (Leiolopisma telfairii)
RED DATA BOOK CATEGORY: Rare

INFORMATION CATEGORY	SOM KEN TANZ MOZ MAD FRA MAUR COM SEY	REMARKS
13. Is protection for these proposed?	nr	
14. Is harvest of eggs/adults controlled?	Y	
15. Does enforcement exist?	Y	
16. Is it adequate?	x	difficult oversea access
17. Is the country a CITES member?	Y	
18. Has a reservation been lodged for this species?	x	
19. Does the country honour CITES?	Y	for this species
20. Is there currently research on this species?	x	
21. Does ranching exist?	nr	
22. Is it proposed?	nr	
23. Do hatcheries exist/ proposed?	nr	

SPECIES: Round Island boa (Bolyeria multocarinata)
RED DATA BOOK CATEGORY: Endangered

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
1. Does it occur?	x	x	x	x	x	x	Y	x	x	endemic to Round Island
2. Population size?										
3. Does it breed?							Y			
4. Are the eggs collected?							x			
5. Is it hunted/fished?							x			
6. Is it traded locally?							x			
7. Is it traded internationally?							x			
8. Are nesting/breeding sites protected?							Y			Round Island Nature Reserve
9. Is protection for sites proposed?							nr			
10. Are feeding areas protected?							Y			Round Island Nature Reserve
11. Is protection of areas proposed?							nr			
12. Are adults, their young and eggs protected?							Y			

SPECIES: Round Island boa (Bolyeria multocarinata)
RED DATA BOOK CATEGORY: Endangered

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
13. Is protection for these proposed?							nr			
14. Is harvest of eggs/adults controlled?							Y			
15. Does enforcement exist?							Y			
16. Is it adequate?							x			difficult oversea access
17. Is the country a CITES member?							Y			
18. Has a reservation been lodged for this species?							x			
19. Does the country honour CITES?							Y			for this species
20. Is there currently research on this species?							x			
21. Does ranching exist?							nr			
22. Is it proposed?							nr			
23. Do hatcheries exist/ proposed?							nr			

SPECIES: Round Island Keel-scaled boa (Casarea dussumieri)
RED DATA BOOK CATEGORY: Endangered

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
1. Does it occur?	x	x	x	x	x	x	Y	x	x	endemic to Round Island
2. Population size?										
3. Does it breed?							Y			
4. Are the eggs collected?							x			
5. Is it hunted/fished?							x			
6. Is it traded locally?							x			
7. Is it traded internationally?							x			
8. Are nesting/breeding sites protected?							Y			Round Island Nature Reserve
9. Is protection for sites proposed?							nr			
10. Are feeding areas protected?							Y			Round Island Nature Reserve
11. Is protection of areas proposed?							nr			
12. Are adults, their young and eggs protected?							Y			

SPECIES: Round Island Keel-scaled boa (Casarea dussumieri)
RED DATA BOOK CATEGORY: Endangered

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
13. Is protection for these proposed?							nr			
14. Is harvest of eggs/adults controlled?							Y			
15. Does enforcement exist?							Y			
16. Is it adequate?							x			difficult oversea access
17. Is the country a CITES member?							Y			
18. Has a reservation been lodged for this species?							x			
19. Does the country honour CITES?							Y			for this species
20. Is there currently research on this species?							x			
21. Does ranching exist?							nr			
22. Is it proposed?							nr			
23. Do hatcheries exist/ proposed?							nr			

SPECIES: Triton's trumpet (Charonia tritonis)
RED DATA BOOK CATEGORY: Rare

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
1. Does it occur?	?	Y	Y	Y	Y	Y	Y	Y	Y	
2. Population size?										
3. Does it breed?		Y	Y	Y	Y	Y	Y	Y	Y	
4. Are the eggs collected?		nr	nr	nr	nr	nr	nr	nr	nr	
5. Is it hunted/fished?		Y	Y	Y	Y	?	Y	Y	Y	
6. Is it traded locally?		Y	Y	Y	Y	?	Y	Y	Y	
7. Is it traded internationally?		Y	Y	Y	Y	?	Y	Y	Y	through tourist trade
8. Are nesting/breeding sites protected?		Y	x	Y	x	x	x	x	Y	some in existing marine protected areas
9. Is protection for sites proposed?		x	x	x	x	x	x	x	x	not specific for this species
10. Are feeding areas protected?		Y	x	Y	x	x	x	x	Y	incidentally in existing marine protected areas
11. Is protection of areas proposed?		x	x	x	x	x	x	x	x	
12. Are adults, their young and eggs protected?		x	x	x	x	x	x	x	Y	protection of Shells Act, 1965

SPECIES: Triton's trumpet (Charonia tritonis)
RED DATA BOOK CATEGORY: Rare

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
13. Is protection for these proposed?	x	x	x	x	x	x	x	nr		
14. Is harvest of eggs/adults controlled?	x	x	x	x	x	x	x	Y		
15. Does enforcement exist?	x	x	x	x	x	x	x	Y		
16. Is it adequate?	x	x	x	x	x	x	x	x		
17. Is the country a CITES member?	nr	nr	nr	nr	nr	nr	nr	nr		
18. Has a reservation been lodged for this species?	nr	nr	nr	nr	nr	nr	nr	nr		not listed in CITES
19. Does the country honour CITES?	nr	nr	nr	nr	nr	nr	nr	nr		
20. Is there currently research on this species?	x	x	x	x	x	x	x	x		
21. Does ranching exist?	nr	nr	nr	nr	nr	nr	nr	nr		
22. Is it proposed?	nr	nr	nr	nr	nr	nr	nr	nr		
23. Do hatcheries exist/ proposed?	nr	nr	nr	nr	nr	nr	nr	nr		

SPECIES: Green snail (Turbo marmoratus)
RED DATA BOOK CATEGORY: Commercially Threatened

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
1. Does it occur?	?	Y	Y	Y	Y	?	Y	Y	Y	probably found throughout the region
2. Population size?										
3. Does it breed?	?	Y	Y	Y	Y	?	Y	Y	Y	
4. Are the eggs collected?	nr	nr	nr	nr	nr	nr	nr	nr	nr	
5. Is it hunted/fished?		Y	Y	?	?		?	Y	Y	
6. Is it traded locally?		Y	Y	?	?		?	Y	Y	
7. Is it traded internationally?		Y	Y	?	?		?	1	Y	through tourist trade; 1=exported in bulk shipments
8. Are nesting/breeding sites protected?		Y	x	x	x		x	x	Y	incidentally in existing marine protected areas; Cosmoledo and Aldabra area major sites in Seychelles-latter protected
9. Is protection for sites proposed?		x	x	x	x		x	x	x	
10. Are feeding areas protected?		Y	x	x	x		x	x	Y	No. 8 remarks apply
11. Is protection of areas proposed?		x	x	x	x		x	x	x	

SPECIES: Green snail (Turbo marmoratus)
RED DATA BOOK CATEGORY: Commercially Threatened

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
12. Are adults, their young and eggs protected?	x	x	x	x		x	x	x		
13. Is protection for these proposed?	x	x	x	x		x	x	x		
14. Is harvest of eggs/adults controlled?	x	x	x	x		x	x	x		
15. Does enforcement exist?	nr	nr	nr	nr		nr	nr	nr		
16. Is it adequate?	nr	nr	nr	nr		nr	nr	nr		
17. Is the country a CITES member?	Y	Y	Y	Y		Y	x	Y		
18. Has a reservation been lodged for this species?	nr	nr	nr	nr		nr	nr	nr		not yet listed
19. Does the country honour CITES?	nr	nr	nr	nr		nr	nr	nr		for this species
20. Is there currently research on this species?	x	x	x	x		x	x	x		
21. Does ranching exist?	nr	nr	nr	nr		nr	nr	nr		
22. Is it proposed?	nr	nr	nr	nr		nr	nr	nr		
23. Do hatcheries exist/ proposed?	nr	nr	nr	nr		nr	nr	nr		

Note: UNIDO proposal for button factory in Seychelles will increase pressure on wild stocks.

SPECIES: Double harp (Harpa costata)
RED DATA BOOK CATEGORY: Rare

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
1. Does it occur?	x	x	x	x	x	x	Y	x	x	endemic to Mauritius
2. Population size?										
3. Does it breed?							Y			
4. Are the eggs collected?							nr			
5. Is it hunted/fished?							Y			collected whenever found
6. Is it traded locally?							Y			
7. Is it traded internationally?							Y			
8. Are nesting/breeding sites protected?							x			
9. Is protection for sites proposed?							x			
10. Are feeding areas protected?							x			
11. Is protection of areas proposed?							x			
12. Are adults, their young and eggs protected?							x			
13. Is protection for these proposed?							x			

SPECIES: Double harp (Harpa costata)
RED DATA BOOK CATEGORY: Rare

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
14. Is harvest of eggs/adults controlled?							x			
15. Does enforcement exist?							nr			
16. Is it adequate?							nr			
17. Is the country a CITES member?							Y			
18. Has a reservation been lodged for this species?							nr			not yet listed
19. Does the country honour CITES?							nr			for this species
20. Is there currently research on this species?							x			
21. Does ranching exist?							nr			
22. Is it proposed?							nr			
23. Do hatcheries exist/ proposed?							nr			

SPECIES: Violet spider conch (Lambis violacea)
RED DATA BOOK CATEGORY: not assigned

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
1. Does it occur?	x	x	x	x	x	x	Y	x	x	endemic to St. Brandon
2. Population size?										
3. Does it breed?							Y			
4. Are the eggs collected?							nr			
5. Is it hunted/fished?							Y			collected when found
6. Is it traded locally?							Y			
7. Is it traded internationally?							Y			
8. Are nesting/breeding sites protected?							x			
9. Is protection for sites proposed?							x			
10. Are feeding areas protected?							x			
11. Is protection of areas proposed?							x			
12. Are adults, their young and eggs protected?							x			

SPECIES: Violet spider conch (Lambis violacea)
RED DATA BOOK CATEGORY: not assigned

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
13. Is protection for these proposed?							x			
14. Is harvest of eggs/adults controlled?							x			
15. Does enforcement exist?							nr			
16. Is it adequate?							nr			
17. Is the country a CITES member?							Y			
18. Has a reservation been lodged for this species?							nr			
19. Does the country honour CITES?							nr			for this species
20. Is there currently research on this species?							x			
21. Does ranching exist?							nr			
22. Is it proposed?							nr			
23. Do hatcheries exist/ proposed?							nr			

SPECIES: Fluted giant clam (Tridacna squamosa)
RED DATA BOOK CATEGORY: Indeterminate

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
1. Does it occur?	?	Y	Y	Y	?	Y	Y	?	Y	
2. Population size?										noticeably decreased in granitic Seychelles, probably also elsewhere
3. Does it breed?	?	Y	Y	Y	?	Y	Y	?	Y	may have been eliminated from parts of former breeding range in Seychelles
4. Are the eggs collected?	nr	nr	nr	nr	nr	nr	nr	nr	nr	
5. Is it hunted/fished?		Y	Y	Y	?		Y	?	Y	
6. Is it traded locally?		Y	Y	Y	?		Y		Y	
7. Is it traded internationally?	?	Y	Y	Y	?		Y		Y	through tourist trade
8. Are nesting/breeding sites protected?	x	Y	x	Y	x		x		Y	incidentally in existing marine protected areas
9. Is protection for sites proposed?	x	x	x	x	x	x	x	x	x	
10. Are feeding areas protected?	x	Y	x	Y	x		x		Y	incidentally in existing marine protected areas
11. Is protection of areas proposed?	x	x	x	x	x	x	x	x	x	

SPECIES: Fluted giant clam (Tridacna squamosa)
RED DATA BOOK CATEGORY: Indeterminate

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
12. Are adults, their young and eggs protected?	x	x	x	x	x	x	x	x	x	
13. Is protection for these proposed?	x	x	x	x	x	x	x	x	x	
14. Is harvest of eggs/adults controlled?	x	x	x	x	x	x	x	x	x	
15. Does enforcement exist?	nr	nr	nr	nr	nr	nr	nr	nr	nr	
16. Is it adequate?	nr	nr	nr	nr	nr	nr	nr	nr	nr	
17. Is the country a CITES member?	nr	nr	nr	nr	nr	nr	nr	nr	nr	
18. Has a reservation been lodged for this species?	nr	nr	nr	nr	nr	nr	nr	nr	nr	not listed in CITES
19. Does the country honour CITES?	nr	nr	nr	nr	nr	nr	nr	nr	nr	
20. Is there currently research on this species?	x	x	x	x	x	x	x	x	x	
21. Does ranching exist?	nr	nr	nr	nr	nr	nr	nr	nr	nr	
22. Is it proposed?	nr	nr	nr	nr	nr	nr	nr	nr	nr	
23. Do hatcheries exist/ proposed?	nr	nr	nr	nr	nr	nr	nr	nr	nr	

SPECIES: Small giant clam (Tridacna maxima)
RED DATA BOOK CATEGORY: Insufficiently known

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
1. Does it occur?	?	Y	Y	Y	?	Y	Y	?	Y	
2. Population size?										noticeably decreased in granitic Seychelles, probably also elsewhere
3. Does it breed?	?	Y	Y	Y	?	Y	Y	?	Y	may have been eliminated from parts of former breeding range in Seychelles
4. Are the eggs collected?	nr	nr	nr	nr	nr	nr	nr	nr	nr	
5. Is it hunted/fished?		Y	Y	Y	?		Y	?	Y	
6. Is it traded locally?		Y	Y	Y	?		Y		Y	
7. Is it traded internationally?		Y	Y	Y	?		Y		Y	through tourist trade
8. Are nesting/breeding sites protected?	x	Y	x	Y	x		x		Y	incidentally in existing marine protected areas
9. Is protection for sites proposed?	x	x	x	x	x	x	x	x	x	
10. Are feeding areas protected?	x	Y	x	Y	x		x		Y	incidentally in existing marine protected areas
11. Is protection of areas proposed?	x	x	x	x	x	x	x	x	x	

SPECIES: Small giant clam (Tridacna maxima)
RED DATA BOOK CATEGORY: Insufficiently known

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
12. Are adults, their young and eggs protected?	x	x	x	x	x	x	x	x	x	
13. Is protection for these proposed?	x	x	x	x	x	x	x	x	x	
14. Is harvest of eggs/adults controlled?	x	x	x	x	x	x	x	x	x	
15. Does enforcement exist?	nr	nr	nr	nr	nr	nr	nr	nr	nr	
16. Is it adequate?	nr	nr	nr	nr	nr	nr	nr	nr	nr	
17. Is the country a CITES member?	nr	nr	nr	nr	nr	nr	nr	nr	nr	
18. Has a reservation been lodged for this species?	nr	nr	nr	nr	nr	nr	nr	nr	nr	not listed in CITES
19. Does the country honour CITES?	nr	nr	nr	nr	nr	nr	nr	nr	nr	
20. Is there currently research on this species?	x	x	x	x	x	x	x	x	x	
21. Does ranching exist?	nr	nr	nr	nr	nr	nr	nr	nr	nr	
22. Is it proposed?	nr	nr	nr	nr	nr	nr	nr	nr	nr	
23. Do hatcheries exist/ proposed?	nr	nr	nr	nr	nr	nr	nr	nr	nr	

SPECIES: Pearl oysters (Pinctada species)
RED DATA BOOK CATEGORY: Commercially Threatened

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
1. Does it occur?	Y	Y	Y	Y	Y	Y	Y	Y	Y	
2. Population size?										
3. Does it breed?	Y	Y	Y	Y	Y	Y	Y	Y	Y	
4. Are the eggs collected?	nr	nr	nr	nr	nr	nr	nr	nr	nr	
5. Is it hunted/fished?	?	Y	Y	Y	Y	?	Y	Y	Y	
6. Is it traded locally?	?	Y	Y	Y	Y	?	Y	Y	Y	
7. Is it traded internationally?	?	Y	Y	Y	Y	?	Y	Y	Y	through tourist trade
8. Are nesting/breeding sites protected?	x	Y	x	Y	x		x	x	Y	incidentally in existing marine reserves
9. Is protection for sites proposed?	x	x	x	x	x	x	x	x	x	
10. Are feeding areas protected?	x	Y	x	Y	x		x	x	Y	incidentally in existing marine reserves
11. Is protection of areas proposed?	x	x	x	x	x	x	x	x	x	
12. Are adults, their young and eggs protected?	x	x	x	x	x	x	x	x	x	

SPECIES: Pearl oysters (Pinctada species)
RED DATA BOOK CATEGORY: Commercially Threatened

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
13. Is protection for these proposed?	x	x	x	x	x	x	x	x	x	
14. Is harvest of eggs/adults controlled?	x	x	x	x	x	x	x	x	x	
15. Does enforcement exist?	nr	nr	nr	nr	nr	nr	nr	nr	nr	
16. Is it adequate?	nr	nr	nr	nr	nr	nr	nr	nr	nr	
17. Is the country a CITES member?	x	Y	Y	Y	Y	Y	Y	x	Y	
18. Has a reservation been lodged for this species?	nr	nr	nr	nr	nr	nr	nr	nr	nr	
19. Does the country honour CITES?	nr	nr	nr	nr	nr	nr	nr	nr	nr	
20. Is there currently research on this species?	x	x	x	x	x	x	x	x	x	
21. Does ranching exist?	nr	nr	nr	nr	nr	nr	nr	nr	nr	
22. Is it proposed?	nr	nr	nr	nr	nr	nr	nr	nr	nr	
23. Do hatcheries exist/ proposed?	nr	nr	nr	nr	nr	nr	nr	nr	nr	

Note: UNIDO proposal for button factory in Seychelles will increase pressure on wild stocks.

SPECIES: Coconut/robber crab (Birgus latro)
RED DATA BOOK CATEGORY: Rare

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
1. Does it occur?	x	Y	x	?		ex/1	Y	Ex/ 2		1=may occur on outer islands; 2=abundant on Aldabra, but extinct on many islands
2. Population size?										
3. Does it breed?		Y					Y	Y		
4. Are the eggs collected?		nr					nr	nr		
5. Is it hunted/fished?		Y					?	1		1=not on Aldabra, on small scale on other islands
6. Is it traded locally?							?	1		1=popular souvenir for people returning from outer islands
7. Is it traded internationally?		x					x	x		
8. Are nesting/breeding sites protected?		x					x	Y		Aldabra
9. Is protection for sites proposed?		Y					x	x		Mbudya Is. in proposed Dar es Salaam Reserve
10. Are feeding areas protected?		x					x	Y		Aldabra
11. Is protection of areas proposed?		Y					x	x		Mbudya Is. in proposed Dar es Salaam Reserve

SPECIES: Coconut/robber crab (Birgus latro)
RED DATA BOOK CATEGORY: Rare

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
12. Are adults, their young and eggs protected?		x						x	x	
13. Is protection for these proposed?		x						x	x	
14. Is harvest of eggs/adults controlled?		x						x	x	
15. Does enforcement exist?		nr						nr	Y	on Aldabra
16. Is it adequate?		nr						nr	Y	on Aldabra
17. Is the country a CITES member?		Y						x	Y	
18. Has a reservation been lodged for this species?		x						nr	x	
19. Does the country honour CITES?		Y						nr	Y	for this species
20. Is there currently research on this species?		x						x	x	
21. Does ranching exist?		nr						nr	nr	
22. Is it proposed?		nr						nr	nr	
23. Do hatcheries exist/ proposed?		nr						nr	nr	

SPECIES: Black coral (Antipathes species)
RED DATA BOOK CATEGORY: Commercially Threatened

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
1. Does it occur?	?	Y	?	?	?	?	Y	?	Y	
2. Population size?										
3. Does it breed?	?	Y	?	?	?	?	Y	?	Y	
4. Are the eggs collected?		nr					nr		nr	
5. Is it hunted/fished?		?					Y		Y	
6. Is it traded locally?		?					Y		Y	
7. Is it traded internationally?		?					Y		Y	through tourist trade
8. Are nesting/breeding sites protected?		x					x		x	
9. Is protection for sites proposed?		x					x		x	
10. Are feeding areas protected?		x					x		x	
11. Is protection of areas proposed?		x					x		x	
12. Are adults, their young and eggs protected?		x					x		x	

SPECIES: Black coral (Antipathes species)
RED DATA BOOK CATEGORY: Commercially Threatened

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
13. Is protection for these proposed?		x					x		x	
14. Is harvest of eggs/adults controlled?		x					x		x	
15. Does enforcement exist?		nr					nr		nr	
16. Is it adequate?		nr					nr		nr	
17. Is the country a CITES member?		Y					Y		Y	listed Appendix II
18. Has a reservation been lodged for this species?		x					x		x	
19. Does the country honour CITES?		?					x		x	for this species
20. Is there currently research on this species?		x					x		x	
21. Does ranching exist?							nr		nr	
22. Is it proposed?							nr		nr	
23. Do hatcheries exist/ proposed?							nr		nr	

SPECIES: Whip coral (Cirrhipathes species)
RED DATA BOOK CATEGORY: Commercially threatened

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
1. Does it occur?	?	Y	?	?	?	Y	Y	?	Y	
2. Population size?										
3. Does it breed?	?	Y	?	?	?	Y	Y	?	Y	
4. Are the eggs collected?		nr				nr	nr		nr	
5. Is it hunted/fished?	?					?	?		Y	
6. Is it traded locally?		?							Y	
7. Is it traded internationally?		?								
8. Are nesting/breeding sites protected?		x				x	x		x	
9. Is protection for sites proposed?		x				x	x		x	
10. Are feeding areas protected?		x				x	x		x	
11. Is protection of areas proposed?		x				x	x		x	
12. Are adults, their young and eggs protected?		x				x	x		x	

SPECIES: Whip coral (Cirrhipathes species)
RED DATA BOOK CATEGORY: Commercially threatened

INFORMATION CATEGORY	SOM	KEN	TANZ	MOZ	MAD	FRA	MAUR	COM	SEY	REMARKS
13. Is protection for these proposed?		x				x	x		x	
14. Is harvest of eggs/adults controlled?		x				x	x		x	
15. Does enforcement exist?		nr				nr	nr		nr	
16. Is it adequate?		nr				nr	nr		nr	
17. Is the country a CITES member?		Y				Y	Y		Y	Listed Appendix II
18. Has a reservation been lodged for this species?		x				x	x		x	
19. Does the country honour CITES?		?				?	?		?	for this species
20. Is there currently research on this species?		x				x	x		x	
21. Does ranching exist?						nr	nr		nr	
22. Is it proposed?						nr	nr		nr	
23. Do hatcheries exist/ proposed?						nr	nr		nr	

Annex XI

Categories of protected areas: Definitions and management objectives

Category I: Scientific reserve/strict nature reserve

Introduction

1. The rapid alteration of many natural environments has created the need for a category of management which will ensure areas free of human intervention and available exclusively for scientific research and environmental monitoring. These natural areas provide locations for research where a complete understanding of natural processes can be attained. In some situations scientific research may be limited to non-manipulative (observational) research to restrict the influence of human activity on the natural ecosystem.

Management objectives

2. Management objectives are to protect nature (communities and species) and maintain natural processes in an undisturbed state in order to have ecologically representative examples of the natural environment available for scientific study, environmental monitoring, education, and for the maintenance of genetic resources in a dynamic and evolutionary state. Research activities need to be planned and undertaken carefully to minimize disturbance.

Criteria for selection and management

3. These areas possess some outstanding ecosystems, features and or species of flora and fauna of national scientific importance or are representative of particular natural areas; they often contain fragile ecosystems or life forms, areas of important biological or geological diversity or are of particular importance to the conservation of genetic resources. Size is determined by the area required to ensure the integrity of the area to accomplish the scientific management objective and provide for its protection.

4. Natural processes are allowed to take place in the absence of any direct human interference; tourism, recreation, and public access are generally proscribed. Ecological processes may include natural acts that alter the ecological system or physiographic feature, such as naturally occurring fires, natural succession, insect or disease outbreaks, storm, earthquakes and the like, but necessarily exclude human disturbances. The educational function of the site is to serve as resource for studying and obtaining scientific knowledge.

5. Control of use of the reserve should in most cases be by central government. Exceptions may be made where adequate safeguards and controls relating to long-term protection are ensured and where the central government concurs.

Category II: National park

Introduction

6. Governments have for some time recognized the desirability of establishing protective regimes over outstanding natural areas representative of the diversity of the ecosystems of their countries and areas of jurisdiction so as to guarantee their protection and use for present and future generations. Rapid exploitation of

natural resources has demonstrated that unless governments take decisive action to protect the most outstanding examples of the country's natural heritage, these resources may be lost. The continued trend of urbanization has increased the need to provide opportunities for outdoor recreation and tourism in natural settings. Furthermore, the need for people to understand more fully the natural environment is of particular concern in an age of rapidly diminishing natural resources. Outstanding representative areas of a nation can serve to contribute to this understanding.

Management objectives

7. Management objectives are the protection of natural and scenic areas of national or international significance for scientific, educational, and recreational interest. They contain one or several entire ecosystems that are not materially altered by human exploitation and occupation. The highest competent authority of the country having jurisdiction over the area has taken steps to prevent or eliminate as soon as possible exploitation or occupation in the area and to enforce effectively the respect of ecological, geomorphological, or aesthetic features which have led to its establishment.

8. The resource is managed and developed so as to sustain recreation and education activities on a controlled basis. The area is managed in a natural or near-natural state. Visitors enter under special conditions for inspirational, educational, cultural, and recreational purposes.

9. The protected status of the area is maintained by the central government or through agreement with another agency.

Category III: Natural monument/natural landmark

Introduction

10. Many countries possess natural features of particular scientific and educational interest; however, in many cases, they receive no special national recognition. The features might include spectacular waterfalls, caves, craters, volcanoes, coastal cliffs, reefs, unique species of flora and fauna, sand dunes, etc., of such scenic, scientific, educational and inspirational importance that they merit special designation and protection; because of their uniqueness, these areas deserve greater protection for both scientific and public enjoyment.

Management objectives

11. Management objectives are to protect and preserve nationally significant natural features because of their special interest or unique characteristics and to the extent consistent with this, provide opportunities for interpretation, education, and public appreciation.

Criteria for selection and management

12. This category normally contains one or more of several specific natural features of outstanding national significance such as a geological formation, a unique natural site, animal or plant species, or habitat which, because of uniqueness or rarity, should be protected. The specific feature to be protected ideally has little or no evidence of man's activities. These features are not of the size nor do they contain a diversity of features or representative ecosystems which could justify their classification as a national park. Size is not a

significant factor; the area only needs to be large enough to protect the integrity of the site.

13. Although Category III areas may have recreational and touristic value, they should be managed in such a way that they remain relatively free of human disturbance. These areas may be owned and managed by either central or other government agencies or non-profit trusts or corporations as long as there is assurance that they will manage to protect their inherent features for the long term.

Category IV: Nature conservation reserve/managed nature reserve/wildlife sanctuary

Introduction

14. Although most of the other categories of management play important roles in protecting habitat for flora and fauna, it is essential that areas be established where manipulative management techniques can be applied to guarantee the stability or survival of certain species of plants and animals, through protection of breeding populations, feeding and breeding grounds, and critical habitat for protection of rare and endangered floral and faunal species.

Management objectives

15. Management objectives are to assure the natural conditions necessary to protect nationally significant species, groups of species, biotic communities, or physical features of the environment where these require specific human manipulation for their perpetuation. Scientific research, environmental monitoring, and educational use are the primary activities associated with this category.

Criteria for selection and management

16. A Category IV area is desirable when protection of specific sites or habitats is essential to the continued well-being of resident or migratory fauna of national or global significance. Although a variety of areas fall within this category, each would have as its primary purpose the protection of nature, and not the production of harvestable, renewable resources, although this may play a role in the management of a particular area. The size of the area is dependent upon the habitat requirements of the species to be protected; these areas could be relatively small, consisting of nesting areas, marshes, or lakes, estuaries, forest or grassland habitats, or fish spawning areas, or seagrass feeding beds for marine mammals.

17. The area may require habitat manipulation to provide optimum conditions for the species, vegetative community, or feature according to individual circumstances. For example, a particular grassland or heath community may be protected and perpetuated through a limited amount of livestock grazing, marsh for wintering waterfowl may require continual removal of excess reeds and supplementary planting of waterfowl food, whereas a reserve for an endangered animal may need protection against predators. These areas may be developed in limited areas for public education and appreciation of the work of wildlife management.

18. Ownership may be by the central government or with adequate safeguards and controls in which long-term protection is ensured, by lower levels of government, non-profit trusts or corporations or private individuals or groups.

Category V: Protected landscape or seascape

Introduction

19. In many areas of the world, distinctive landscape patterns are created by the integration of specific natural and cultural features that present aesthetically attractive land and water settings. These may result through traditional land use practices which have retained relatively large and scenic natural or semi-natural areas near urban centres.

20. At the same time, increasing population and leisure time and expanding urban areas are creating demand for additional recreation and tourism areas and facilities in aesthetic environments for citizens and visitors.

21. The management and protection of these natural and cultural areas are important to both recreation and science because of their potential as reservoirs of genetic material and for their social customs and land use practices, which may be disappearing under modern technology.

Management objectives

22. Management objectives are to maintain nationally significant natural landscapes which are characteristic of the harmonious interaction between man and land while providing opportunities for public enjoyment through recreation and tourism within the normal life style and economic activity of these areas. They also provide for ecological diversity, scientific, cultural and educational purposes.

Criteria for selection and management

23. The scope of areas that fall within this category are necessarily broad because of the wide variety of semi-natural and cultural landscape that occur within various States. This may be reflected in two types of areas: those whose landscapes possess special aesthetic qualities which are a result of the interaction of man and land; and those that are primarily natural areas managed intensively by man for recreational and tourism uses.

24. In the former case (the manmade ones), these landscapes may demonstrate certain cultural manifestations such as: customs, beliefs, social organisation, or material traits as reflected in land use patterns. These landscapes are characterised by either scenically attractive or aesthetically unique patterns of human settlement. Traditional land use practices associated with agriculture, grazing and fishing are dominant. The size of the area is large enough to ensure the integrity of the landscape pattern.

25. The latter case (the natural ones) often includes natural or scenic areas found along coastlines and lake shores or in hilly or mountainous terrain or along the shores of rivers and inland adjacent to important tourist highways or population centres offering scenic views and climatic variation; many will have the physical qualities and potential to be developed for a variety of outdoor recreational uses with national significance.

26. In some cases the area may be privately held and the use of either central or delegated planning control would likely be necessary to ensure the perpetuation of both the land use and life style. Means of government assistance, might be required to improve the standard of living while maintaining the natural quality of the site through appropriate management practices. In some instances, the areas are established and managed under public ownership.

Category VI: Resource reserve

Introduction

27. Despite the rapidly increasing utilization of the natural resources of land and sea, there still remain areas for which the most appropriate utilization has yet to be determined. If these areas are not protected exploration, occupation and use are likely to occur on an unplanned single-use and short-term economic exploitation basis. This utilisation without sufficient knowledge may result in resource deterioration and loss of longer-term economic and social benefits.

Management objectives

28. Management objectives are to restrict use of these areas until adequate studies have been completed on how best to utilize the remaining resources, to protect the natural resources of the area for future use and prevent or contain development activities that could affect the resource pending the establishment of objectives which are based upon appropriate knowledge and planning.

Criteria for selection and management

29. Category VI areas will normally comprise an extensive and relatively isolated and uninhabited area having difficult access, or regions that are lightly populated yet may be under considerable pressure for colonization and greater utilization. In many cases, there has been little study or evaluation of these areas, and the consequences of converting them to agriculture, mineral or timber extraction. Similarly, use of the resources may not be appropriate because of the lack of technology, human or financial resource restrictions, or alternative national priorities. Consequently, natural, social, and economic values are not sufficiently identified to permit the area to be managed for specific objectives or to justify its conversion to other uses. On land restricted access is implied so areas will normally require control, depending upon the pressures to enter and utilise them. Areas may be owned or administered by government or public corporations.

30. Maintenance of existing conditions to allow for studies on the potential use for the designated areas is a prerequisite. No exploitation should occur with the exceptions of use of resources by indigenous inhabitants, ongoing ecologically sound activities are acceptable.

Category VII: Natural biotic area/anthropological reserve

Introduction

31. In some countries there may be a need for the protection of natural areas in which man is a component and obtains his livelihood by means that do not involve extensive cultivation or other major modifications of the vegetation and animal life. These individuals or societies may require special protection to maintain their existence.

Management objectives

32. Management objectives are to allow the way of life of societies living in harmony with the environment to continue undisturbed by modern technology. Research into the evolution of man and his interaction with the land would be a secondary objective.

Criteria for selection and management

33. Category VII areas are characterised by natural areas where the influence of technology of modern man has not significantly interfered with or been absorbed by the traditional ways of life of the inhabitants. These areas may be remote and isolated and their inaccessibility may be maintained for a considerable period of time. The societies are of particular significance to the maintenance of cultural diversity; there is a strong dependence of man upon the natural environment for food, shelter, and other basic material to sustain life. Extensive cultivation or other major modifications of the vegetation and animal life is not permitted.

34. Management is oriented towards the maintenance of habitat for traditional societies so as to provide for their continuance within their own cultural mores.

Category VIII: Multiple use management area/managed resource area

Introduction

35. There is a need for a category of management for terrestrial and marine areas that can both provide protection to natural resource and ecological systems and yet contribute significantly to economic, social, and material needs of States. The multiple function of these lands or waters can provide for a sustained yield of a series of natural products and services under proper management as well as for preservation of genetic diversity and protection of natural features and systems. Watershed protection, for example, may be of particular importance in addition to the timber, forage or wildlife aspect of the area. In the case of marine areas, protection of areas of great biological diversity may be of importance in addition to sustaining the production of fish or other marine products.

Management objectives

36. Management objectives are to provide for sustained production of water, timber, wildlife, pasture or marine products, and outdoor recreation. The conservation of nature may be primarily oriented to the support of the economic activities (although specific zones may also be designated within these areas to achieve specific conservation objectives). Within the overall area, zones may be established in which either the conservation of nature or sustainable development is the primary objective.

Criteria for selection and management

37. A large area, containing considerable territory suitable for production of wood products, water, pasture, wildlife, marine products and outdoor recreation, part of the area may be settled and may have been altered by man. The area may possess nationally unique or exceptional natural features, or may as a whole represent a feature or area of international or national significance.

38. Planning programmes to ensure the area is managed on a sustained yield basis would be a prerequisite. Land ownership would be under government control. Through proper zoning, parts of the area could be given degrees of protection ranging from the equivalent of scientific reserve status to minimal control consistent with sustainable development. For instance, the establishment of wilderness-type areas is consistent with the purpose of these areas as would be establishing nature reserves. Multiple use, in the context of Category VIII, is considered to be the management of all renewable resources, utilized in some combination to best meet the needs of the country. The major premise in the management of these areas is that

they will be managed to maintain the overall productivity of the area and its resources in perpetuity.

Category IX: Biosphere reserve

Introduction

39. One focus of the UNESCO Man and the Biosphere Programme, initiated in 1970, is to conserve representative natural areas throughout the world through the establishment of a network of biosphere reserves.

Management objectives

40. Management objectives are to conserve for present and future use the diversity and integrity of biotic communities of plants and animals within natural ecosystems, and to safeguard the genetic diversity of species on which their continuing evolution depends.

41. Biosphere reserves provide opportunities for ecological research, particularly baseline studies, both within natural and altered environments. These reserves have particular value as benchmarks or standards for measurement of long-term changes in the biosphere as a whole and are consequently important sites for environmental monitoring. Biosphere reserves are to provide facilities for education and training.

Criteria for selection and management

42. Each biosphere reserve will include one or more of the following:

a) representative examples of natural biomes;

b) unique communities or areas with unusual natural features or exceptional interest;

c) examples of harmonious landscapes resulting from traditional patterns of land use; and

d) examples of modified or degraded ecosystems capable of being restored to more natural conditions.

43. A biosphere reserve must have adequate long-term legal protection. Each biosphere reserve will be large enough to be an effective conservation unit, and to accommodate different uses without conflict. Each reserve must be approved by the Man and the Biosphere International Co-ordinating Council before it can receive designation as a biosphere reserve.

44. Each biosphere reserve will be zoned to provide direction as to its management. Four zones may be delineated as follows:

a) Natural or Core Zone;

b) Manipulative or Buffer Zone;

c) Reclamation or Restorative Zone; and

d) Stable Cultural Zone.

Category X: World heritage site (natural)

Introduction

45. The International Convention concerning the Protection of the World Cultural and Natural Heritage (UNESCO 1972) provides for the designation of areas of "outstanding universal value" as World Heritage Sites. These exceptional areas must be recommended by the signatory State responsible for the site for declaration by the International World Heritage Committee. The sites will undoubtedly include many previously designated protected areas.

Management objectives

46. Management objectives are to protect the natural features for which the area was considered to be of world heritage quality; to provide information for world-wide public enlightenment; to provide for research and environmental monitoring.

Criteria for selection and management

47. Areas to be considered under the Convention will be restricted to those which are truly of international significance. Natural sites must represent one or more of the following criteria:

a) be outstanding examples representing the major stages of the earth's evolutionary history;

b) be outstanding examples representing significant ongoing geological processes, biological evolution and people's interaction with their natural environment;

c) contain unique, rare or superlative natural phenomena, formations or features or areas of exceptional natural beauty; and

d) be habitats where populations of rare or endangered species of plants and animals still survive.

48. Natural Heritage Sites must also fulfil conditions relative to the integrity of the site.

49. Management of these sites will stress the maintenance of the heritage values, will ensure the continuation of legal protection and will promote each site for its significance to each country, its people and the world.

50. All sites will have to have strict legal protection and will be owned by government or non-profit corporation or trust for the long term. While recreation and on-site interpretation will generally be developed, some sites may be of such significance that public use will either be strictly controlled or prohibited.

Annex XII

Data sheets for marine and coastal protected areas in the East African region

KENYA

NAME Malindi/Watamu Marine National Parks and Reserves

MANAGEMENT CATEGORY II, VI & IX (National Park Resource Reserve & Biosphere Reserve)

BIOGEOGRAPHICAL PROVINCE 3.14.7 (Somalian)

LEGAL PROTECTION 2 marine national reserves and 2 marine national parks, gazetted under the Wildlife Conservation and Management Act, 1976.

DATE ESTABLISHED 1968, and May 1979 as a Biosphere Reserve.

GEOGRAPHICAL LOCATION A strip of coast and sea 30km long and 4km broad south of Malindi, and including Mida Creek, 88 km north of Mombasa; 3°14'-25'S, 39°57'-40°11'E.

ALTITUDE Sea level.

AREA 21,309 ha MNR; 1,600 ha MNP. Biosphere Reserve 19,600 ha.

LAND TENURE Government of Kenya, managed through the Ministry of Tourism and Wildlife (Wildlife Management and Conservation Department).

PHYSICAL FEATURES Three major habitats can be identified: intertidal rock, intertidal sand and mud, and the sublittoral area. In addition there are other special features like 'rock platforms' and cliffs. In the Watamu area there are caves and coral reefs inhabited by fish. The continental shelf is narrow and the coastline is bordered by fringing reefs on the seaward side with water depth dropping sharply within short distances. Between the limestone cliffs there are stretches of beautiful sandy beach. Mida creek contains tidal mudflats with fringing mangrove swamp.

The southern monsoons, which come between April and October, create a current which can have a velocity of 4 knots. Northern monsoons come between November and March. There is no great variation in temperature, which averages 26°C.

VEGETATION The marine flora is very varied, and includes the algae Padina commersonii, Dictyota bartayresiana, and Udotea indica. In the sublittoral zone, microscopic marine plants occur everywhere except on areas of mobile sand and actively growing coral, sometimes even gaining a foothold there. They are, however, absent from the upper part of the intertidal zone (except for the the brown alga Bostrychia binderi), and in the extensive mangrove areas of Mida Creek in Watamu. In the intertidal sand and mud, the finer sediments below water (which are subject to less wave action) have become fixed by growth of the marine angiosperms Cymodocea rotundata, Thalassodendron ciliatum, Halodule wrightii, Thalassia hemprichii, Syringodium and others. The mangroves Sonneratia alba, Rhizophora mucronata, Bruguiera gymnorhiza, Ceriops tagal and Avicenna occur. Considerable quantities of drifted plant debris, mainly dead leaves shed by seagrasses, accumulate on the shore.

NOTEWORTHY FAUNA The intertidal rocks are inhabited by the rock crabs Grapsus maculatus and Geograpsus lividus, small rock gobies, anemones, a few Holothuria, and the large flat Six-plated barnacle. Near the foot of the cliffs a red and white xanthid crab is common (tightly wedged into cracks) and below this, in rock pools, the porcelain crab Petrolisthes predominates. On the sandy beaches, the hermit crab Coenobita rugosus, and occasional Ocypode kuhlii are found. This zone is also characterized by amphipods, Ocypode ceratophthalma, gastropod molluscs and a few polychaetes. In the coral gardens, the heads consist primarily of Porites spp., supplemented by the branching Acropora spp., Pocillopora spp., colonies of Cyphastrea spp., Galaxea spp., brain corals and Millepora. Other reef species include Ophicoma crinaceus living in coral cracks, E. matthaei and Diadema spp. on the surfaces. Beneath overhangs, Diadema spp. and Echinothrix spp. may be present, and the large blue starfish Linckia laevigata is abundant. Tridacna squamosa lives attached to the coral, Barbatia spp. lives inside it and Lithophaga spp. burrows extensively through it. The other conspicuous molluscs are the tiger cowrie Cypraea tigris, the large oyster Pinctada margaritifera and numerous species of nudibranchs. Among the marine worms (Polychaeta) the sabellid fan worm and serpulids are common in the coral.

ZONING The Malindi-Watamu Biosphere Reserve comprises the Malindi-Watamu Marine National Parks and the Malindi-Watamu Marine National Reserves. The National Parks constitute the core areas and the National Reserves form the buffer zone.

DISTURBANCES OR DEFICIENCIES Perhaps the most significant human effect on the park at present is the silting of the Sabaki River, which brings heavy loads of silt to the park during the rainy seasons as a result of uncontrolled cultivation in the Ukambani hills. Corals and shells have been exploited heavily but after the protected areas had been gazetted, this practice stopped and there has been considerable recovery. There is apparent tourist pressure during the peak tourist season. The effects on the ecosystem of activities such as swimming, sailing and snorkling (which are allowed in the park) have not yet been investigated, but there are possible disturbances due to trampling and boat anchorage. Some fishing occurred in the parks prior to their establishment but this has been stopped (apart from some traditional fishing). It has been noted that the fish populations are smaller in the reserves where fishing is still allowed, and when proper monitoring has been carried out there might be a need to introduce quota fishing systems and controls on fishing methods used. There is no pollution from the city of Malindi as the sewage system is closed, but there have been oil discharges from tankers in the deep seas. The extent of oil pollution has not yet been investigated. The adjacent section of Arabuko Sokoke forest should be included in reserve.

SCIENTIFIC RESEARCH Some research has been carried out on corals and turtles; on ecological zonation, and on siltation effects on reef ecology. Potential for research is high.

SPECIAL SCIENTIFIC FACILITIES The government has appointed an officer to look into the possibilities of a marine research station.

PRINCIPAL REFERENCE MATERIAL

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(1969) Bango-Watamu Expedition. University College of Wales.

(1972) Some aspects of ecology of the Malindi-Watamu. University of Newcastle upon Tyne Exploration Society.

Hamilton, H. (1973) Taxonomy and Distribution of corals of the East African Coast. M.Sc. Thesis, Univ. of Dar-es-Salaam.

Biosphere Reserve nomination submitted to Unesco.

STAFF 2 wardens, 26 rangers, 17 support staff.

BUDGET Kshs. 301,715 (US$ 40,200) 1979-80.

LOCAL PARK OR RESERVE ADMINISTRATION Warden, Marine National Parks, PO BOX 109, Malindi, Kenya.

DATE November 1980.

KENYA

NAME Kisite/Mpunguti Marine National Park

MANAGEMENT CATEGORY II (National Park)

BIOGEOGRAPHICAL PROVINCE 3.14.7 (Somalian)

LEGAL PROTECTION Total.

DATE ESTABLISHED 2 November 1973, Gazette Notice No. 215.

GEOGRAPHICAL LOCATION South of Wasini Island, off Shimoni on south coast, not far from the Tanzanian border; 04°40'-44'S, 39°21'-26'E.

ALTITUDE Sea level to c. 5m.

AREA 2301 ha (island area approximately 18 ha).

LAND TENURE Government expropriated, under Trusteeship.

PHYSICAL FEATURES A trapezoid section of the Indian Ocean encompassing four small coral islands: Kisite, Mpunguti ya juu, Mpunguti ya chini and Jiwe la Jahazi, together with a considerable area of the fringing reefs and sand surrounding them.

VEGETATION Sea grasses Cymodocea serrulata and Syringodium isoetifolium cover large areas of the back-reef zone. Marine algae include Padina commersonii, Dictyota bartayresiana, Bostrychia binderi, Ulva lactuca, Dictyoshpaera sp., Udotea indica, Halimeda opuntia, Sargassum and Turbinaria.

NOTEWORTHY FAUNA Includes the corals Galaxea sp. and Porites sp., money cowrie Cypraea moneta, starfish Protoreaster lincki, sea urchins Echinometra matthaei, ghost and rock crabs Ocypode kuhlii and Grapsus maculatus, sergeant-major fish Abudefduf sexfasciatus, butterfly fish Chaetodon lunula and parrotfish Callyodon guttatus. There are also valuable cowries such as Cypraea turdus, C. mappa and C. lynx.

ZONING None.

DISTURBANCES OR DEFICIENCIES Damage to the area by past blasting has caused concern. It is hoped that present protection will permit regeneration.

TOURISM Open to tourism, with accommodation and boats for hire available in Shimoni.

SCIENTIFIC RESEARCH None at present.

SPECIAL SCIENTIFIC FACILITIES None.

PRINCIPAL REFERENCE MATERIAL

Ray, C. (1969) Marine Parks and Inshore Conservation in Kenya. African Wildlife Leadership Foundation, Nairobi.

Saw, P. (1974) Sea Sanctuary. Africana 5(5).

STAFF Warden, 2 assistants, 20 rangers, 10 labourers or workers.

BUDGET Recurrent expenditure, 1975/76: K£ 20,573 (US$ 45,300); capital expenditure 1975/76: K 17,500 (US$ 38,500).

LOCAL PARK OR RESERVE ADMINISTRATION Warden, Kisite/Mpunguti Marine National Park, P.O. Box 55, Ukunda, Kenya.

NAME OF CNPPA COORDINATOR

DATE World Directory 1977.

NAME Kiunga Marine National Reserve

MANAGEMENT CATEGORY VI & IX (Resource Reserve & Biosphere Reserve)

BIOGEOGRAPHICAL PROVINCE 3.14.7 (Somalian)

LEGAL PROTECTION Partial under the Wildlife Conservation and Management Act (1976). The boundaries are delineated on Boundary Plan No. 216/39, which is deposited in the Survey Records Office, Survey of Kenya, Nairobi.

DATE ESTABLISHED 1979, by Legal Notice No. 291 in the official Kenya Gazette, as a reserve; accepted by the MAB Bureau in 1980.

GEOGRAPHICAL LOCATION North-eastern coastal border of mainland Kenya, and the Pate Islands, Indian Ocean; 1°75'-2°00'S; 41°20'-41°25'E.

ALTITUDE 0-30m.

AREA 25,000 ha, but extending to about 60,000 ha when the marine area is included. The Biosphere Reserve is of 60,000 ha.

LAND TENURE The offshore islands and mangrove swamps are state owned, vested in Lamu County Council. The coastal waters are under the supervision of the Fisheries Department and the Wildlife Conservation and Management Department (Ministry of Environment and Natural Resources).

PHYSICAL FEATURES Sandy beaches on the coast, some with mangrove swamps, with about 50 calcareous offshore islands and coral reefs paralleling the coastline. The upper part of the reserve on the mainland consists of sand dunes and there is dry coastal shrubby forest.

VEGETATION The marine flora varies widely in the area. In the sublittoral zone microscopic marine plants are absent only from areas of mobile sand and actively growing coral, and sometimes gain footholds in those unfavourable habitats. Microscopic marine plants are, however, absent from the upper part of the intertidal zone except for areas of Bostrychia bindelia. In the intertidal sand and mud, the finer sediments below water which are subject to less wave action, have become fixed by growth of marine angiosperms, and there are extensive areas of seagrass and algae. Thickets of salt-tolerant plants, typical of the Indo-Pacific beach littoral zone, are common on the mainland and include Ipomoea pescaprae, Cyperus maritimus, Scaevola, Suaeda, and Tephrosia species. Mangrove swamps dominated by Rhizophora mucronata occur in the sheltered tidal waters between Mwanzi and Mkokoni.

NOTEWORTHY FAUNA The offshore islands are rich in sea birds and there are large nesting colonies of various gulls and terns including sooty gull Larus hemprichi, and Roseate tern Sterna dougalli. Gulls and terns are particularly numerous during the breeding season between June and August. The roseate tern, white-cheeked tern Sterna repressa and the bridled tern S. anaethetus are particularly noteworthy. Dugong Dugong dugon (V) and green turtle Chelonia mydas (E) are also seen. Several large land mammals also frequently visit the mainland buffer area, including Hunter's antelope Damaliscus hunteri (R), elephant Loxodonta africana (V) and lesser kudu Tragelaphus imberbis are resident on some of the islands. Extensive coral and reef fishes.

ZONING Dodori National Reserve, which occupies the mainland area inland of the

Kiunga Reserve, acts as a buffer zone as it separates the increasing human activities on the mainland from the coastal beach areas.

DISTURBANCES OR DEFICIENCIES The area has suffered little human interference in the past, and this is one of the reasons for its protection now. There has been limited collection of reef coral and shells for sale. The rate of cutting of the mangrove forest for commercial purposes was on the increase just before reserve status was declared, but has now been brought under control. Poaching of green turtle and its eggs is a problem, but this is being dealt with by the Game Warden from Lamu. There is also some poaching of dugong. Certain water sports are allowed within the park (passage and anchorage of boats, water skiing, etc.) and use of the beaches under the control of the authorities.

SCIENTIFIC RESEARCH None.

SPECIAL SCIENTIFIC FACILITIES There is a need for both basic research and also the training of local marine scientists. This will in the initial phases require co-operation and support from international research and financing institutions. It is in this field that assistance of Unesco through the MAB programme has been suggested.

PRINCIPAL REFERENCE MATERIAL Biosphere Reserve nomination submitted to UNESCO.

STAFF Currently supervised by the game warden from Lamu, it has been proposed that a staff of 45 should be appointed.

BUDGET Under preparation.

LOCAL PARK OR RESERVE ADMINISTRATION Warden, WCMD, P.O. Kiunga, via Lamu, Kenya.

DATE November 1980.

KENYA

NAME Boni National Reserve

MANAGEMENT CATEGORY VI (Resource Reserve)

BIOGEOGRAPHICAL PROVINCE 3.14.7 (Somalian)

LEGAL PROTECTION Partial.

DATE ESTABLISHED 1976.

GEOGRAPHICAL LOCATION On Kenya/Somali border: 1°21'-1°40'S; 41°02'-41°35'E.

ALTITUDE 0-100 m.

AREA 133,960 ha.

LAND TENURE State land vested in Garissa County Council.

PHYSICAL FEATURES Inland flat coast plain. Braided drainage system separated by marine sand and clay ridges. Seasonally flooded to a depth of 2m in area behind Mundani Hills. Two major flood pan areas (Ziwas).

VEGETATION Coastal lowland forest consisting of Sterculia - Chlorophora - Memecylon. Primarily lowland dry bushland and bush grassland consisting of dense Manilkara. Diospyros, Encephalartus and Euphorbia in drier areas. Flood pan grasses are Echinochloa and Setaria.

NOTEWORTHY FAUNA Elephant dry season concentration area. Rare Harvey's duiker Cephalophus harveyi and Ader's duiker Cephalophus adersi.

ZONING None.

DISTURBANCES OR DEFICIENCIES Poaching.

TOURISM No tourism.

SCIENTIFIC RESEARCH Vegetation inventory (Kremu).

SPECIAL SCIENTIFIC FACILITIES Kiunga Wildlife Research Station.

PRINCIPAL REFERENCE MATERIAL None.

STAFF 2 wardens, 1 ranger, 2 support staff (allocated but not in place).

BUDGET Grant in aid KSh. 560,000 for 1979. No expenditure made in reserve.

LOCAL PARK OR RESERVE ADMINISTRATION Warden, WCMD, Box 58, Garissa.

NAME OF CNPPA COORDINATOR J. Thorsell.

DATE November 1980.

KENYA

NAME Dodori National Reserve

MANAGEMENT CATEGORY II (National Park)

BIOGEOGRAPHICAL PROVINCE 3.14.7 (Somalian)

LEGAL PROTECTION Partial.

DATE ESTABLISHED 1976.

GEOGRAPHICAL LOCATION Coastal zone near Somali border: 1°40' - 1°55'S; 40°52'-41°25'E.

ALTITUDE 0-100 m.

AREA 87,739 ha.

LAND TENURE State land vested in Lamu County Council.

PHYSICAL FEATURES Dodori River flows through alluvial valley of short grass flood meadows. Mundani Hills are Pleistocene dune sand ridges paralleling the coast. Estuary of Dodori Creek at entrance to Indian Ocean.

VEGETATION Mangrove swamps (Rhizophora mucronata) along Dodori Creek. Primarily lowland dry forest of dense Manilkara and Cynometra. Some marshes and seasonally flooded glades.

NOTEWORTHY FAUNA Topi Damaliscus lunatus, elephant Loxodonta africana (V) and lesser kudu Tragelaphus imberbis most common larger species. The tidal mangrove swamps contain a rich avifauna, crustacea, and molluscs. Estuary formerly supported substantial dugong Dugong dugon (V) population.

ZONING None.

DISTURBANCES OR DEFICIENCIES Wet season poaching.

TOURISM One public campsite available. Occasionally used by lodges located in nearby Kiunga Reserve.

SCIENTIFIC RESEARCH None.

SPECIAL SCIENTIFIC FACILITIES Kiunga Wildlife Research Station.

PRINCIPAL REFERENCE MATERIAL None.

STAFF 1 Assistant warden, 9 rangers, 2 subordinate, 30 casual.

BUDGET KSh. 134,000 expenditure 1979.

LOCAL PARK OR RESERVE ADMINISTRATION Warden, Dodori National Reserve, Box 82, Kiunga.

NAME OF CNPPA COORDINATOR J. Thorsell.

DATE November 1980.

MADAGASCAR

NAME Nosy Mangabé Special Reserve

MANAGEMENT CATEGORY IV (Managed Nature Reserve)

BIOGEOGRAPHICAL PROVINCE 3.3.1 (Malagasy Rainforest)

LEGAL PROTECTION Total.

DATE ESTABLISHED 1965.

GEOGRAPHICAL LOCATION A small island situated to the east of Maroantsetra, 15°25'S, 49°45'E.

ALTITUDE

AREA 520 ha.

LAND TENURE State owned.

PHYSICAL FEATURES Cretaceous limestone island.

VEGETATION The island has a typical east coast rainforest vegetation including species of Canarium, Ocotea and Ravennara, along with many palms and ferns.

NOTEWORTHY FAUNA The reserve was especially created to protect the aye-aye Daubentonia madagascariensis (E). Several attempts have been made to establish the species on the island; 9 individuals were released in 1967 and 12 in 1971, however there has only been one (unofficial) record of the species (1976) since their release. An interesting example of the localisation of species of Madagascar is the Anton-guille frog Discophus antonguiller, a scarlet frog found within the reserve. This species is common in a very small area but it is completely unknown elsewhere. Ruffed lemur Varecia variegata (K) also occurs in the reserve.

ZONING None.

DISTURBANCES OR DEFICIENCIES The island can only support limited tourism and this must be more strictly controlled. It has been suggested (IUCN Project 1953) that no more buildings be constructed on the island. Planned staff housing should be built on the adjacent mainland. Any manipulation of the habitat should be strictly minimised. There is a manned lighthouse on the island, and a "public works" shop.

TOURISM The reserve is open to the public if authorisation is obtained from Direction des Eaux et Forêts at Tananarive.

SCIENTIFIC RESEARCH Introduction of aye-aye. Censuses of the aye-aye and Anton-guille frog have been recommended.

SPECIAL SCIENTIFIC FACILITIES Labratory.

PRINCIPAL REFERENCE MATERIAL IUCN/WWF Project 1953, IUCN, Gland, Switzerland.

STAFF No information.

BUDGET IUCN: initial allocation US$ 25,000 (1981). W.W.F. Tropical Forests Campaign grant of US$ 5,000 in 1982 and 1983 in addition to the already approved

W.W.F. funding of US$ 22,400 in 1982 and US$ 1,000 in 1983. The money will go towards the location and protection of the remaining aye-aye population, park maintenance and an environmental education programme.

LOCAL PARK OR RESERVE ADMINISTRATION

NAME OF CNPPA COORDINATOR Joseph Adriamampianina.

DATE January 1983.

MADAGASCAR

NAME Réserve Naturelle Intégrale de Lokobe

MANAGEMENT CATEGORY I (Strict Nature Reserve)

BIOGEOGRAPHICAL PROVINCE 3.9.4 (Malagasy woodland/savanna)

LEGAL PROTECTION Total.

DATE ESTABLISHED 31 December 1927.

GEOGRAPHICAL LOCATION On the island of Nosy-Be; 13°23'-25'S, 48°18'-20'E.

ALTITUDE 0-550m.

AREA 740 ha.

LAND TENURE State land.

PHYSICAL FEATURES The reserve is situated on the island of Nosy-Be. Tortuous relief on volcanic rocks. The reserve has an important role in the local water network. Eastern climate with low precipitation and a well-marked dry season of 3 or 4 months.

VEGETATION The reserve contains the only remaininq forest on the island. This is a dense humid forest with species of the family Chlaenaceae (endemic to Madagascar) and numerous members of the genus Anthostema.

NOTEWORTHY FAUNA Numerous birds. An important colony of Lemur macaco but also weasel-lemur Lepilemur mustelinus, lesser mouse-lemur Microcebus murinus, and brown lemur Lemur albifrons. According to the agent, the monqoose-lemur L. mongoz (V) has not been seen there since 1944-48. Chameleons and various other reptiles.

ZONING The reserve boundaries are clearly delimited, and obviously marked.

DISTURBANCES OR DEFICIENCIES The small size of the reserve makes it vulnerable to encroachment, especially in view of the great need for agricultural land on Nosy Bé.

SCIENTIFIC RESEARCH None.

SPECIAL SCIENTIFIC FACILITIES The Centre National de Recherches Océanographiques owns a laboratory close to the Réserve, but the work is always orientated towards the marine fauna.

PRINCIPAL REFERENCE MATERIAL W.W.F. Forest Pack 5 (1982), W.W.F. Tropical Forest Campaign.

STAFF Only an agent, M. Alphonse.

BUDGET Salaries paid by the government. 1982; W.W.F. Tropical Forest Campaign grant of US$ 22,000 over 2 years to buy essential equipment and assist in the protection of 150-200 ha of the planned buffer zone in the northeast.

LOCAL PARK OR RESERVE ADMINISTRATION At Hell-ville on Nosy-Be.

NAME OF CNPPA COORDINATOR Jospeh Andriamampianina.

DATE 8 October 1980.

NAME Ile Cocos

MANAGEMENT CATEGORY I (Strict Nature Reserves)

BIOGEOGRAPHICAL PROVINCE 3.25.13 (Mascarene Islands)

LEGAL PROTECTION Total. Protected by law under the Ancient Monument Act.

DATE ESTABLISHED 30 May 1981.

GEOGRAPHIC LOCATION 3.7 km off the west coast of Rodrigues, 19°43'S, 63°17.7'E.

ALTITUDE Sea-level to 4 m.

AREA 14.40 ha.

LAND TENURE Public ownership.

PHYSICAL FEATURES Sand cay with coarse granular sand and other debris of marine organisms accumulated by sea currents and tides in shallow lagoon waters. The more protected shores merge into extensive sand flats which are largely exposed at low tide. Due to erosion the calcarenite islet displays jagged coastline and pitted inland areas.

VEGETATION The island is largely under mixed plantation, Filao, Casuarina equisetifolia and coconut trees. Large expanses of grassy swards present with local weed societies of Stachytarpheta jamaicensis, Desmanthus virgatus and Achyranthes aspera. Dense Pisonia grandis thicket along part of the western littoral and inland as isolated clumps which are sharply delimited from the cultivated tree plantation.

A fairly extensive inland salt marsh supports a lush vegetation of Sesuvium ayresii with patches of Bacopa monnieri.

NOTEWORTHY FAUNA Large colonies of noddies Anous stolidus pileatus, the lesser noddy Anous tenuirostris tenuirostris and the fairy tern Gygis alba are present. The colony of both species of noddies is very large, between 4-7 thousand and the favourite nesting sites are the Casuarina trees and Pisonia thickets.

The fairy terns lay eggs directly on bits of corals or on horizontal branches and the hatchlings are reared in very precarious situations. Both noddies lay one egg at a time in nests made of algae on branches of casuarina.

ZONING None.

DISTURBANCES OR DEFICIENCIES Eggs of birds on the islet are extremely vulnerable. Indiscriminate collection by visitors has caused considerable disturbance and damage to bird life.

SCIENTIFIC RESEARCH The vegetation of the island recently surveyed by J. Gueho (1980).

SPECIAL SCIENTIFIC FACILITIES None.

PRINCIPAL REFERENCE MATERIAL

Gueho, J. (1977) Guide des principales plantes indigènes de l'Ile Rodrigues. Rev. Agric. Sucr. Ile Maurice 56(1):6-23.

Gueho, J. (1980) A survey of vegetation of the lagoon islets of Rodrigues. Rev. Agric. Sucr. Ile Maurice 59(1).

Staub, F. (1973) Birds of Rodrigues Islands. Proc. R. Soc. Arts Sci. Mau. 4(1):17-59.

Staub, F. (1977) L'avifaune de Rodrigues. Rev. Agric. Suc. Ile Maurice 56(1):24-26.

Vinson, J. (1956) Quelques remarques sur l'Ile Rodrigues et sur sa faune terrestre. Proc. R. Soc. Art Sci. Mau 2: 263-277.

STAFF Visited as often as possible by Fisheries and Forestry Service officers from the main island of Rodrigues. One watchman posted on the islet.

BUDGET Virtually nil.

LOCAL PARK OR RESERVE ADMINISTRATION Forest Department, Ministry of Agriculture, Fisherie and Natural Resources, Curepipe, Mauritius.

NAME OF CNPPA COORDINATOR

DATE

NAME Ilot Sable

MANAGEMENT CATEGORY I (Strict Nature Reserve)

BIOGEOGRAPHICAL PROVINCE 3.25.13 (Mascarene Islands)

LEGAL PROTECTION 30 May 1981.

DATE ESTABLISHED

GEOGRAPHIC LOCATION 3.7 km northwest from Pointe La Fouche in the west of Rodrigues 19°42'S; 63°18'E.

ALTITUDE Sea-level to about 2 m.

AREA 7.75 ha.

LAND TENURE Public ownership.

PHYSICAL FEATURES Sand cay with coarse granular sand and other debris of marine organisms. Extensive sand flats merge with the sandy west coast.

VEGETATION The islet has been mostly under Casuarina cultivation. Flora consist of scarcer representatives of both exotic and native species than that of Ile Cocos. These consist of Stachytarpheta jamaicensis, Desmanthus virgatus and Archyranthis aspera. The native Pisonia grandis is encountered as few isolated individuals inland. Thespesia populnea is also scantily represented on higher ground.

NOTEWORTHY FAUNA Large colonies (but smaller than Ile Cocos) of noddies Anous stolidus pileatus, the lesser noddy Anous tenuirostris tenuirostris and the fairy tern Gygis alba are present. Casuarina trees are the favourite nesting sites for these birds.

ZONING None.

DISTURBANCES OR DEFICIENCIES Eggs of birds on the islet are extremely vulnerable. Indiscriminate collection by visitors has caused considerable disturbance and damage to bird life. Recently through GN 157 of 182, everyone intending to visit the islet must seek prior authorization of the Resident Commissioner.

SCIENTIFIC RESEARCH The vegetation of the islet has recently been surveyed by J. Gueho (1980).

SPECIAL SCIENTIFIC FACILITIES None.

PRINCIPAL REFERENCE MATERIAL

Gueho, J. 1977 Guide des principales plantes indigènes de l'Ile Rodrigues. Rev. Agric. Sucr. Ile Maurice 56(1):6-23.

Gueho, J. 1980 A survey of vegetation of the lagoon islets of Rodrigues. Rev. Agric. Sucr. Ile Maurice 59(1).

Staub, F. 1973 Birds of Rodrigues Islands. Proc. R. Soc. Arts Sci. Mau. 4(1):17-59.

Staub, F. 1977 L'avifaune de Rodrigues. Rev. Agric. Sucr. Ile Maurice 56(1)24-26.

Vinson, J. 1956 Quelques remarques sur l'Ile Rodrigues et sur sa faune terrestre. Proc. R. Soc. Art Sci. Mau 2: 263-277.

STAFF Visited as often as possible by Fisheries and Forestry Service officers from the main Island of Rodrigues.

BUDGET

LOCAL PARK OR RESERVE ADMINISTRATION Forest Department, Ministry of Agriculture, Fisheries and Natural Resources, Curepipe, Mauritius.

NAME OF CNPPA COORDINATOR

DATE 7 July 1983.

NAME Flacq Fishing Reserve

MANAGEMENT CATEGORY VIII (Multiple Use Reserve)

BIOGEOGRAPHICAL PROVINCE 3.25.13 (Mascarene Islands)

LEGAL PROTECTION Fisheries Act 1980.

DATE ESTABLISHED

GEOGRAPHIC LOCATION Eastern coast of Mauritius.

ALTITUDE Sea level.

AREA 6 sq km.

LAND TENURE Public ownership.

PHYSICAL FEATURES Includes that part of the sea between the sea coast at high water mark and a line drawn from Point La Brise at Poste Lafayette to Pointe de Flacq. Encloses a barachois (fish pond). Lagoon environment, with sandy and rocky bottom and coral reefs.

VEGETATION Includes small rocky outcrops covered by mangrove trees, inter-tidal zone covered by sandy beaches, mangrove stands and water lilies. Various species of sea grasses and algal erg ulva, uchemia, eutomorpha ohastomorpha.

NOTEWORTHY FAUNA All commercially exploited species well represented. Large nursery areas for mullet, siganids, letrinids, mullidae and Ohamus champs. Knowledge of smaller taxa generally lacking.

ZONING

DISTURBANCES OR DEFICIENCIES Hotel development, boating activities, illegal fishing.

SCIENTIFIC RESEARCH Fish stock assessment (not restricted to the reserve)

SPECIAL SCIENTIFIC FACILITIES None.

PRINCIPAL REFERENCE MATERIAL Fisheries Act 1980. Fisheries Regulations G.N. No. 18 of 1983.

STAFF 3 fisheries assistants posted in an adjacent fisheries post.

BUDGET No specific budget. Recurrent expenditure and personal emolument met from budget allocated to both Fisheries Research and Protection Service i.e. Rs. 8.3 million.

LOCAL PARK OR RESERVE ADMINISTRATION Protection Service; Fisheries Division.

NAME OF CNPPA COORDINATOR

DATE 7 July 1983.

NAME Black River Fishing Reserve

MANAGEMENT CATEGORY VIII (Multiple Use Reserve)

BIOGEOGRAPHICAL PROVINCE 3.25.13 (Mascarene Islands)

LEGAL PROTECTION Fisheries Act 1980.

DATE ESTABLISHED

GEOGRAPHIC LOCATION West coast of Mauritius.

ALTITUDE Sea-level.

AREA 9 sq km.

LAND TENURE Public ownership.

PHYSICAL FEATURES That part of the sea between the sea coast at high water mark and

(i) the sinuosities of the reefs from Petit Vacoas where the reefs meet the coast to Point Lascars on the northern part of Black River Pass;

(ii) a straight line from the said Point Lascars to Grand Pointe on the southern point of the pass, both Black River and Case Royale being included in the reserves;

(iii) straightline drawn from the said Grand Pointe to the southern extremity of Point des Requins.

Lagoon environment, coral patches and reefs, sandy areas. Internal zone covered by sandy beaches, rocky shores and mangrove stands.

VEGETATION Various species of seaweed, notable ulva cuchemia, enteromorpha and sea grass, gracilaria and chaetomorpha.

NOTEWORTHY FAUNA All commercially exploited species well represented. Good nursery area for mullet and crab and oysters.

ZONING None.

DISTURBANCES OR DEFICIENCIES Hotel development, boating activities, illegal fishing; silt deposit appears to be extensive.

SCIENTIFIC RESEARCH Fish stock assessment (not restricted to reserve)

SPECIAL SCIENTIFIC FACILITIES Fisheries Research Centre situated a few km to the north.

PRINCIPAL REFERENCE MATERIAL Fisheries Act 1980. Fisheries Regulations in G.N. No. 18 of 1983.

STAFF 3 fisheries assistants posted in an adjacent fisheries post.

BUDGET No specific budget. Recurrent expenditure and personal emolument met from budget allocated to both Fisheries Research and Protection Service i.e. Rs. 8.3 million.

LOCAL PARK OR RESERVE ADMINISTRATION Protection Service; Fisheries Division.

NAME OF CNPPA COORDINATOR

DATE 7 July 1983.

NAME Grand Port - Mahébourg Fishing Reserve

MANAGEMENT CATEGORY VIII (Multiple Use Reserve)

BIOGEOGRAPHICAL PROVINCE 3.25.13 (Mascarene Islands)

LEGAL PROTECTION Fisheries Act 1980.

DATE ESTABLISHED

GEOGRAPHIC LOCATION South east coast of Mauritius.

ALTITUDE Sea-level.

AREA 22 sq km.

LAND TENURE Public ownership.

PHYSICAL FEATURES That part of the sea coast at high water mark and a straight line drawn from a stone bearing the letters "R.L." behind the Roman Catholic church at Old Grand Port to the extreme eastern point of Ile aux Aigrettes to the reefs and along the sinuosities of the reefs to the Ilot at le Broudou. Lagoon environment, coral patches and reefs, sandy areas, rocky bottom, inter-tidal zone covered by sandy beaches, and rocky shores. In some areas inter-tidal zone occupied by cliffed shores and eroded eolianite deposits.

VEGETATION Patches of mangroves and ferns in some areas with dense stands of mangroves in others; mangrove stands normally harbouring significant areas of mud flats in upper limits of the inter-tidal zone. Various species of seaweeds and algae, e.g. ulva, cuchemia, entomorpha, chaetomorpha.

NOTEWORTHY FAUNA All commercially exploited species are fairly well represented. Knowledge of smaller taxa generally lacking.

ZONING

DISTURBANCES OR DEFICIENCIES During heavy rains and cyclones, siltation of lagoon. Illegal fishing.

SCIENTIFIC RESEARCH Fish stock assessment (not restricted to the reserve)

SPECIAL SCIENTIFIC FACILITIES Mahebourg fish farm about 83 ha including laboratory and aquaria facilities.

PRINCIPAL REFERENCE MATERIAL Fisheries Act 1980, regulations in G.N. No. 18 of 1983.

STAFF 3 fisheries assistants posted in an adjacent fisheries post.

BUDGET No specific budget. Recurrent expenditure and personal emolument met from budget allocated to both Fisheries Research and Protection Service i.e. Rs. 8.3 million.

LOCAL PARK OR RESERVE ADMINISTRATION Protection Service; Fisheries Division.

NAME OF CNPPA COORDINATOR

DATE 7 July 1983.

PROPOSED NATURE RESERVE — Mauritius

NAME Ile aux Serpents

MANAGEMENT CATEGORY I (Strict Nature Reserve)

BIOGEOGRAPHICAL PROVINCE 3.25.13 (Mascarene Islands)

LEGAL PROTECTION To be protected under the Ancient Monuments Ordinance, Cap. 282 of 1944.

DATE ESTABLISHED

GEOGRAPHIC LOCATION 26.8 kms to the northeast of Cap Malheureux; 19°49'S; 57°48'.4E.

ALTITUDE Sea-level to 177 m.

AREA 31.2 ha.

LAND TENURE

PHYSICAL FEATURES The islet is distinctly dome-shaped, being constituted mostly of volcanic (basaltic) tuff, fashioned all over its slope by more or less large cornices.

VEGETATION The islet is bare of vegetation with the exception of patches of Portulaca and Brachiaria in crevices of the volcanic rocks. The cornices on the slopes are particularly favoured by the birds as egg laying sites. Fairly large numbers of skink Gongylomorphus b. bojerii and a few rare Cyrtodactylus serpensinsula are the only reptile living on the islet.

NOTEWORTHY FAUNA It provides home for some 30,000 birds. Sooty terns, Sterna fuscata nubilosa in great numbers, the noddy Anous stolidus pileatus, the lesser noddy, Anous tenuirostris tenuirostris and a few pairs of masked boobies Scula dactylatia melanops share its bleak terraces.

ZONING None.

DISTURBANCES OR DEFICIENCIES The islet is very attractive from the sea on account of a large colony of seabirds nesting on its slope. Passing tourists often cause considerable disturbance by shouting in the air to watch hugh flocks of birds taking off.

SCIENTIFIC RESEARCH Occasionally visited by scientists. No ongoing research project on the islet.

SPECIAL SCIENTIFIC FACILITIES Herbarium facilities available at the Mauritius Sugar Industry Research Institute (MSIRI) in Mauritius.

PRINCIPAL REFERENCE MATERIAL

Bullock, D. and S. North. (1975) Report of the Edinburgh University Expedition to Round Island.

Lloyd, J.A. (1946) Relation d'un voyage à l'Ile Ronde et a l'Ile aux Serpents en décembre 1844. Proc. Soc. Hist. Nat. Maurice, 154-162.

Vinson, J. (1950) L'Ile Ronde et l'Ile aux Serpents. Proc. R. Soc. Arts & Sci., Mauritius 1(1):32-52.

Vinson, J. (1953) Some present data on fauna of Round and Serpent Islands. Soc. Art & Sci., Mauritius. (13):253-257.

STAFF The islet is very rarely visited by Forest Service and Fisheries Department Officers.

BUDGET Virtually nil.

LOCAL PARK OR RESERVE ADMINISTRATION Forest Department, Ministry of Agriculture, Fisheries and Natural Resources, Curepipe, Mauritius.

NAME OF CNPPA COORDINATOR

DATE 1983.

NAME Port Louis Fishing Reserve

MANAGEMENT CATEGORY VIII (Multiple Use Reserve)

BIOGEOGRAPHICAL PROVINCE 3.25.13 (Mascarene Islands)

LEGAL PROTECTION Fisheries Act 1980.

DATE ESTABLISHED

GEOGRAPHIC LOCATION North-west coast of Mauritius.

ALTITUDE Sea-level.

AREA 5 sq km.

LAND TENURE Public ownership.

PHYSICAL FEATURES That part of the sea between the sea coast from high water mark and a line drawn from Martello Tower at Pointe aux Sables to a point due west on the reefs; place called "Point Tortue" along a straight line to the most westerly point at Fort George. Encloses harbour of Port Louis. Includes an estuary at the entry of the Grand River North West and River St. Louis. Lagoon substrate muddy to sandy with coral patches of mostly dead communities. A deep channel leads to the main harbour of the island from a wide pass in the reef which consists of mostly dead communities.

VEGETATION Seagrass communities extensive on the southern part with some eutrophication and seaweeds at the entry of sewage outfalls. Various specifics of seaweeds - Alva lectuca; Enchemia sp. Enteromorpha sp.

NOTEWORTHY FAUNA Lagoon fishes, particularly siganids, parrot fishes and other marine organisms; crabs, all commercially exploited species, specially siganids.

ZONING

DISTURBANCES OR DEFICIENCIES Effluents (including industrial waste) from two sewage outfalls. Solid waste dumping area around Northern Point, presence of harbour.

SCIENTIFIC RESEARCH Fish stock assessment (not restricted to reserve)

SPECIAL SCIENTIFIC FACILITIES Fisheries Research Centre situated 10 km to the south.

PRINCIPAL REFERENCE MATERIAL Fisheries Act 1980. Regulations in G.N. No. 18 of 1983.

STAFF 3 fisheries assistants posted in an adjacent fisheries post.

BUDGET No specific budget. Recurrent expenditure and personal emolument met from budget allocated to both Fisheries Research and Protection Service i.e. Rs. 8.3 million.

LOCAL PARK OR RESERVE ADMINISTRATION Protection Service; Fisheries Division.

NAME OF CNPPA COORDINATOR

DATE 7 July 1983.

NAME Trou d'Eau Douce Fishing Reserve

MANAGEMENT CATEGORY VIII (Multiple Use Reserve)

BIOGEOGRAPHICAL PROVINCE 3.25.13 (Mascarene Islands)

LEGAL PROTECTION Fisheries Act 1980.

DATE ESTABLISHED

GEOGRAPHIC LOCATION East coast of Mauritius.

ALTITUDE Sea-level.

AREA 7 sq km.

LAND TENURE Public ownership.

PHYSICAL FEATURES That part of the sea between the sea coast from high water mark and a line drawn for the old lime kiln at Le Morne to the extreme western point of Ile aux Rats, then along the inner shore of the several Isle aux Cerfs to Pointe Petit Vacoas, then to the extreme point of Ilot Lièvre and to Point Saint Lain, commonly known as Pointe Cassis.

VEGETATION Varied coral communities. Extensive mangrove areas in the inter-tidal zones and around many small islets of the Ile aux Cerf region. Rich in seagrass communities. Brackish water along most of the shallow area including the estuaries at the Grand River South east provide habitats to communities of oysters, particularly settling on the mangrove roots. Nursery ground especially rich in mullet species.

NOTEWORTHY FAUNA

ZONING

DISTURBANCES OR DEFICIENCIES Large amount of silt deposited in the reserve during heavy rain. Pollutants from a sugar mill carried to part of the reserve which abounds with juvenile mullet via the Deep River Beau Champ.

SCIENTIFIC RESEARCH

SPECIAL SCIENTIFIC FACILITIES None.

PRINCIPAL REFERENCE MATERIAL Fisheries Act 1980. Fisheries Regulations in G.N. No. 18 of 1983.

STAFF

BUDGET

LOCAL PARK OR RESERVE ADMINISTRATION

NAME OF CNPPA COORDINATOR

DATE

NAME Flat Island

MANAGEMENT CATEGORY I (Strict Nature Reserve)

BIOGEOGRAPHICAL PROVINCE 3.25.13. (Mascarene Islands)

LEGAL PROTECTION Totally protected by law under the Ancient Monument Ordinance Cap 282 of 1944.

DATE ESTABLISHED 15.7.72.

GEOGRAPHIC LOCATION About 11 km NNE of Cap Malheureux, the northern-most point of Mauritius; 19°53'S; 57°39'E.

ALTITUDE Sea-level to 116 m.

AREA 253 ha.

LAND TENURE Public ownership.

PHYSICAL FEATURES The islet is nearly circular in outline and about a mile in diameter and consists of 2 main parts, a rocky hill 116 m high on its southern extremity with a plateau of volcanic rock beneath it, stretching northward and forming more than half of the island. The eastern and western parts are formed of sand ridges some of which rise to 9 m above msl. They stretch northward from the base of the hill and degrade into a mass of loose coral and finally into loose volcanic blocks. Below the hill, landward, the rising ground is formed of thin stratum of volcanic soil and volcanic sand.

VEGETATION Coastal strand flora is represented along part of the sandy eastern coast. The inland native flora has almost completely been destroyed by man, periodic fires and establishment of exotic tree plantation. Extensive grass and shrub savanna is present on the eastern slopes of the islet. The spinose shrubs Lantana camara is widespread. Only a few Pandanus vandermeerschii trees persist in a pocket of basaltic foreshore on the southern side of the islet (near Palisade Bay). A few Latania and Pandanus trees still occur inland fixing themselves in the fissures of rocks.

NOTEWORTHY FAUNA Skinks, Gongylomorphus bojerii bojerii observed on coral block and open ground sparsely covered by Cassytha, Cylophora and Graminae. Lizard Phelsuma vinsoni vinsoni often seen on rocks near the sea. Apart from a few passing migratory seabirds, practically no bird species nest on the islet.

ZONING None.

DISTURBANCES OR DEFICIENCIES Presence of feral cats. Rats still plentiful in spite of presence of cats. Periodic fires often cause enormous damage to vegetation. A priority should be given here to elimination of both cats and rats.

SCIENTIFIC RESEARCH Individual studies on flora and fauna.

SPECIAL SCIENTIFIC FACILITIES None on the islet, though quarters available. A light house tops the hill of the islet. Herbarium and other laboratory facilities present in Mauritius.

PRINCIPAL REFERENCE MATERIAL

Ayres, P.H.B. (1860) Geology of Flat and Gabriel Islands. Trans Roy. Soc. Arts and Sciences, Mauritius, New Series Vol. I, part II. pp. 220-232.

Hornes, J. (1887) Notes on flora of Flat Island. Trans Roy. Soc. Arts and Sciences Mauritius, New Series Vol. XIX. pp. 116-151 (Annex G).

STAFF Visited as often as possible by Forestry Service, Fisheries and Port Officers

BUDGET None.

LOCAL PARK OR RESERVE ADMINISTRATION Forest Department, Ministry of Agriculture, Fisheries and Natural Resources, Curepipe, Mauritius.

NAME OF CNPPA COORDINATOR

DATE

NAME Ilot Gabriel

MANAGEMENT CATEGORY I (Strict Nature Reserve)

BIOGEOGRAPHICAL PROVINCE 3.25.13 (Mascarene Islands)

LEGAL PROTECTION Total. Protected by law under the Ancient Monument Act.

DATE ESTABLISHED 4 December 1972.

GEOGRAPHIC LOCATION 12 km to NNE of Cap Malheureux; 19°53'3S, 57°40'2E.

ALTITUDE Sea-level to 27.5 m.

AREA 42 ha.

LAND TENURE Public ownership.

PHYSICAL FEATURES Central portion of volcanic mound which rise to about 90 ft is broken into ridges and boulders and covered with a thin layer of volcanic earth. This is bounded by low sand banks except at a point on the south-east where the beach is composed of long spurs of volcanic rock projecting into the sea. Toward the central portion, the shore sand intermixes with coral blocks and volcanic detritus which extend for a considerable distance forming a narrow belt to the central portion of volcanic rock.

VEGETATION This islet is afforested with shrubby vegetation mainly of Psiadia trinervia (Baume de l'Ile Plate) of renowned medicinal value. Coastal scrub of Suriana, Scaevola and Tournefortia are also present.

NOTEWORTHY FAUNA The presence of two species of reptile Gongylomorphus bojerii and Phelsuma ornata is noteworthy. The islet does not appear to be an important nesting site for seabirds now though Newton (1956) reported that white-tailed and red-tailed tropic birds bred in terrain.

ZONING None.

DISTURBANCES OR DEFICIENCIES Rabbits and rats have become numerous on the islet.

SCIENTIFIC RESEARCH Several individual surveys of vegetations are carried out from time to time.

SPECIAL SCIENTIFIC FACILITIES None on the islet, but facilities exist on the island of Mauritius.

PRINCIPAL REFERENCE MATERIAL

Ayres, P.H.B. (1860) Geology of Flat and Gabriel Islands. Trans. Roy. Soc. Arts and Sciences, Mauritius, New Series Vol. I, part II. pp. 220-232.

Hornes, J. (1887) Notes on flora of Flat Island. Trans. Roy. Soc. Arts and Sciences Mauritius, New Series Vol. XIX. pp. 116-151 (Annex G).

Newton, R. (1956) Bird islands of Mauritius. Ibis 98:296-302.

STAFF Islet visited as often as possible by Forest and Fisheries Service Officers.

BUDGET None.

LOCAL PARK OR RESERVE ADMINISTRATION Forest Department, Ministry of Agriculture, Fisheries and Natural resources, Curepipe, Mauritius.

NAME OF CNPPA COORDINATOR

DATE

NAME Coin de Mire

MANAGEMENT CATEGORY I (Strict Nature Reserve)

BIOGEOGRAPHICAL PROVINCE 3.25.13 (Mascarene Islands)

LEGAL PROTECTION Total. Protected by law under the Ancient Monuments Ordinance Cap 282 of 1944.

DATE ESTABLISHED 14 January 1970.

GEOGRAPHIC LOCATION About 4.16 km north of Cap Malheureux 19°56'5S 57°37'E.

ALTITUDE Sea-level to 158 m.

AREA 76 ha.

LAND TENURE Public ownership.

PHYSICAL FEATURES Mass of volcanic rocks, apparently destitute of any secondary formation, the sea around being so rough as to preclude reef formation. The single mass forms a wedge-shaped cliff with stratification dipping on the one side towards Mauritius and the other towards Flat Island. The top of the cliff is flat with a layer of volcanic soil.

VEGETATION Thicket of introduced Santalum album established over a large area of the top of the wedge-shaped cliff. Presence of extensive colonies of endemic liliacenous aloe-like plant, Lomatophyllum tormentorii (a special feature of this islet and Round Island) as well as few individuals of Dracaena concinna together with the native shrubs, Scutia myrtina and Eugenia lucida. Otherwise the islet is much invaded by exotic weed species.

NOTEWORTHY FAUNA This island is a breeding place for a large population of the white-tailed tropic bird Phaethon lepturus, the red-tailed tropic bird Phaethon rubricauda rubricauda and the wedge-tailed shearwater, Puffinus pacificus chlororynchus. It is suspected to harbour a special variety of Cyrtodactylus. Phelsuma vinsoni vinsoni also present.

ZONING None.

DISTURBANCES OR DEFICIENCIES Rats present. No natural freshwater source.

SCIENTIFIC RESEARCH The islet has recently been surveyed by Bullock and North of Edinburgh University. Report still forthcoming.

SPECIAL SCIENTIFIC FACILITIES None on the islet. Herbarium facilities are available on Mauritius.

PRINCIPAL REFERENCE MATERIAL

Ayres, P.H.B. (1860) Geology of Flat and Gabriel Islands. Trans Roy. Soc. Arts and Sciences, Mauritius, New Series Vol. I, part II. pp. 220-232.

STAFF Periodic visits by Forestry and Fisheries Department staff.

BUDGET None.

LOCAL PARK OR RESERVE ADMINISTRATION Forest Department, Ministry of Agriculture, Fisheries and Natural Resources, Curepipe, Mauritius.

NAME OF CNPPA COORDINATOR

DATE

NAME Ilot Mariannes

MANAGEMENT CATEGORY I (Strict Nature Reserve)

BIOGEOGRAPHICAL PROVINCE 3.25.13 (Mascarene Islands)

LEGAL PROTECTION Total. Protected by law under the Ancient Monument Act.

DATE ESTABLISHED 4 December 1972.

GEOGRAPHIC LOCATION 7.4 km to the east of Vieux Grand Port in the south-east of Mauritius 20°22'.6S; 57°47'E.

ALTITUDE Sea-level to 1-2 m.

AREA 2 ha.

LAND TENURE Public ownership.

PHYSICAL FEATURES The islet is typically calcarenitic with eroded coastline.

VEGETATION Low sparse strand flora on eroded calcarenite substrate with native halophilous herbs. Typical of salt spray zone near reef. May be partially submerged during cyclonic weather.

NOTEWORTHY FAUNA There is no nesting bird population, though migratory birds such as shearwater and fouquet are present. The skink Gongylomorphus bojerii bojereii is present. The water around the islet contains numerous species of molluscs which have been subjected to intensive exploitation.

ZONING

DISTURBANCES OR DEFICIENCIES It has long been a favourite site for shell collection. Further its long distance from the mainland coast preclude any efficient control of activities of collectors around the islet.

SCIENTIFIC RESEARCH Occasional surveys of flora by individual scientists.

SPECIAL SCIENTIFIC FACILITIES None on the islet. Herbarium available in Mauritius.

PRINCIPAL REFERENCE MATERIAL

Johnson, H.H. (1984) Report on Flora of Ile aux Aigrettes. Trans. Bot. Soc. Edinb. December 1894. pp. 317-331.

Vinson, J. and J.M. Vinson. (1969) The Saurian fauna of the Mascarene Islands. Proc. Roy. Soc. Arts and Sci. Mauritius. 6(4).

STAFF Periodic visit by Forestry and Fishery Department Staff.

BUDGET Virtually none.

LOCAL PARK OR RESERVE ADMINISTRATION Forestry Department, Ministry of Agriculture, Fisheries and Natural Resources, Curepipe, Mauritius.

NAME OF CNPPA COORDINATOR

DATE

NAME Ile aux Aigrettes

MANAGEMENT CATEGORY I (Strict Nature Reserve)

BIOGEOGRAPHICAL PROVINCE 3.25.13 (Mascarene Islands)

LEGAL PROTECTION Total. Protected by law under the Ancient Monument Ordinance Cap 282 of 1944.

DATE ESTABLISHED 30 November 1965.

GEOGRAPHIC LOCATION About 1 km east of Pte. d'Esny in Mahebourg, 20°25.2'S, 57°43.7'E.

ALTITUDE Sea-level to 4-5 m.

AREA 35 ha.

LAND TENURE Public ownership.

PHYSICAL FEATURES Calcarenite (coralline dune rock) with jagged eroded coastline.

VEGETATION Typical strand salt spray zone scrub with Suriana, Pemphis and Scaevola well represented. Inland flora comprises endemic coastal trees and shrubs which have now mostly disappeared from coastal belt due to human settlements in the past. The native indigenous trees represented by Diospyros egrettarum, Tarenna coriacea (Rutidea coriacea, Bois de rat) Gastonia cutispongia (Bois boeuf), Dracaena concinna the orchid, Listrostachys polystachys are noteworthy and require additional protection.

NOTEWORTHY FAUNA The name Ile aux Aigrettes was probably derived from reef heron, "Egrettes". The islet serves as a site for large numbers of migratory seabirds. The reptilian fauna is represented mainly by Phelsuma ornata.

ZONING None.

DISTURBANCES OR DEFICIENCIES Rats are now plentiful on the islet. The easy accessibility of this islet together with the fact that there is no watchman posted there, has led to the virtual decimation of most indigenous trees. There is no natural freshwater source.

SCIENTIFIC RESEARCH Occasionally visited by the staff of Forestry and Fisheries Departments.

SPECIAL SCIENTIFIC FACILITIES None on the island.

PRINCIPAL REFERENCE MATERIAL

Johnson, H.H. (1894) Report on Flora of Ile aux Aigrettes. Trans. Bot. Soc. Edinb. December 1894. pp. 317-331.

Staub, F. (1973) Oiseaux de l'Ile Maurice et de Rodrigues. Mauritius Printing Company, Port Louis.

Vaughan, R.E. and P.O. Wiehe. (1937-47) Studies of the vegetation of Mauritius. Journ. Ecol. 25, 28, 29, 34.

STAFF Visited as often as possible by Forest Service and Fisheries Department Officer.

BUDGET

LOCAL PARK OR RESERVE ADMINISTRATION Forest Department, Ministry of Agriculture, Fisheries and Natural Resources, Curepipe, Mauritius.

NAME OF CNPPA COORDINATOR

DATE

MAURITIUS

NAME Round Island

MANAGEMENT CATEGORY IV (Managed Nature Reserve)

BIOGEOGRAPHICAL PROVINCE 3.25.13 (Mascarene Islands)

LEGAL PROTECTION Total. Protected by law under the Ancient Monuments Ordinance Cap 282 of 1944.

DATE ESTABLISHED 1957.

GEOGRAPHICAL LOCATION About 24km north-east of Cap Malheureux, the northernmost point of Mauritius; 19°51'S, 57°47'E.

ALTITUDE Sea level to 300 m.

AREA 159 ha.

LAND TENURE Public ownership.

PHYSICAL FEATURES Part of a volcanic cone, of which a kidney-shaped section remains above water. Most of the island is composed of volcanic tuff, weathered into curious horizontally ridged pillars and deep gullies. Blocks of basalt and deposits of coral detritus occur at various levels.

VEGETATION Greatly reduced by rabbits and goats (introduced about 1840). Thus, of the indigenous palms Hyoporbe lagenicaulis and Dictyosperma album var. conjugatum only one specimen survives. Scattered Latania loddigesii and the screw pine Pandanus vandermeerschii sometimes form small clumps and in a few places there is moderately dense ground cover of grasses, herbs and widespread ruderal species.

NOTEWORTHY FAUNA The island still provides a breeding place for fairly good populations of four species of seabirds, the wedge-tailed shearwater Puffinus pacificus, the Trinidad petrel Pterodroma arminjoniana (elsewhere known to breed only on the Trinidade/Martin Vaz islands off the south-east coast of Brazil), the red-tailed tropic bird Phaethon rubricauda and the white-tailed tropic bird P. lepturus. The island is also visited by migrant waders such as the turnstone Arenaria interpres, and several species of tern feed close in to its shores. Reptile species constitute the most notable element of the fauna with no less than four species included in the Red Data Book - the Serpent Island gecko Cyrtodactylus serpensinsula (E), the Round Island day gecko Phelsuma guentheri (R), the Round Island or Telfair's skink Leiolopisma telfairii (R), the Round Island boa Bolyeria multicarinata (E) and the keel-scaled boa Casarea dussumieri (E). In addition, another gecko Phelsuma ornata and two more skinks, Gongylomorphus bojerii and Ablepharus boutonii, are present in larger numbers.

ZONING None.

DISTURBANCES OR DEFICIENCIES Due to physical conditions, wardening of the island is a difficult problem and a certain amount of poaching - mainly of petrel and tropic-bird chicks - and disturbances still occur. Some success has recently been achieved in eliminating goats and reducing the number of rabbits but extermination of the latter is still a priority. The solution of these problems once again depends on very substantial funds.

TOURISM Due to the difficulty of effecting a landing except for the period September to mid-December, visitors to the island have been very limited in number; no water or shelter is available on the island, and the heat may be considerable. Landing or evacuation by helicopter has been effected occasionally but is expensive and a helicopter may not always be available. Nevertheless, the potential for a very unusual tourist attraction is there if and when adequate development funds can be provided.

SCIENTIFIC RESEARCH Several studies of the fauna and flora by individual scientists.

SPECIAL SCIENTIFIC FACILITIES Herbarium facilities are available on Mauritius.

PRINCIPAL REFERENCE MATERIAL

Bullock, D. and North, S. (1975) Report of the Edinburgh University Expedition to Round Island.

Johnston, H.H. (1894) Report on the flora of Round Island, Mauritius. Trans. Bot. Soc. Edinburgh 20: 237-264.

Staub, F. (1973) Oiseaux de l'Ile Maurice et de Rodrigues. Mauritius Printing Company, Port Louis.

Vaughan, R.E. and Wiehe, P.O. (1937-47) Studies of the Vegetation of Mauritius. Journ. Ecol. 25, 28, 29, 34.

Vinson, J. (1964) Sur la disparition progressive de la flore et de la faune de l'Ile Ronde. Proc. Roy. Soc. Arts & Sci. Mauritius 2(3): 247-261.

STAFF The island is visited as often as possible by Forest Service officers.

BUDGET Virtually nil.

LOCAL PARK OR RESERVE ADMINISTRATION Enquiries to: Conservator of Forests, Forestry Service Headquarters, Curepipe, Mauritius.

NAME OF CNPPA COORDINATOR A.W. Owadally.

DATE 21 January 1983.

MAURITIUS

NAME Baie de l'Arsenal

MANAGEMENT CATEGORY Proposed Marine Park

BIOGEOGRAPHICAL PROVINCE 3.25.13 (Mascarene Islands)

LEGAL PROTECTION

DATE ESTABLISHED Proposed.

GEOGRAPHICAL LOCATION

ALTITUDE

AREA

PHYSICAL FEATURES Lined by smoothly rounded boulders (basalt cemented basally by beachrock). Southern shore has a small gravel beach (composed of coral fragments). On the north of the lagoon is a grey sandy beach and north of Pointe aux Piments is a continuous course sandy beach, two shell and coral grains. Brackish water lagoon. Several ledges of beach rock off Pointe aux Piments form a more or less continuous series or arcs parallel to the shore. East towards the brackish lagoon are 13 rocky outcrops - large slabs of compacted back-reef exposed 2 m above sea level and deeply undercut at seaward faces. These rocks are studded with small colonies of boulder corals (Porites).

VEGETATION

i) Plant based alga; beds behind surf zone. Abundant species: Sargassum, Turbinaria. Sea grasses; beds of Syringodium isoetifolium and Halodule uninervis.

ii) Sand-based (sand flats, bay floor sediments, sandy beaches) and rock-based (shore-line basalt boulders, intertidal beach rock-reef rock); few plant species.

NOTEWORTHY FAUNA Coral reefs. Peripheral fringing reef north and south. Sheltered fringing reef inside bay north and south (Acropora assemblage) remarkably intact, large and varied. Boulder reef (Porites) features in areas with erratic salinity, turbidity and temperature. Lagoonal coral patches. With such a wide range of habitats, this area supports a good variety of fauna including wrasses and parrotfishes, notably Halichoeres kawarin, Thalliurus chlorurus, Leptoscarus vaigiensis and Xanothon margaritus; molluscs include Pinna kraussi, Cassis cornuta and Dolabella, shame-faced crab. Various annelids and juvenile of food fishes, sea cucumber, sand gobies, goat fish (Mullidae) and millets (Mugilidae), hawksbill turtle Eretmochelys imbricata (E), ghost crabs, brittle stars, gastropod snails, barnacles, Sally Lightfoot crab, echinoids.

ZONING

DISTURBANCES OR DEFICIENCIES Relocating three fishermen who are currently based in this bay.

SCIENTIFIC RESEARCH

SPECIAL SCIENTIFIC FACILITIES

PRINCIPAL REFERENCE MATERIAL

IUCN/WWF Conservation in Mauritius - a report to the Government of Mauritius.

STAFF

BUDGET

LOCAL PARK OR RESERVE ADMINISTRATION

NAME OF CNPPA COORDINATOR A.W. Owadally.

DATE 21 January 1983.

REPUBLIC OF SEYCHELLES

NAME Aldabra Atoll

MANAGEMENT CATEGORY I (Strict Nature Reserve) and X (World Heritage Site)

BIOGEOGRAPHICAL PROVINCE 3.24.13 (Comores Islands and Aldabra)

LEGAL PROTECTION Designated as a Special Reserve under the National Parks and Nature Conservancy Act, 1971. Protective regulations under this act have been drafted and will be introduced when designation is complete. In 1967 the Royal Society acquired the lease; in 1980 it was succeeded by the Seychelles Islands Foundation, a charitable trust established under the Seychelles Islands Foundation Decree, 1979. The Foundation is governed by a Board of Trustees with international representation and the Atoll is managed by four subcommittees (Management, Scientific Advisory, Finance, and Appeal) set up under the Foundation.

DATE ESTABLISHED 1976 as Aldabra SNR.

GEOGRAPHICAL LOCATION An atoll north of the Mozambique Channel, 420km northwest of Madagascar and 640km east of the East African mainland; 9°25'S, 46°25'E.

ALTITUDE Rarely over 3 m above sea level.

AREA 35,000 ha.

LAND TENURE The Seychelles Island Foundation, on lease from the Government of Seychelles.

PHYSICAL FEATURES A classic coral atoll which has been uplifted from the sea. It consists of four main islands of coral limestone, separated by narrow passes and enclosing a large shallow lagoon. The lagoon contains many smaller islands and the entire atoll is surrounded by an outer reef. Geomorphological processes have produced a varied topography, generally rugged, which supports a variety of habitats with a relatively rich biota for an oceanic island, and a high degree of endemicity. Marine habitats range from coral reefs to mangrove mudflats and have almost completely escaped interference, human impact having been minimal. The climate is semi-arid with a pronounced wet season from November to April.

VEGETATION The terrestrial flora is exceptionally rich for a small coral island, with 273 species of flowering plant and fern. 19 of these species are endemic, including Peponium sublitorale (R) which is only known from the south island. A further 22 species are shared only with the neighbouring islands. Many of these plants are considered to be threatened. Mangroves.

NOTEWORTHY FAUNA Most outstanding is largest world population (152,000) of giant tortoise Geochelone gigantea (R), which attains a density of 1700 per sq km, and is self-sustaining. Green turtle Chelonia mydas (V) breed here, approximately 1000 females laying annually. Of the 13 species of terrestrial birds, one is the last representative of the western Indian Ocean flightless birds, the Aldabran rail Dryolimnas cuvieri aldabranus (R) (about 5,000 individuals); two are full Aldabran forms, the Aldabran warbler Nesillas aldabranus (R) and the Aldabran drongo Dicrurus aldabranus; and the remainder are marked subspecies. In addition, the colonies of red-footed boobies Sula sula and frigate birds (Fregatidae) are the largest in the western Indian Ocean.

ZONING

DISTURBANCES OR DEFICIENCIES Past exploitation of mangroves, turtles, fish and tortoises appears to have done no irreparable damage and the populations have all recovered. Rats, cats and goats have been introduced and have become established, together with a number of exotic plants.

SCIENTIFIC RESEARCH An intensive research effort covering the whole atoll has been in operation since 1967. From 1982 the resident warden, funded by W.W.F., is to survey and monitor the tortoise and turtle populations on the Atoll.

SPECIAL SCIENTIFIC FACILITIES A fully-equipped research station was established by the Royal Society in 1971, and is maintained by the Foundation. The Seychelles Government maintains a meteorological station. There is accomodation for 15 visiting scientists and a network of field camps for their use.

PRINCIPAL REFERENCE MATERIAL Two main sources for bibliography are Phil. Trans. R. Soc. Lond. B Volume 260, 1971, and Phil. Trans. R. Soc. Lond. B Volume 286, 1979. The Seychelles Islands Foundation/Royal Society prepared 'A management plan for Aldabra'. Especially Stoddart, D.R. 'Settlement, development and conservation of Aldabra', Phil. Trans. R. Soc. Lond. B 260: 611-628.

W.W.F. Project 1784 (Nov 1982), W.W.F. Monthly Report.

STAFF 1982 - J.A. Stevenson, warden appointed by the Seychelles Island Foundation and funded by W.W.F., with 10-12 resident Foundation employees.

BUDGET

LOCAL PARK OR RESERVE ADMINISTRATION The Chairman, Seychelles Islands Foundation, c/o Department of Agriculture and Land Use, PO Box 54, Mahé, Seychelles.

NAME OF CNPPA COORDINATOR

DATE 25 November 1981.

NAME St. Anne Marine National Park

MANAGEMENT CATEGORY II (National Park)

BIOGEOGRAPHICAL PROVINCE 4.16.12. (Seychelles and Amirantes Islands)

LEGAL PROTECTION Designated as a Marine National Park in 1973 under the National Parks and Nature Conservancy Act 1971. Protective regulations under this act have been enforced since 1975. The commencement notice appeared in 1975.

DATE ESTABLISHED 1973 as Ste. Anne Marine National Park.

GEOGRAPHIC LOCATION A series of 6 granitic islands about 5 kilometres due east of Victoria, Capital of Seychelles. All the surrounding reefs and seas between them form part of the park.

ALTITUDE From 30 m depth to 250 m (the top of Ste. Anne)

AREA 1423 ha.

LAND TENURE The sea forms part of the Seychelles Territorial Sea. The islands St. Anne, Round, Long are government owned. The islands of Moyenne, Cerf and Cachée are privately owned.

PHYSICAL FEATURES A chain of 6 small granitic islands, most of which are quite rugged. The St. Anne channel is the deepest part ranging from about 30 m. There are extensive seagrass beds between Round Island and Cerf. There are sandy patches providing habitats for molluscs, starfishes, burrowing shrimps and gobies. A great variety of coral reefs can be seen within the park: ranging from fringing to patch reefs and dead reefs to live stands of pure Acropora sp. Many corals are dead from unknown causes.

VEGETATION Among some of the dead reefs are fairly extensive beds of Sargassum seaweeds. The seagrass Thalassia hemprichii is to be found between Round Island and Cerf. All the algae associated with the various types of coral polyps are of course present. The islands are all covered by secondary vegetation, with coconuts (Cocos nucifera) being the most common. On the NE side of St. Anne there is a very steep and rocky area which still has fine stands of the native palm Phoenicophorium, and various Pandanus species.

NOTEWORTHY FAUNA Some of the finest marine life can be seen off the north side of Moyenne where some 150 species of fish have been identified including clown fishes Amphiprion, Moorish idols Zanclus canescens, blue surgeon fish Acanthurus leucosternon and a wide variety of butterfly fishes (family Chaetodontidae). Small rays are particularly abundant within the park. It is probably the main breeding site for hawksbill turtles Eretmochelys imbricata within granitic Seychelles. Octopi, sea urchins, sea cucumbers, starfishes including Acanthaster planci are to be found in varying numbers. Among the common birds seen in the park are little green heron Butorides striatus, greenshanks Tringa nebularia, Turnstone Arenaria interpres, grey plover Pluvialis squatarola and whimbrel Numenius phaeopus.

ZONING There are seven areas of delicate shallow water coral reefs which were to be administered as viewing areas only. Anchoring and fishing were prohibited. However it has not been easy to demarcate these sites, although most of the glass bottom boat operators (the main park users) know these areas well.

DISTURBANCES OR DEFICIENCIES In the past shell collecting caused some damage to the corals. Many of the reefs have been killed by unknown causes, and some siltation resulted from the dredging for the construction of Seychelles International Airport on Mahé. The main problem is persistent poaching by two or three families from the Les Mamelles area of Mahé. The rangers tend to be on the young side and have not been formally trained. Due to the strong SE monsoon the park boundary buoys have to be renewed every year which can be quite a major exercise.

SCIENTIFIC RESEARCH An American has done some studies on the growth rate of sea urchins. The Fisheries Division was monitoring the fish catches from the licensed fishermen. Since 1981 a programme has been underway to tag hawksbill turtles and to count tracks.

SPECIAL SCIENTIFIC FACILITIES None. There were accommodation facilities and a wet lab. These have been appropriated by government for a National Youth Service school.

PRINCIPAL REFERENCE MATERIAL

Salm, R.V. (1978) Conservation of marine resources in Seychelles. IUCN Publication.

Vines, Peter. Life on the Coral Reefs in the Seychelles.

Lionnet, G. (1972) The Seychelles. David and Charles Newton Abbot: 200 pp.

Robertson, I.J.B. (1972) Seychelles Marine National Parks. IUCN/WWF report No.726, Gland, Switzerland.

Smith, J.L.B. (1969) The fishes of Seychelles. The J.L.B. Smith Institute of Ichthyology. 223 pp.

Taylor, J.D. (1968) Coral reef and associated invertebrate communities (mainly molluscan) around Mahé, Seychelles. Phil. Trans. R. Soc. (8) 254:129-206.

Salm, R.V. (1976) A guide to snorkelling and diving in Seychelles. Octavian Books, London: 60 pp.

STAFF Two park rangers grade I, and 2 park rangers grade II. There were 2 labourers but these have been transferred to the National Youth Service Village.

BUDGET Falls within the budget of the Conservation Section which has a total budget of 600,000 S.R. ($90,000) per annum. On average about 150,000 S.R. ($22,000) are collected as entrance fees to the park every year.

LOCAL PARK OR RESERVE ADMINISTRATION Conservation Officer, c/o Ministry of National Development, Independence House, Mahé, Seychelles.

NAME OF CNPPA COORDINATOR L.A. ChongSeng.

DATE 26 May 1983.

NAME Port Launay National Park

MANAGEMENT CATEGORY II (National Park)

BIOGEOGRAPHICAL PROVINCE 4.16.12. (Seychelles and Amirantes Islands)

LEGAL PROTECTION Designated as a nature reserve in 1979 under the National Parks and Nature Conservancy Act 1971. A draft management plan has been drawn up, but is not being enforced.

DATE ESTABLISHED 1979 as Port Launay National Park.

GEOGRAPHIC LOCATION A cove on the north west coast of Mahe. The coordinates for the central region are 4°39' and 55°3'30"E.

ALTITUDE Depth ranges from sea level to 25 m.

AREA 158 ha.

LAND TENURE Republic of Seychelles.

PHYSICAL FEATURES A beautiful sheltered cove with a central sandy beach. There is reef fringing the rocky shores at either end of the beach. The two fringing reefs are of the boulder type characteristic of areas of calm sea and erractic temperature and salinity. The back-reef zones are shallow and covered by the stalked seaweed Turbinaria. Reef development is not extensive and living corals are few. One of the best beaches in Seychelles is to be found in the SE corner.

VEGETATION

NOTEWORTHY FAUNA

ZONING None.

DISTURBANCES OR DEFICIENCIES Since the establishment of the first National Youth Service camp at Port Launay the area has been closed to general public. Some fishing with handline and traps and even some seine netting (mostly mackerel) is carried out by the N.Y.S. staff and students.

SCIENTIFIC RESEARCH None.

SPECIAL SCIENTIFIC FACILITIES None.

PRINCIPAL REFERENCE MATERIAL

Salm, R.V. (1977) A guide to snorkelling and diving in Seychelles. Octavian Books, London. 60 pp.

Salm, R.V. (1978) Conservation of Marine Resources in Seychelles. IUCN/WWF report, Gland, Switzerland.

Wilson, R. (1980) Baie Ternay National Park, Port Launay National Park and the La Plaine Intertidal swamp -- a draft management plan (mimeo).

STAFF None.

BUDGET None.

LOCAL PARK OR RESERVE ADMINISTRATION Conservation Officer, c/o Ministry of National Development, Independence House, Mahé, Seychelles.

NAME OF CNPPA COORDINATOR L.A. ChongSeng.

DATE 20 May 1983.

NAME Baie Ternay National Park

MANAGEMENT CATEGORY II (National Park)

BIOGEOGRAPHICAL PROVINCE 4.16.12 (Seychelles and Amirantes Islands)

LEGAL PROTECTION Designated as a national park in 1979 under the National Parks and Nature Conservancy Act, 1971. A draft management plan exists but has not been enforced.

DATE ESTABLISHED 1979 as Baie Ternay National Park.

GEOGRAPHIC LOCATION A sheltered bay on the extreme western tip of Mahé.

ALTITUDE Sea level to a depth of about 25 m.

AREA 80 ha.

LAND TENURE Republic of Seychelles.

PHYSICAL FEATURES A shallow lagoon approximately 800 m wide separates the reef from the shore. A continuous fringing reef borders the shallow lagoon at the head of the bay. Grooved and cut by numerous surge channels this section of reef offers refuge to a host of large and small reef fishes.

VEGETATION The shallow reef-flat is covered by a variety of seaweeds.

NOTEWORTHY FAUNA

ZONING None.

DISTURBANCES OR DEFICIENCIES To date lack of trained personnel, equipment and houses has meant that there is no enforcement of park regulations. There has been some poaching of corals, shells and hawksbill turtles. Since early 1983 the second and largest N.Y.S. Village was sited next to the Bay. This means that it is effectively closed to the general public. The treated sewage (3 oxidation ponds) end up within the enclosed Bay. Some of the existing mangrove swamp has been reclaimed.

SCIENTIFIC RESEARCH Was the site for a general survey by a group from Galway University.

SPECIAL SCIENTIFIC FACILITIES None.

PRINCIPAL REFERENCE MATERIAL

Government of Seychelles (1971) Conservation policy in the Seychelles. Government Printer, Mahé, Seychelles. 10 pp.

Lionnet, G. (1972) The Seychelles. David and Charles Newton Abbot: 200 pp.

Procter, J. (1970) Conservation in the Seychelles. Government Printer, Mahé, Seychelles: 35 pp.

Salm, R.V. (1977) A guide to snorkelling and diving in Seychelles. Octavian Books, London. 60 pp.

Salm, R.V. (1978) Conservation of Marine Resources in Seychelles. IUCN/WWF report, Morges, Switzerland.

STAFF None.

BUDGET None.

LOCAL PARK OR RESERVE ADMINISTRATION Conservation Officer, c/o Ministry of National Development, Independence House, Mahé, Seychelles.

NAME OF CNPPA COORDINATOR L.A. ChongSeng.

DATE 20 June 1983.

NAME Curieuse Marine National Park

MANAGEMENT CATEGORY VIII (Multiple Use Reserve)

BIOGEOGRAPHICAL PROVINCE 4.16.12 (Seychelles and Amirantes Islands)

LEGAL PROTECTION Declared a marine national park in 1979 under the National Parks and Nature Conservancy Act, 1971. protective regulations under this act have been drafted and will be introduced when designation is complete.

DATE ESTABLISHED 15 May 1976.

GEOGRAPHIC LOCATION Consists of Curieuse Island and its surrounding waters including the channel between the island and Anse Boudin on Praslin. The central coordinates are 4°5', 55°43'E.

ALTITUDE 100 m altitude to depth of 30 m.

AREA 13.7 sq km total (283 ha = sea area)

LAND TENURE Government ownership.

PHYSICAL FEATURES Contains a rugged granitic island of 2.83 ha. Some areas of the island have been badly burnt and extensive anti-erosion work in the form of contour drains, and casuarina plantations are visible. Also good stands of coco-de-mer and capucin. The sea part of the park ranges from about 30 m drop off to shallow water reefs which are exposed at low tide.

VEGETATION The island is famous as being one of two islands where the coco-de-mer Lodoicea maldivica grows naturally. It is also the main site for the endemic vine Toxocarpus schimperianus. Some of the finest specimens of the Northea seychellarum are to be found at the back of Baie La Raie. In a small walled-up bay a quite diverse patch of mangrove swamp is developing including Rhizophora mucronata, Lumnitzera sp., Sonneratia sp. and Xylocarpus sp. A new species of bois banane Gastonia sp. has been discovered since 1982.

NOTEWORTHY FAUNA It has some of the more common land bird species like the sunbird Nectarinia dussumieri, the bulbul Hypsipetes crassirostris crassirostris and some fairy terns Gygis alba. It also has an introduced population of 300 giant tortoises Geochelone gigantea from Aldabra. These tortoises are breeding well and are at large. About 20-40 female hawksbill turtles use the beaches on Curieuse during the breeding season. The marine section has good coral growth, especially around Ile St. Pierre which is well known for its tubular coral colonies and Anse Petit Coeur on the Praslin side. Most noticeable are colonies of blue-tipped Acropora, mauve or brown staghorn and pink Pocillopora. Many large angelfishes and groupers lurk with the soldierfish around the caves in the pitted bases of larger boulder corals. To sum up the fish life is remarkably rich, varied and unafraid. Curieuse was also well-known for its abundant molluscs, octopi and lobsters. Crabs within the mangrove are only now making a comeback. The landcrab Cardiosoma is abundant on the coastal strip.

ZONING Divided in three main zones: a) Conservation: by far the most extensive including the badly burnt hillsides which are being restored. b) Agricultural, including commercial forest. The fertile land by the exleper colony has been earmarked for a fruit farm and piggery. c) Tourism: there is a proposal to turn the old doctor's house into an information centre and to have some chalet-style hotel development.

DISTURBANCES OR DEFICIENCIES It is probable that in their search for boat building material the government will want to exploit the fine stands of takamaka Callophylum inophylum. Various politicians have come up with plans to drain the marshes and go for extensive vegetable production. This means that the most suitable site for starting a second colony of Seychelles paradise flycatcher will be lost. Some of the families living on the Praslin side are persistent hawksbill turtle poachers.

SCIENTIFIC RESEARCH The introduced giant tortoise Geochelone gigantea population is being closely monitored as well as its impact on the vegetation. A tagging programme for female hawksbill turtles during the breeding season has been launched since 3 years. Some preliminary terrestrial plant surveys have also been carried out.

SPECIAL SCIENTIFIC FACILITIES None.

PRINCIPAL REFERENCE MATERIAL

Frazier, J, (1974) Sea turtles in Seychelles. Biol. Conserv. 6: 71-73.

Government of Seychelles. (1971) Conservation policy in the Seychelles. Government Printer, Mahé, Seychelles, 10 pp.

Procter, J. (1970) Conservation in the Seychelles. Government Printer, Mahé, Seychelles: 35 pp.

Salm, R.V. (1977) A guide to snorkelling and diving in Seychelles. Octavian books. London. 60 pp.

Salm, R.V. (1978) Conservation of Marine Resources in Seychelles. Report on current status and future management. IUCN/WWF report, Gland, Switzerland.

STAFF 1 senior park ranger; 1 park ranger grade 11; 8 labourers.

BUDGET Again Curieuse forms part of the park system administered by the Conservation Division which has a total annual budget of 600,000 SR ($90,000).

LOCAL PARK OR RESERVE ADMINISTRATION Conservation Officer, c/o Ministry of National Development, Independence House, Mahé, Seychelles.

NAME OF CNPPA COORDINATOR L.A. ChongSeng.

DATE 12 June 1983.

NAME Cousin Island Special Reserve

MANAGEMENT CATEGORY I (Strict Nature Reserve)

BIOGEOGRAPHICAL PROVINCE 4.16.12 (Seychelles and Amirantes Islands)

LEGAL PROTECTION Designated as a special reserve in 1975 under the National Parks and Nature Conservancy Act 1971. The Cousin Island Special Reserve Regulations (S.I. No. 93 of 1979) were gazetted in 1979. The marine turtles are further protected under The Turtle Act which lists Cousin as a protected breeding site, i.e. no turtles to be caught, killed etc., less than 1,000 metres from the High Water Mark.

DATE ESTABLISHED 1975 as Cousin Island Special Reserve. However has been administered as bird sanctuary since 1968.

GEOGRAPHIC LOCATION A small granitic island due west of Praslin Island. An area comprising the whole of Cousin Island centred at latitude 4°19'45"S and longitude 55°39'50"E, together with the surrounding sea extending for a distance of 400 m from the high water mark.

ALTITUDE Sea level to 58 m.

AREA 28 ha.

LAND TENURE International Council for Bird Preservation British Section.

PHYSICAL FEATURES About 80% of the island is a plateau that had been established as a coconut plantation. The NW, N and especially the NE sides are surrounded by fine white sandy beaches. The other 20% consist of a rocky hill with mostly indigenous vegetation. There is also a fringing reef all around the island which on average extends 200 m from the high water mark.

VEGETATION The plateau area is an abandoned coconut Cocos nucifera plantation. Among the plants now doing well are Carica papaya, Scaevola taccata, Bois chauvre souris and various Ficus sp. Along the beaches are some huge Casuarina equisitifolia trees. On the hill there are more indigenous species like Euphorbia pyrifolia, Pandanus multispicatus, Guettarda speciosa, Ficus mantarum and Ficus avi-avis.

NOTEWORTHY FAUNA Cousin was acquired mainly because it was the home of 3 rare endemic land birds namely: Seychelles brush warbler, Seychelles weaver, Seychelles turtle dove. By far the largest biomass is represented by large seabird colonies. It probably has the largest Seychelles colony of the white fairy tern Gygis alba. There are shearwaters (Audubon and wedgetail), tropic birds (white-tailed) and bridled terns breeding among the rocks on the hills. In the plateau there are mainly the lesser noddy and common noddy terns that are nesting. There is an abundance of the skinks Mabuya wrightii and Mabuya seychellensis. The brown "loose skin" geckos Aelusony seychellensis are also fairly common. Cousin is acknowledged as having one of the largest populations of breeding hawksbill turtles in Seychelles.

ZONING There are certain very dense colonies where the visitors are not allowed. Apart from this the island is too small for proper zoning.

DISTURBANCES OR DEFICIENCIES Its past history as a well-maintained coconut plantation means that it is only now that the native vegetation is making a

comeback. Many exotic species, like papaya, castor oil and cotton, were introduced in the past. A patch of rangoon creeper has turned out to be a constant headache, growing back vigourously despite repeated hackings and applications of weed killers. In an effort to encourage the return of native vegetation all coconuts that fall down are collected and shipped to Praslin. Recently the very low prices being offered for the nuts has made it difficult to continue this activity. Occasional visits by the introduced African barn owl have to be watched. These owls are killed because they prey on the fairy terns. Some of the Praslin fishermen have persisted in poaching hawksbill turtles.

SCIENTIFIC RESEARCH A fairly intensive research effort covering most of the flora and fauna has been carried out by the successive scientific administrators and is still being carried out. Special attention has been given to the ecology, behaviour and population size of the brush warbler. Various ringing programmes have been carried out. Another long-term study has been the tagging of female hawksbill turtles. The hawksbill turtle population is probably the most studied one in the world.

SPECIAL SCIENTIFIC FACILITIES A fully-equipped research station was built from a donation by Ciba-Geigy (professor). However, it is very much under-utilized probably from lack of publicity. Two or three visiting scientists can be accomodated.

PRINCIPAL REFERENCE MATERIAL

Percy, R. Lord, (1970) Cousin Island Nature Reserve in the Seychelles, Indian Ocean. Biol. Conserv. 2:225-227 (bought by ICBP in 1968; an account of its possibilities, with recommendations).

Newton, E. (1867) On the land birds of the Seychelles Archipelago. Ibis. (2)3:335-60.

Oustalet, M.E. (1878) Etude sur la faune armithologique des îles Seychelles. Bull. Soc. Philomath. Paris (7) 2:161-206.

Vesey-Fitzgerald, L.D.E.F. (1940) The birds of the Seychelles. I: The endemic birds. Ibis (14) 4: 480-9.

Loustau-Lalanne, P.L. (1962) Land birds of the granitic islands of the Seychelles. Occ. Publs. Seychelles Soc. 1. pp.32.

STAFF 1 expatriate scientific administrator plus 5 Seychellois workers.

BUDGET 1981

	Local (Rs)		London (£)
Income	115,110.85	Income	5,497.07
Expenditure	161,133.44	Expenditure	4,632.02
Deficit			

LOCAL PARK OR RESERVE ADMINISTRATION Mr. Guy Lionnet, Chairman Cousin Island Local Management Committee, c/o Plaisance, Mahé, Seychelles.

NAME OF CNPPA COORDINATOR L.A. ChongSeng.

DATE 25 June 1983.

NAME Riviere du Rempart - Poudre d'Or Fishing Reserve

MANAGEMENT CATEGORY VIII (Multiple Use Reserve)

BIOGEOGRAPHICAL PROVINCE 3.25.13 (Mascarene Islands)

LEGAL PROTECTION Fisheries Act 1980.

DATE ESTABLISHED

GEOGRAPHIC LOCATION North east coast of Mauritius.

ALTITUDE Sea-level.

AREA 35 sq km.

LAND TENURE Public ownership.

PHYSICAL FEATURES That part of the sea between the sea coast from high water mark and a line drawn from Pointe Grand Courant to the nearest shore of Ile d'Ambre and along the shore of that island to Pointe Dejeuner, thence along a prolonged line to the southern side of Passe St. Geran, along the reef to Point Roches Noires. It enclosed two barachois (fish ponds). Lagoon environment, sandy and rocky bottoms, coral reefs, inter-tidal zone covered by small stretches of sandy beaches, rocky shores predominating in the area.

VEGETATION Mangroves are found interspersed in rocky shores, in some areas mangroves form denser stands. Numerous rocky islets topped with mangrove trees.

NOTEWORTHY FAUNA Area particularly rich in mullets, siganids, mullidae and lettrinidae. Rich oyster beds present. All the commercially exploited species fairly well represented. Part of the reef fringing reef communities is present. Knowledge on smaller taxa generally lacking.

ZONING None.

DISTURBANCES OR DEFICIENCIES Illegal fishing.

SCIENTIFIC RESEARCH Fish stock assessment (not restricted to the reserve).

SPECIAL SCIENTIFIC FACILITIES None but fish and oyster farms present.

PRINCIPAL REFERENCE MATERIAL Fisheries Act 1980. Regulations G.N. No. 18 of 1983.

STAFF 3; fisheries assistants posted in a nearby fisheries post.

BUDGET No specific budget allocated but recurrent expenditures and personal emolument met from budget allocated to both Fisheries Research and Protection Service, i.e. Rs 8.3 million.

LOCAL PARK OR RESERVE ADMINISTRATION Protection Service, Fisheries Division.

NAME OF CNPPA COORDINATOR

DATE 7 July 1983.

PUBLICATIONS IN THE UNEP REGIONAL SEAS REPORTS AND STUDIES SERIES

No. 1 UNEP: Achievements and planned development of UNEP's Regional Seas Programme and comparable programmes sponsored by other bodies. (1982)

No. 2 UNIDO/UNEP: Survey of marine pullutants from industrial sources in the West and Central African region. (1982)

No. 3 UNESCO/UNEP: River inputs to the West and Central African marine environment. (1982)

No. 4 IMCO/UNEP: The status of oil pollution and oil pollution control in the West and Central African region. (1982)

No. 5 IAEA/UNEP: Survey of tar, oil, chlorinated hydrocarbons and trace metal pollution in coastal waters of the Sultanate of Oman. (1982)

No. 6 UN/UNESCO/UNEP: Marine and coastal area development in the East African region. (1982)

No. 7 UNIDO/UNEP: Industrial sources of marine and coastal pollution in the East African region. (1982)

No. 8 FAO/UNEP: Marine pollution in the East African region. (1982)

No. 9 WHO/UNEP: Public health problems in the coastal zone of the East African region. (1982)

No. 10 IMO/UNEP: Oil pollution control in the East African region. (1982)

No. 11 IUCN/UNEP: Conservation of coastal and marine ecosystems and living resources of the East African region. (1982)

No. 12 UNEP: Environmental problems of the East African region. (1982)

No. 13 M. PATHMARAJAH: Pollution and the marine environment in the Indian Ocean. (1982)

No. 14 UNEP/CEPAL: Development and environment in the Wider Caribbean region: A Synthesis. (1982)

No. 15 UNEP: Guidelines and principles for the preparation and implementation of comprehensive action plans for the protection and development of marine and coastal areas of regional seas. (1982)

No. 16 GESAMP: The health of the oceans. (1982)

No. 17 UNEP: Regional Seas Programme: Legislative authority. (in preparation)

No. 18 UNEP: Regional Seas Programme: Workplan. (1982)

No. 19 UNEP: Regional Seas Programme: Compendium of projects. (1982)

No. 20 CPPS/UNEP: Action Plan for the protection of the marine environment and coastal areas of the South-East Pacific. (1983)