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**Report on the Initiation of Activities under the Red Sea
Conservation Management Plan with Special Reference to the
Mooring Buoy Pilot Program (2.3.3)**



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2.3 Red Sea Southern Zone Conservation Management Plan

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Conservation Management Plan with Special Reference to the
Mooring Buoy Pilot Program (2.3.3)**

Prepared for U.S. Agency for International Development
Egypt Mission

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1 INTRODUCTION

This report is in partial fulfillment of deliverables in support of Policy Objective 2.3 of the USAID-funded EEPP Tranche 2 Policy Program. Specifically, this report is one of two “verified output descriptions” (VoD) for the policy measure Means of Verification (MoV) 2.3.3. This MoV is:

“ A report disseminated by EEAA of results from the initiation of activities under Red Sea Southern Zone Conservation Management Plan, with special reference to the mooring buoy pilot program.”

This report is the first VoD for the MoV. A second VoD requires EEAA to document the dissemination of this report to all relevant partners and other stakeholders. The second VoD is submitted as a separate document. This report of activities of the Red Sea Southern Zone Conservation Management Plan (hereinafter referred to as the SZCMP) covers the period of 2002 to the present (March 2004).

1.1 Government Initiation

The *First Egyptian International Conference on Protected Areas and Sustainable Development* was held in Sharm El-Sheikh on 23–26 October 2002. At this conference, the Minister for Environment, HE Dr Mamdouh Riad, announced the creation of the *Wadi el-Gemal–Hamata Protected Area* (WGHPA). Dr. Mostafa Fouda, Director of the Egyptian Environmental Affairs Agency’s (EEAA) Nature Conservation Sector (NCS), and Mr. John McEachern of the Red Sea Project subsequently referred to the preparation of the Southern Zone Conservation Management Plan and discussed its role in affording protection to the area’s marine and terrestrial natural resources.

1.2 Launching the CMP with Minister and Governor Endorsement

Staff from the EEAA and PSU recognized that the successful adoption and eventual implementation of the CMP would require the endorsement of Dr Mamdouh Riad, Minister for Environment and HE General Saied Abu Reeda, Governor of the Red Sea Governorate. In March 2003 a meeting, arranged by the PSU, was held in Hurghada to brief the Minister for Environment on the importance of the proposed CMP.

The following day, a second meeting was held that was attended by the Minister of Environment, the Red Sea Governor, PSU representatives, and Dr Mostafa Fouda of the NCS. At this meeting the Minister revealed the need for a CMP and the creation of a large protected area in the Wadi el-Gemal area.

1.3 Declaration of Wadi el-Gemal–Hamata Protected Area

A key recommendation of the SZCMP was the declaration of a large protected area along the southern Red Sea coast of Egypt. In March 2003, the entire Wadi el-Gemal watershed and marine waters from Ras Samadaia to Marsa Wadi Lhami was declared the *Wadi el-Gemal–Hamata Protected Area* (WGHPA). It was formally declared under Prime Ministerial Decree No. 143 (2003).

A plan for conservation management of the southern Red Sea and WGHPA was prepared by PSU staff in Hurghada and submitted to the EEAA during 2003. This report contained a review of all activities related to the SZCMP. The *Conservation Management Area* (CMA) extends from Marsa Toronbi in the north to Ras Banas in the south.

2. OVERVIEW OF THE SOUTHERN ZONE CONSERVATION MANAGEMENT PLAN (SZCMP)

The plan has three main aims. First, it describes the natural and social resources of the Conservation Management Area (CMA) of the southern Red Sea. Second, it lists and prioritizes threats to these resources. Third, it recommends strategies to respond to these threats. Importantly, this plan is not prescriptive because EEAA managers and Red Sea Protectorates (RSP) rangers will need to be adaptable in order to meet emerging and unpredicted issues. In addition, it is not a legal document because much of the CMA is not a Protected Area (PA) under Egyptian law. The plan provides guidance for conservation of the biological values of the CMA and ensures that existing and future threats to the area's natural values are managed within an ecologically sustainable framework. This reflects a proactive approach to managing human usage of the area rather than waiting until it is degraded before implementing reactive management strategies. The CMA includes all Egyptian territorial waters between Ras Toronbi and Ras Banas, inclusive of the Wadi El Gimal-Hamata Protected Area (WGHPA)

The CMA is an area of phenomenal biological diversity and natural beauty. Ninety-seven species of soft and hard corals and 141 species of fishes are known from the CMA. At least six species of seagrass and one species of mangrove are found there. Indeed, it contains a substantial proportion of the total mangrove resources of Egypt. At Hamata, *Avicennia marina* extends 12km in a semi-continuous fringe. The CMA has seagrass meadows that provide food for green turtles (*Chelonia mydas*) and dugongs (*Dugong dugon*). At least two species of marine turtle, the green and hawksbill (*Eretmochelys imbricata*), nest on islands and mainland beaches in the area. Both these species and the dugong are frequently observed there. The coral reefs, wadis, and other natural resources of the CMA also have enormous economic value by providing the basis for international tourism activities. However, in contrast to the natural resources near Hurghada and Safaga, the coral reefs and wadis in the CMA remain comparatively undisturbed by human activity. This is due, in part, to their remoteness from large urban and industrial centers. Nevertheless, not all habitats in the CMA have been spared human activity. Anchors and anchor chains have damaged many offshore coral assemblages. Tar balls and plastic bags litter beaches and rocky shores. Unregulated fishing continues throughout the Egyptian Red Sea and little is known of the long-term ecological effects of this activity. Livestock graze mangroves and sparse desert flora, and local people harvest mangrove wood. Tourists and fishermen have been reported disturbing nesting seabirds. Furthermore, the Tourism Development Authority (TDA) is proposing major coastal development adjacent to the CMA.

Importantly, this plan has been developed concomitantly with a plan of management specifically for the WGHPA: the Southern Red Sea Conservation Management Area Plan. This Plan follows a structure developed by the EEAA and the World Conservation Union (IUCN) for use in Egypt. It begins with a general introduction that includes a description of the purpose of the plan; its scope and limitations; the plan's structure; a vision statement for

the CMA; the strategic goals for the CMA and a description of its boundaries. Section 3 provides an overview of the existing legal framework relating to marine conservation management in Egypt. Next is a description of its physical, biological and social resources (Section 4), followed by a summary of the main management issues (Section 5). Proposed management objectives, strategies and evaluation are presented in Section 6. Sections 7, 8, 9 and 10 consist of reports on the proposed management tools, zoning, site plans and mooring strategy, respectively. Section 11 illustrates how to build capacity to achieve the plan's objectives. Section 12 is a list of people consulted during the preparation of the plan, and Section 13 contains the references; Section 14 holds the maps, and in Section 15 the appendices are found.

The plan was developed using an outcome-based approach to facilitate effective auditing of its implementation. The integration of evaluation programs into management plans offers a number of significant benefits for natural resource management. The ability to demonstrate the results or outcomes of management has the following advantages:

- Providing feedback to management about the extent to which previous actions are achieving management objectives.
- Providing the opportunity to learn from past management experience and so progressively improve management performance.
- Providing a more informed basis from which to make ongoing management decisions and for allocating and prioritizing management effort and resources.
- Providing the necessary link to public accountability and to those funding management by demonstrating the outcomes for expenditure on protected area management.

PSU and EEAA staff based in Hurghada developed this plan. Key stakeholders who operate in or adjacent to the CMA provided input into the issues and made recommendations.

3. ACHIEVEMENTS IN STAFF DEVELOPMENT AND LAW ENFORCEMENT

3.1. Capacity Building

3.1.1. Offices and Staffing

The EEAA/NCS, especially with regard to the Red Sea, is by far the fastest growing governmental agency in Egypt. A few numbers prove that fact. In 1997, three rangers were sent to Hurghada, with the minimum facilities to aid them in achieving the minimum objectives at that time. However, the dream of creating the second largest marine protected area in the world inspired the EEAA/NCS to increase the capacity of rangers and their facilities in the area.

In May 1998, the second deployment of new rangers took place; an additional five rangers were sent to the area after receiving initial training in the Ras Mohammad National Park. In the same time, a new office in Quseir was added to the Hurghada one, thus creating easier and more convenient access to areas further south. Current manpower at the Quseir office is four rangers.

The Quseir office remained the southern point of contact until the beginning of 2002, when the EEAA, with the technical assistance of the EEPP, bought two apartments in Marsa Alam and decided to extend their access further south.

In the beginning of February 2002, the office of Red Sea Protectorates in Marsa Alam was officially opened. Four rangers were appointed to the office.

On January 1st, 2003, after two years of discussing the need to conserve Samadai area 'Dolphin House,' the proposed management plan was approved by the appropriate authorities. The Samadai project adds to the Marsa Alam office two rangers for dolphin monitoring, plus two accountants. This increased the ranger capacity in Marsa Alam to eight, plus two boat skippers who were appointed by the Red Sea Governorate.

The WGHPA was declared in January 2003. In October that year a prefabricated cabin was set up in the protected area to serve as an office and accommodation. Four rangers were assigned to work in the protected area.

3.1.3 Staff Training

In order to provide the staff with knowledge and raise their performance level, the EEAA/NCS, jointly with USAID, provided them with different types of training programs. Table 1 provides information on training given to the rangers. New rangers have been passing through very complicated processes of trials and training provided by older staff for selection. Six hundred and fifty people applied for the positions as rangers; sixteen were chosen. Initial training also was provided to them on conservation issues and field inspection. Table 1 is a list of the training courses provided for Red Sea Parks (RSP) rangers including those located in the southern sector

3.1.4 Equipment and Facilities

The three offices in the southern zone are equipped with the following:

- Three Jeep Cherokee vehicles, one for each office; maintained and in good condition.
- Diving gear for each diver ranger.
- Various types of monitoring equipment, including cameras and U/W cameras, binoculars, camera traps, etc.
- Office equipment, such as computers, printers, faxes machines, etc.
- Communication equipment: telephones, cell phones, satellite phones, and radios.
- One Zodiac boat which will be moving soon to the WGHPA, plus a speedboat to Samadai area.

3.2 Law Enforcement

With improvements in the capacity of the RSMP, the geographical range of patrolling and law enforcement activities also have improved. Enforcement of the provisions of Law 102 for 1983 and Law 4 for 1994 has been a focal activity for the staff of the three offices of Quseir, Marsa Alam and Wadi El-Gimal. Patrolling the shore to follow up different types of project EIAs has expanded to cover the whole shore of the CMA. Various types of violations have been documented to date including illegal construction mainly for tourism projects, coral grounding by pleasure boats, illegal

fishing of sea cucumber and the use of destructive fishing gear, the use of four-wheel drive vehicles, the spilling of used motor oils and building violations. Close contact and coordination with Governorate authorities, local coastguard and police has been achieved, which is critical to having effective law enforcement.

4. ACHIEVEMENTS IN MARINE RESOURCE DEVELOPMENT

4.1. Monitoring of Resources

4.1.1. Habitats

4.1.1.1 Coral reefs:

The Red Sea contains some of the world's unique coastal and marine environments. Among the most notable is the extraordinary system of coral reefs and their associated animals and plants. This environment supports rich biological communities and representatives of several endangered species. The important coastal and marine environments and resources of the Red Sea are subject to a series of individual and cumulative threats that have significant short and long-term consequences for sustainable development of the region. The threats include habitat destruction, overexploitation of living marine resources, environmental degradation from petroleum development, significant risks from marine transportation, pollution from industrial activities, diverse environmental impacts from urban and tourist development and a series of emerging environmental issues associated with new types of economic developments and uses of new technologies. The Egyptian coast of the Red Sea has suffered during the last decade from destructive activities related in one way or another to the vast increase in tourist development of the coastal area. The damage caused by these activities impelled several national and international organizations to direct some of their funds towards the protection of the coral reefs of the Red Sea.

An important step was taken toward initiating a monitoring program for the coral reefs around the area of Hurghada during 2001. It was agreed that this program will incorporate EEAA park rangers as trainees and it was even suggested that on a small scale their methodology-application capability should be evaluated. The results included, in addition to system establishment and training, a complete analysis of 42 underwater fixed quadrates at ten sites around Hurghada. The mission was at this time considered to be a unique and successful one.

Accordingly, after two years, it was recommended that the established sites around Hurghada should be revisited for evaluation and that the coral monitoring program should be expanded to the southern sector (see Figs 1 & 2, annex 2). This program also established an approach to applying GIS capabilities to the coral monitoring program in order to set up a database to serve the monitoring unit of the Red Sea Protectorates. A suggested format for the database was characterized by being simple, accessible, easy to update, and able to help in generating both graphic and numerical data reports. In addition, and as a basis for the current database, a set of background data was fed to the GIS computer as a foundation for the coral biodiversity database to be completed by EEAA park rangers in the years to come.

Some recommendations were made to the PSU to expand this program to cover more dive sites representing all diving areas along the Red Sea coast, increase the number of fixed

quadrates per site in the future to include at least 20 quadrates representing different depths, and raise the capabilities of monitoring unit personnel, especially in the fields of data collection, feeding to database, data analysis, and reporting. Concerning the mooring system and the patrolling of the sites, it was recommended that the current system should be continued and that patrolled areas should be increased to include all possible sites for evaluation. It was also recommended that a detailed study of the reef carrying capacity should be done in different areas around the coast using various techniques based on the approach used in the baseline monitoring program (2001). The detailed reef carrying capacity study will present a baseline with accurate figures to help decision makers in managing the Red Sea reefs.

4.1.1.2. Mangroves

Some mangrove stands show evidence of grazing by camels and cutting by local people, especially in the CMA area. To evaluate the impact of these activities, a monitoring program for selected mangrove stands in the northern and southern sectors of the Red Sea was established and implemented during 2003. The main objectives of this work were to establish an applicable monitoring program and to train the RSMP Rangers to implement and expand this program as well as to establish baseline data for future monitoring, using GIS capabilities (see Figs 3, 4 & 5, annex 2). Therefore, a group of EEAA rangers (starting with four and increased to seven), working at different locations in the Red Sea Protectorate, were chosen for on-the-job training as a monitoring unit. They were instructed in all phases of the program and trained in various techniques for monitoring the mangrove-protected areas.

During this program, thirteen mangrove sites (stands) were incorporated, seven of which are in the northern province (north of Hurgada to south of Quseir), and six sites are in the southern province (Abu Ghusson to Hamata). These sites are mangrove stands that are experiencing differing adverse impacts: solid waste (litter from land and sea) at four sites; tourism and nearby development at two sites; and camel grazing and human trampling at seven sites. Field surveys and data gathering were achieved using a variety of criteria for the mangrove trees in several permanent transects and/or plots representative of different mangrove sites. The locations of each sampling transect or plot, together with all involved trees, was marked in the field, while its coordinates were measured using GPS. Collected information include demarcation and zonation of the addressed stands, measures facilitating computing of the cover and density of the sampled trees, their dimensions by length, width and height; the distance separating trees from each other; the number of aerial roots; number of seedlings and saplings; signs of deterioration; and, when possible, data on the type and level of human impact. All applied methods are documented herewith to ensure consistency in monitoring schemes and for further implementation at other sites.

Data analyses included computing estimates of the different criteria for mangrove trees within a sample. These comprise the area of ground occupied by a tree, its volume (to mimic the size); the distribution pattern of trees and their density value and cover percentage; and the density of seedlings and pneumatophores (aerial roots). All data and computed estimates, characterizing each sampled transect or plot, are digitally stored in MS Excel format. These include a sequence of trees that lie across a sampling transect or all the trees within a plot described by individual position (coordinates) and associated measurements as well as estimates for each tree. This sequence of measurements was used to present the available information using a GIS application. Consequent to the availability of information needed to represent the sampled mangrove sites within a GIS application; convenient comparison and

interpretation of monitoring data are possible in the short- and long-term. Investigation of the best way to perform this task revealed the need for treating trees as single entities along sampling transects. This was realized by applying mathematical formulas that compute the coordinates of a tree utilizing those of the end points of their sampling transect and the distance between trees while correcting for incline based on the slope of the transect. The structure of these formulas depends on the original direction of field sampling, whether towards the north, south, east or west. The base map used for the GIS implementation is a digitized image of cuts from an original map provided by a GIS unit (processed satellite image). Critical testing and verification of utilized information beside visual evaluation of results based on field experience and photographs were considered to ensure representative outputs. The data were analyzed and entered as baseline data for the future mangrove monitoring program.

Conclusions and recommendation in respect of the information obtained from the mangrove monitoring program include the following:

- The EEAA monitoring-unit rangers have learned the basics necessary to apply the mangrove monitoring program leaning on their newly-gained skills from this program.
- Verification and validation of their performance indicated a reasonable degree of consistency and reliability in such work. The rangers have to be regularly provided with fresh, up-to-date information and additional personnel will be required to cover all the monitoring sites.

Long-term monitoring needs the extraction of a minimum data set to be recorded at various temporal and spatial scales on a schedule that ensures indication of changes in the concerned system and procedures that quantify the causes of these changes; whether they are natural, socio-economic, or management induced. The established mangrove monitoring program is a basis for establishing a mangrove information system capable of providing estimates and evaluation measures of the status of the mangroves as needed, especially as the basic information and procedures are being built up through this and similar programs. The application of the current monitoring program setup is feasible in two time scales; short-term (seasonal and/or annual) and long-term (at three to five year intervals) by scheduled visits to the marked positions of monitoring units.

1. Short-term measures (seasonal or annual)

- Patrol of permanent transects and plots of mangrove trees at the monitoring sites with the major task of renewing any field mark to sampling units; whether a transect or a sampling tree unit.
- Seasonal records of the number of seedlings, saplings, and other units if any, are measured in the permanent plots. These can be used to follow the progress of the seedlings or saplings (survivorship and growth).
- Seasonal records of phenotypic sequences (vegetative activity, flower budding, flowering, fruiting, maturation of propagules and germination).
- Annual recording of any deterioration in marked trees along all the permanent transects, including death of branches, wilting of leaves and branches, smearing of aerial roots, and any exogenous interference. This would make it possible to correlate deterioration with causes of impacts when evaluated.

2. Long-term measures (at 3 to 5 year intervals)

- Applying procedures, addressed in the mangrove monitoring program, to the same marked units in the permanent transects and plots at all sites. The methodology used for recording and computing specific measures should be applied critically to arrive at a comparable basic output that enables interpretation and extraction of indicators of change.

Additional measures that can reflect the causes of estimated change are needed. These should cover exogenous impacts on both the physical and biological environment of the mangrove ecosystem. Expanding and improving the program in the future calls for new parameters to consider for monitoring and rangers to be trained in the following:

- Mangrove population dynamics;
- Soil parameters of the different zones;
- Water and soil quality in and around the mangrove system;
- Attached wadis and watershed systems;
- Mode of impact of insects and disease.

Methods of evaluating any added parameters should be critically taught to the monitoring unit rangers. Finally a proposal for future activities can include:

- The great potential for expanding the areas covered by mangroves in the Red Sea Protectorate and rehabilitating degraded sites subject to anticipated control of the causes.
- The need to set up a special case study on the deteriorating mangroves of Abu Monqar Island and similar islands susceptible to degradation, resulting from unpredicted impacts, in the near future. This must be associated with water and soil quality studies, among other pollution measures, and should be compared with corresponding situations on some other islands.

4.1.1.3 Water quality

During 2003, deterioration of seawater quality due to land-originated pollution (sewage and industrial waste) as well as ship-originated pollution was examined in a water-quality monitoring program. Based on the capabilities of the RSP laboratory, eutrophication levels—the accumulation of nutrients that support the dense growth of algae and other organisms—were selected as the main target for water monitoring. The principal objectives of this program are to establish an applicable monitoring program to be implemented and expanded by trained RSP rangers. Fixed “hot spots” and reference sites were selected for long-term monitoring. On-the-job training for RSP rangers in sampling and analyzing seawater for differing eutrophication parameters were implemented. Additionally, because of the diversity in education and experience among the three rangers who participated in the program, the training focused on fundamental issues: the marine ecosystem, practice in making field measurements, and analytical procedures for seawater quality analysis.

The monitoring area was divided into six sectors, based on experience with various pollution drivers. These sectors are north Hurghada (El-Gouna), Hurghada, Abu Soma, Safaga, El-Quseir, and Marsa Alam (Fig. 6, annex 2). A water sampling strategy was selected for each sector based on the collection of water samples for analysis from a sufficient number of stations, which were chosen to represent the possible dispersal of the pollution driver in the sector’s marine environment. The mean position of these stations in the sector will be the

fixed-site positions for a future monitoring program. A reference site far away from any land-based pollution source was selected half way between Hurghada and Abu Monqar Island. A total of 28 stations from the area were selected. *In situ* hydrography measurements were taken followed by analysis in the NCS laboratory of:

- Water temperature acidity or alkalinity (pH)
- Turbidity transparency
- Salinity conductivity
- Total dissolved solids (TDS)
- Oxygen concentration and saturation
- Nitrogen forms and phosphorus
- Silicates
- Chlorophyll-a
- Total suspended solids (TSS)

Baseline data were also established, using the RSP GIS capabilities, for future monitoring. Determination of biochemical oxygen demand (BOD), chemical oxygen demand (COD), and organic water contents was difficult due to limited laboratory facilities. The results for concentrations and levels at each station and their mean in each sector were represented as GIS images for the entire area monitored; they will form part of the monitoring database.

The results obtained did not show any signs of change or increase in the eutrophication levels. This confirms the findings of a survey conducted during a Global Environmental Fund (GEF) project in 1997–1998.

Baseline data were also established using the RSMP's GIS capabilities for future monitoring. The program includes a proposal for water-quality monitoring in the studied area, taking into consideration other pollution sources such as oil, garbage, and mining waste, to be applicable in the future.

4.1.1.4 Fisheries

During 2003, a general survey of the current status of fisheries in the area between Hurghada and Ras Banas (including CMA area) on the Red Sea was conducted. It provides information that will assist in predicting the environmental consequences of fishing in the study area and in developing a proposed management plan to alleviate the detrimental effects of this activity on the marine environment. Field visits were made to 21 landing sites in the area, where fishermen and coastguard personnel were interviewed. A review of published scientific studies and consultation with local and national experts provided part of the survey.

A detailed description and analysis of the relevant fisheries and fishing operations are included herewith. These consist of:

- Official fisheries statistical data
- Landing sites
- Fishing fleet and fishing gear
- Catch and target species
- Nursery grounds
- Fishermen
- Wadi el-Gemal–Hamata Protected Area
- Fish handling and marketing

- Fisheries legislation.

Using RSP GIS capabilities, the spatial distribution of fishing activities per fishery as well as important nursery and spawning areas are mapped (see Figs 7, 8, 9 & 10, annex 2). The local administration faces difficulty in trying to collect accurate data on fisheries due to the mobility of the fleet, with a relatively large number of boats moving through different areas at different times. The government lacks both trained enumerators and the transportation facilities to provide complete data. In addition, there are considerable numbers of amateur fishermen scattered along the coast, so available data do not include the actual landed quantities of fish. Tourist boats are known to fish as well, creating conflicts between tourist boat operators and professional fishermen as they compete on the same fishing grounds. Hurghada's fishing port, Sakala, is considered to be a distinct landing site, with Safaga's port lying further south. The fishing fleet operating in the study area is composed of nine purse-seiners and 420 deck boats with inboard or outboard engines. The principal artisanal fishing methods are hand lines, long lines, gill nets, and trammel nets. In the southern Protected Area, gray mullet are fished using veranda nets. Fishermen coming from Fayoum Governorate have introduced illegal gill nets called *sabeeb*, which have a smaller mesh than the stipulated minimum size. They also use ring nets on the coral reefs, which cause serious damage. The main fishing grounds are concentrated in the northern Protected Area of the study area along the coast and around the Hurghada islands. Small fishing grounds scattered southward are mainly fished using hand and long lines.

All habitats are considered to be fishing grounds, including coral reefs, hard substrate, soft bottoms, mangroves, and deep water. The study area fisheries are dominated by reef fishing. Purse-seiners and artisan vessels operate in the vicinity of the Hurghada islands and along the coast, landing pelagic species. There is a marked difference in the catch down the coast, due primarily to different habitats, but also due to the different gear used. Twenty-three nursery grounds were identified within the study area. Seventeen of them are threatened by fishing and tourism activities. Two mangrove fishing and nursery grounds are reported. The remaining four nursery grounds are not being used for any activity. Serious action should be taken to protect and conserve the nursery grounds.

Fisheries resources in the area are targeted by three groups: local fishermen, migratory fishermen from other governorates, and visiting fishermen from the Nile Delta who operate purse-seiners in the fishing season, then return to their home villages. Traditional local fishermen are increasingly leaving for more lucrative opportunities in tourism, working in the diving industry or in hotels. Newcomers who replace them have less knowledge of the local ecology and use unsustainable fishing methods. This has led to an increase in habitat destruction from net damage. Traditional local fishing knowledge is being irrevocably lost. The Wadi el-Gemal–Hamata Protected Area includes three landing sites:

1. Sharm el-Loly's 55 fishermen operate 11 boats with 40 horsepower (hp) outboard engines and use trammel nets. Annual landings are estimated at about 28 tons.
2. Qula'an village has 20 local fishermen operating four fishing boats with 20–40 hp outboard engines. They mainly use trammel nets.
3. At Hamata, 50 local and migratory fishermen operate 10 boats with 40 hp outboard engines and use mainly hand lines and trammel nets. The average annual landing is estimated at about 25 tons.

Unfortunately, most fishery regulations governed by laws do not have the strength and clarity needed for effective management or for monitoring, control, and surveillance (MCS). Penalties for infringements are frequently far too low, which undermines respect for management and control since there is minimal deterrence. Licensing systems are often inadequate and poor coordination between governmental bodies results in overlapping responsibilities and jurisdictions for the implementation of legislation for the marine environment and coastal zone. Prohibition of fishing with nets on the coral reefs in the Red Sea, according to the decree of the General Authority for Fisheries Resources, is valuable in the process of conservation and fisheries management but still needs to be properly implemented.

A proposed Fisheries Management Plan for the study area including the Wadi el- Gemal-Hamata protected area is one of the outcomes of this survey. The plan highlights the key issues and constraints for sustainable fisheries development and conservation. It identifies objectives for the fisheries, and strategies to be employed in order to achieve those objectives. To be successful, the plan must have active input, support, and acceptance from all stakeholders, especially the fisherman. The proposed plan identifies the main tasks and options as:

- Registering fishing vessels
- Licensing fishermen
- Licensing fishing vessels
- Recommending regulatory measures for targeted species and sea cucumbers
- Establishing and improving data collection systems as tools for proper monitoring and assessment.

4.2. Threatened Species

4.2.1. Marine Turtles

Seven species of marine turtles representing two families, Cheloniidae and Dermochelyidae, are the only living members of what was a large and diverse radiation of cryptodiran marine turtles. These seven species include the loggerhead (*Caretta caretta*), green (*Chelonia mydas*), hawksbill (*Eretmochelys imbricata*), Kemp's ridley (*Lepidochelys kempfi*), olive ridley (*Lepidochelys olivacea*), flatback (*Natator depressus*), and leatherback (*Dermochelys coriacea*). An eighth species, the black turtle or East Pacific green turtle (*Chelonia agassizi*), is recognized by some biologists, but morphological, biochemical, and genetic data published to date are conflicting, and the black turtle is currently treated as belonging to *Chelonia mydas*.

Of the seven (or eight) species of marine turtles, five have been reported from the Red Sea: green turtle, hawksbill, loggerhead, olive ridley and leatherback. In comparison, only three species are reported from the Egyptian coasts of the Red Sea, namely green turtle, hawksbill and leatherback. The first two species are known to use the Egyptian coast for nesting, while the last species was reported as possibly using the area as a feeding ground and/or a migratory route.

Humans have the potential to disturb marine turtles. Threats to the marine turtles in the Red Sea include deterioration of the feeding and nesting grounds, accidental catch during fishing activities and, to a lesser extent, collecting for ornaments and food. Data available on the

nesting activities of marine turtles on the Egyptian coast of the Red Sea are very poor. The only paper on the subject was written by Frazier (1983), who qualitatively surveyed a few areas on the Egyptian Red Sea coast and based his conclusions largely on communication with local fishermen.

Starting in 2001, RSP personnel established and implemented a monitoring program for marine turtle nesting beaches (Fig. 11, annex 2). The main objectives of this program were to establish a proper method for data gathering and to train RSP rangers to monitor nesting beaches. Data collection on marine turtle nesting, started in 2001, was continued in 2003, and focused on the inshore and offshore beaches of the Red Sea governorate (more than 1000km shore length and 44 islands). Of the 38 surveyed beaches along the coast of the Red Sea, 31 beaches were found to be suitable for turtle nesting. These beaches are commonly sandy and characterized by the gentle slope of the reef flats. Of the 31 suitable beaches, nesting activities (crawls and/or pits) were recorded at 22 beaches, mainly located in the CMA (Fig. 12, annex 2).

Two species of marine turtles are found to nest on the Egyptian coast of the Red Sea, namely hawksbill and green turtles. Green turtles are found to be the common nesting turtles in the Egyptian Red Sea in term of nesting intensity or the number of female turtles nesting on the Egyptian coast. The nesting season of the hawksbill is believed to start in May with a peak in June, while the green turtle is expected to start in June and peak in July. Of the 22 beaches with recorded nesting activities, only eight were identified as hawksbill nesting beaches and 14 as green turtle nesting beaches. In general, all valuable nesting beaches of hawksbill turtles were found on the northern islands of the Egyptian Red Sea, with three sites of greatest value, namely, Shadwan Island, and Large and Small Giftun Islands. Green turtles commonly nest on inshore beaches and islands farther south. Three main inshore beaches are found to be valuable for nesting of green turtles, namely Wadi el-Gemal beaches including Torfat el-Mashyeikh, Marsa Umm el-Abbas and Quraa Hertway (Ras Banas). In addition, the offshore beaches of four islands (i.e. Sarenka, Zabargad, Siyal and Rawabiel) were categorized as highly valuable nesting sites for green turtles. Fortunately, all the valuable nesting sites occur within the boundaries of the Red Sea Protectorates, except for Shadwan Island. It has been proposed that this island should be declared a protected area.

In general, the quantitative estimates of nesting intensity varied between low and high value nesting beaches. The low value nesting beaches are characterized by the occurrence of a few scattered crawls and/or pits, mostly old ones. The high value nesting beaches are characterized by the occurrence of numerous crawls and pits, old and new crawls, false and true nests. Of the 22 nesting beaches, fourteen were found to be valuable nesting sites and eight to be low value nesting sites. Quantitative data on nesting intensity (i.e., number of crawls, number of false and true nests/shore length) were collected for three nesting beaches of hawksbill and seven nesting beaches of green turtles. During 2003, the highest level of hawksbill nesting was recorded on the Large Giftun Island compared with the other two sites. The occurrence of an extremely high number of false nests compared with the number of true nests on the Large Giftun Island could be related to some sort of human impact. Large Giftun is the only island to which visitor can get permits for access. At the three selected sites, the total numbers of false and true nests were estimated at 84 and 26, respectively. Quantitative analysis for the nesting level or intensity indicated that seven of the 14 surveyed green turtle nesting beaches are highly valuable nesting sites. Of these, the offshore beach of Zabargad Island represented the most valuable and important nesting site for green turtles in the

Egyptian Red Sea area. Although there are no quantitative data, the far southern islands of Siyal and Rawabiel are expected to be valuable nesting sites for green turtles as they are similar to Zabargad Island. The most valuable recorded offshore beaches for green turtle nesting were found to be located in the CMA (Wadi el-Gemal, Torfat el-Mashayeikh north and Marsa Umm el-Abbas).

4.2.2. Marine Mammals

Recently, marine mammal/tourist interactions have been identified as a serious human impact on dolphins and the dugong as discussed in the SZCMP. Interactions occur between spinner dolphins (*Stenella longirostris longirostris*) and snorkelers at Dolphin House (Samadai reef) and Dolphin Reef (Shaab Sattaiah) in the CMA (Fig. 13 & 14, annex 2). During the summer of 2003, the huge impact on dolphin population was due to the booming level of tourist visits. By this time the number of visitors ranged between 600 and 1000 per day. This alarmed the RSP, which, together with the Red Sea Governorate and in cooperation with local diving operators, established and implemented a site-specific management plan to mitigate tourist impact, and to collect fees as a tool for controlling the number of visitors as well as providing a source of income for self-financing. The main objective of this plan is to allow the continuation of tourist activity involving a respectful interaction with the dolphins, which is important for the local economy and which contains, if properly conducted, high educational value that has the benefit of enhancing human attention, attraction and care for the marine environment. The main components of this plan are:

- Fees: On the basis of US\$15 per visitor
- Limit the number of visitors: Control the number of snorkelers, not to exceed 100 per day
- Zoning: Establish and implement a proper zoning plan by dividing the area into two main parts; the northern part (inner reef) as a core area where no entrance or activities are allowed and the swimming area in the southwest part. The two parts are already marked with buoys.
- Enforcement: The continuous presence of RSP rangers on the site, at a minimum of one hour before the opening of the site to visitors to one hour after. Permitted visiting time is between 10.00am and 2.00pm. Four rangers are allocated for this purpose.
- Monitoring: A detailed monitoring protocol has been designed and implemented to (a) measure dolphin population size and behavior, (b) measure human use of Samadai Reef, (c) establish possible correlation between the two, (d) train the RSP rangers in field data gathering, analysis and reporting.
- Education and awareness: A widespread program of education and awareness is needed. Some attention was given to this matter during 2003, included two workshops with the stakeholders and the establishment of a NGO for dolphin conservation is progressing (Abu Salama Association)
- Stakeholder involvement: Stakeholders currently participating at Samadai reef (dive operators) are involved in most aspects of the management plan
- Code of conduct: Already established and distributed to different stakeholders.

In conclusion, a plan to implement the same program in the area of Dolphin Reef (Sataiah) is necessary.

In general the main threats to dugongs include: habitat deterioration, fisheries activities, tourism, and indigenous use and hunting. The SZCMP reported diving and snorkeling with dugongs as a threat to dugong populations. Diving or snorkeling with dugongs is well known at one site (Marsa Abu Dabab) in the CMA area. EEAA (RSP rangers) are surveying the status of dugong populations in the Egyptian waters of the Red Sea.

A study of sighting of dugongs along the coast of the Red Sea was carried out based on questionnaire sheets issued during the years 2001, 2002 and 2003 (Fig. 15, annex 2). The involvement of stakeholders in this sighting program increased the geographic range and made them clearly aware of the need to conserve dugongs in the area. Nothing was known about dugong distribution in the Egyptian waters of the Red Sea before that time. The increasing recorded number of dugongs sighted between 2001(nine sightings) and 2003 (16 sightings) is not known to be related to population recovery in the Egyptian Red Sea or related to increasing the geographical range of the program. Only two incidents of dugongs caught in fishing nets were recorded, one adult in the area of Hamata in May 2000, and another adult in Shalitin area in July 2002. Data on the dugong sighting program are entered and mapped using RSP GIS capabilities (Fig. 16, annex 2). Based on the sighting data, tourist impact mitigation, such as that at Dolphin House, still needs to be established and implemented in the dugong/tourist interaction areas like Marsa Abu Dabab, Lahmi and Wadi el-Gemal.

4.3. Activities for the Mooring Buoy System 2003-04

EEAA's *Southern Conservation Management Plan (CMP)* identified issues related to conservation of coral reefs—especially their use by the dive industry—and the need for an effective mooring buoy system to ensure that they are used without sustaining damage. Accordingly, the CMP recommended that a Mooring Buoy Strategy be prepared for the CMA and that a pilot mooring installation program be instituted. The Mooring Strategy was subsequently prepared by EEAA/PSU and implemented through a pilot program during the first half of 2003. A number of lessons learned from the pilot have been incorporated into EEAA's operations and have been carried forward into 2004.

4.3.1. Pilot Implementation Activities

The *Mooring Buoy Pilot Program* conducted mooring maintenance, made new installations and tested out new approaches. At the time of preparing this report, the pilot program has resulted in the installation of 191 moorings. The new installations were installed from Marsa Alam, south to Wadi Gimal and southeast to the reefs in the vicinity of Fury Shoals, lying 15km-30km offshore of Wadi Lahmi. *Table 4 & Fig. 17*; summarize the number of installations by location.

4.3.2. Preparation of the Mooring Implementation Plan

This *Mooring Buoy Implementation Plan (MBI Plan)* is an outgrowth of the previously drafted *Red Sea Mooring Buoy Strategy*. The purpose of the plan is to identify the practical steps to be taken by EEAA, in fulfilling the priority initiatives discussed in the strategy. The timeframe for plan implementation is 2003-2004, although some activities will necessarily

require an additional year (2005) to complete. The most important initiatives that are highlighted in the *MBI Plan* form the basis for EEAA's implementation activities. These initiatives are discussed in the following sections.

4.3.3. Establish a Full-Service EEAA Mooring Team with Supporting Infrastructure

This involves hiring additional commercial divers and support personnel, equipping and training them in the particulars of the mooring system, and providing appropriate support services within the Red Sea Protectorates to enable them to do their work. The Red Sea Protectorates is making application to the Director of Nature Conservation Sector for EEAA Ministerial approval to hire 6 commercial divers during 2004. Internally, additional rangers will be added to the Mooring Unit to meet the anticipated workload.

There are significant ancillary investments to be made in building a mooring system. These are not obvious to the dive industry or the end users. EEAA is actively engaged in opening new ranger offices, acquiring storage space, expanding their fleet of vessels, and procuring additional mooring equipment. For example, in 2003 a new Ranger office was opened in Wadi Gimal at Shams Alam Resort. Once it becomes fully operational, it will focus on managing the marine environment, including the mooring system. EEAA has plans to establish a second office in the vicinity of Abu Ghusun/Hematah.

Two new Zodiac RIBs have been procured to aid in the task of coral reef monitoring as well as mapping and reviewing the status of the mooring system. One Zodiac 550 SRMN will be based at Safaga and the larger Zodiac 600 SRMN will be sent to the south at Wadi Gimal after it arrives in Egypt in July '04. For more exposed areas (Hematah, Gouna), EEAA plans to use the Molly RIBs which are returning to service, outfitted with new Merrier Drive Systems.

Other ancillary mooring activities in 2003/2004 involve procurement of mooring installation tools, anchors, ropes, buoys, and shackles. The 2003 equipment arrived mid-year; and the 2004 order will arrive this summer. Most of this equipment is unavailable in Egypt, and is of high-strength specification. To store this equipment, EEAA has purchased a container that can be transported to any location, and has also held discussions with selected dive centers and resort owners to discover if local storage space can be provided. Local storage will assist the installation work and enable EEAA to store topside mooring materials to emplace when needed by selected local dive centers. This shared-approach to mooring maintenance will result in faster repairs to the system, and reduced workload for HEPCA's team. Results of discussions with industry representatives have been encouraging¹.

4.3.4. Survey and Report on the State of the Mooring System

Efforts will be made to survey and report on the state of the mooring system *in situ*—especially on the reliability and durability of specific components comprising the system.

¹ Storage space can be made available at Shams Alam Resort (Wadi Gimal) and at Emperor Divers (Soma Bay). Prospects are good for continuing to store mooring equipment at El Gouna.

During survey missions, positional data will be acquired for mapping the associated reefs. This is particularly needed in the south, between N Lat. 24° 35' (Ras Honkorab) and N Lat. 24° 10' (Fury Shoals/Sataya). Mapping is also needed south of Ras Banas, from N Lat. 23° 50' (Mikauwa Is. & Horseshoe reef) extending to N Lat. 23° 20' (St. John's Reef). This latter work will be done in conjunction with a survey of reefs used by Safari boats, as a preliminary step to installing new moorings.

The Red Sea Protectorates has invested heavily in creating a GIS service unit, with the capability of mapping field data onto satellite and traditional map bases. Differential GPS equipment has been acquired, along with Landsat 7, ASTER, and some large-scale QuickBird imagery to support reef & mooring mapping. Staff training has proceeded apace, with courses in advanced GIS software, image interpretation methods, and use of GPS for field mapping.

4.3.5. Maintain and Expand the Mooring System in Northern Red Sea

The EEAA is maintaining and expanding the mooring system in the Northern Red Sea in two priority areas, Safaga and the Northern Islands. Initially, mooring maintenance, as well as installing new moorings, will be undertaken by EEAA/HEPCA with local dive center support in the Safaga Sector during March 2004. Sites having the greatest need are the 9 reefs from Ras Soma to Gamul Kebir²; and 7 oceanic reefs³. Secondly, the Gouna and Hurghada dive operators are being consulted to determine the mooring needs in the Northern Islands Sector. Some maintenance will also be done in the Gouna area, and new installations made at several important sites frequented by Safari vessels further to the north.

4.3.5.1. Moorings on frequently used coral reefs

HEPCA, with the collaboration of EEAA, has continued to do maintenance on reefs in the Hurghada area throughout 2003-04. There is a chronic need for this, because the Hurghada Sector remains the core area of Red Sea diving, playing host to several thousand divers per day, as well as snorkelers who are expanding faster than dive groups.

Safaga is also under dive pressure and expansion of the mooring system is warranted. Several new dive centers have opened in Soma Bay, and some Safari boats are now entering Safaga waters and anchoring for the night at Safaga's offshore reefs (Shaab Sheer). Further, dive centers from Makadi Bay and Hurghada visit the area. Recently, EEAA/PSU attended several meetings in Safaga to review the situation before planning and implementing a local program⁴. An outcome of these meetings was an implementation plan for maintenance and new installations to be scheduled for mid-March '04, prior to the late March-to-April upswing in dive tourism.

² Ras Abu Soma, Abu Soma Garden, Tobia Arbaa, Tobia Hamra, Tobia Kebir, Tobia Soraya, Tobia "Beda", Gamul Soraya, and Gamul Kebir.

³ Panorama, Middle Reef, Hal Hal, Shaab Sheer, Shaab Claude, Shaab Humdallah, and Abu Kafan.

⁴ The most recent meeting was held February 26 '04 at the Safaga Diving Center. Attendees included HEPCA and the dive centers of Emperor Divers, Holiday Inn, Mean Dive, Shams Safaga, Safaga Paradise, Orca Safaga and Toms Diver House.

4.3.5.2. Moorings at special locations and remote areas

There have also been installations at some *special sites*, such as Little Megawish Island, where EEAA authorized the construction of a pyramid-shaped sport facility on this small sandy islet. Shore protection moorings were installed at this location to prevent damage to the shoreline by vessels engaged in the construction of the building. another case of moorings being installed for shore protection is off the SE tip of Big Giftun, where a second restaurant day-facility has been constructed. Dive boats landing customers at this facility must moor well away from the beach.

New installations for El Gouna & Northern Islands are in the planning stage, with maintenance missions scheduled for the 2nd quarter of 2004.

4.3.6. Maintain and Expand the Mooring System in Southern Red Sea

EEAA plans to maintain and expand the mooring system in the Southern Red Sea in two priority areas. (a) In the Wadi Gimal–Hematah Sector from Marsa Alam to Ras Banas (N25°–N24°), the moorings installed last year will be checked for problems, repaired as required and mapped using differential GPS. This work will be undertaken by EEAA/HEPCA with local dive center support. (b) The Marsa Alam safari boat operators will be consulted to determine the mooring needs in the Zabargad Sector which are those offshore sites stretching from Ras Banas to Miriar Is (N24°–N23°). EEAA will arrange for at least two installation missions during 2004, with additional work being scheduled for 2005.

New installations for Zabargad Sector are in the early planning stage and await scheduling, but the June to August 2004 period looks possible currently for implementation.

4.3.7. Funding the Mooring System

EEAA's challenge is to determine a financially sustainable mechanism for funding the mooring system, *in return for the environmental services that the mooring system provides to the end user*. Ideally, the allocation of annual support funds for mooring activities should be part of the overall revenue generation scheme to be adopted by EEAA and the RSG. Funds earmarked for moorings should be in a separate operating account from general support funds going to the Red Sea Protectorates, in order to ensure the continuity of fund allocations and the mooring system use for which these funds are allocated. By such means, annual budgets can be prepared and maintenance performed on a regularly scheduled basis. This approach will forestall equipment failures that occur when the system is neglected and allowed to run down.

4.3.8. Stakeholder Consultation and Collaboration

4.3.8.1. Southern Red Sea Conservation Management Plan workshop

The Southern Red Sea Conservation Management Workshop was held at the Shams Alam Hotel in Marsa Alam on June 12, 2003. The purpose of the workshop was to present and familiarize key stakeholders with the plans which have been developed by the EEPP Policy Support Unit and the EEAA Nature Conservation Sector for the management of southern Red

Sea resources, including the *Southern Red Sea Conservation Management plan*, the *Wadi Gemal-Hamata Protected Area Management Plan* and the *Red Sea Mooring Strategy*.

Comments and feedback from participants were acquired to further improve the plans. Participants included staff from PSU, EEAA, the Egyptian Coast Guard; local tourists and dive operators. Participants were also taken on a field trip within the WGHPA. The participants were shown Ras Baghdadi, Sharm El Luli and Umm Abass, a mainland turtle-nesting beach.

4.3.8.2. Mooring meetings

Due to funding constraints, moorings could not be placed at all reefs frequented by tourist vessels in the CMA. Therefore, EEPP-PSU staff undertook a detailed consultation process with key stakeholders to determine priority reefs. A priority reef was defined as a reef receiving large numbers of tourist vessels, having coral communities vulnerable to physical disturbance and having insufficient or no mooring capacity.

Meetings with representatives of the dive industry are held when required. This is because the Rangers responsible for the Mooring and Monitoring Units have historically consulted with the industry about moorings and other conservation matters. Examples from the south, include past meetings held at the resorts of Kahramana, 30 km north of Mara Alam, and at Shams Alam 40 km south of Marsa Alam⁵ and at Wadi Lahmi⁶. Other meetings have been held at individual dive centers operating between Marsa Alam and Quseir.⁷ Once the Pilot mooring installations became operational last year, multiple meetings were held with HEPCA, members of the dive industry and the Red Sea Association for Diving & Watersports (RSADW) to plan the scope of the work, decide on the schedule, and arrange for local support.

The completion of the draft *S. Conservation Management Plan*, has led to a greater awareness of the role of moorings in helping to protect sites designated to become marine reserves, as distinct from coral reefs used by the dive industry. EEAA has actively participated in joint meetings with several dive centers comprising the S. Branch of the RSADW, in addition to meetings with the RS Governor's Office, to prepare and implement an operational management plan for Samadai. These meetings began in mid-2003 and continued into 2004⁸.

⁵ Preliminary consultation to determine priority reefs began at two meetings held at Kahramana Resort and the Wadi Gimal Diving Centre situated approximately during March 2002

⁶ Admiral Nader, PSU Hurghada, and Tamer Kamal, EEAA Hurghada, visited dive centres between El Quseir and Wadi Lhami to begin listing priority reefs. This survey culminated in the preparation of the document *Pilot Mooring Installation Plan for Southern Zone July 2002*.

⁷ Convened by McEachern & Colby to identify additional priority reefs and the number of moorings required per reef.

⁸ Members of the southern Branch of the RSADW proposed to establish guidelines for tourists interacting with dolphins at Samadai Reef at a meeting 7 May 2003. EEAA & Project staff attended and provided information on conservation initiatives in the CMA. Since then, more than 6 additional meetings have been convened on the issue of Samadai, and a decision on where to place the control moorings has been reached.

Other stakeholder meetings that were attended by EEAA/PSU and held in 2004 concerned the status and plans for expanded moorings in Safaga (2 meetings in February '04)⁹, as well as the need for rangers to be posted to the area. To this end, EEAA has entered discussions with the manager of the Soma Bay Development Co. for the long term assignment of one or two rangers to Soma. Options for contributory support are being explored¹⁰. In March, a preliminary mooring planning meeting was held to discuss the mooring situation at Gouna and Northern Islands¹¹.

4.3.9. Create a Sea Ranger Auxiliary (SRA)

The EEAA Rangers are a small group, operating over a vast area, which inevitably means that they are stretched thin on the ground. One solution to this problem is to form a voluntary *Sea Ranger Auxiliary* group whose actions will improve the survivability of the mooring system. The concept of the *SRA* is to assemble and train selected individuals from participating dive centers and empower them to assist Rangers during their dive activities. Thus their role will be to extend the 'eyes and ears' of the rangers at sea, to promote proper conservation practices, and to alert the rangers to problems requiring attention. These problems can include: damage to the mooring system, destructive practices of dive boats, dumping of garbage at sea, illegal fishing and other matters. Work on this initiative will be completed in 2004, using several handpicked dive centers for pilot implementation¹².

4.4. Public Awareness

Several training programs, conference and workshops were conducted to raise public awareness of the RSP rangers, school students and teachers and various stakeholders as summarized in Table (5)

5 ACHIEVEMENTS IN TERRESTRIAL RESOURCE DEVELOPMENT

5.1 Establish Wadi El-Gemal–Hamata Protected Area Operational Plan

The Wadi el-Gemal–Hamata Protected Area (WGHPA) management plan calls for the development of an annual operational plan. This operational plan is an adaptation from the general draft management plan prepared and published in June 2003. It has a specific time scale extending from November 2003 to November 2004. Specific activities and actions have been selected that are considered a management priority and can feasibly be implemented

⁹The most recent meeting was held February 26 '04 at the Safaga Diving Center. Attendees included HEPCA and the dive centers of Emperor Divers, Holiday Inn, Mean Dive, Shams Safaga, Safaga Paradise, Orca Safaga and Toms Diver House.

¹⁰The cost of posting a ranger to new tourist centers located along the Red Sea can be prohibitively expensive. A ranger needs a furnished office, communications, accommodation, a vehicle, marine transport, and access to a storage shed for materials used on the job.

¹¹ Meeting with P. Jones, Manager of the El Gouna Marina, who provided information collected from the Gouna dive centers.

¹² Candidate areas include: Soma Bay/Safaga, Samadai, Wadi Gimal, and Wadi Lahmi as pilot areas for implementation.

within the plan period. The ability of the WGHPA staff to achieve and apply the activities/instructions listed in the plan depends to a great extent on the resources, facilities and manpower made available.

5.2. Coordination and Consultation with WGHPA Stakeholders

- Extensive consultative meetings with the primary stakeholders in the WGHPA (TDA & RSG) were held to resolve conflicting plans for the region.
- The efforts focused on reconciling tourism development plans with the CMP for the region. Particular attention was paid to development standards in the two eco-tourism zones in the WGHPA. The development regulations established by the TDA were clarified to ensure unity of interpretation, as well as compatibility with the park's objectives.
- The WGHPA management plan was adjusted to address TDA concerns.

5.3. Infrastructure

- Established ranger presence at Shams Alam Park headquarters and secured the most essential facilities.
- Designated locations for second portacabin at Hamata Village and three outposts at remote strategic locations in the PA as well as main entrance sign locations. Design and contractual arrangements are underway to complete installation of these facilities before the project ends in September 2004.

5.4 Staffing

- Assigned four rangers at WGHPA, including both marine and terrestrial specialists.
- Recruited two local community guards and identified three more, including one boat driver for marine patrols.

5.5. Management Tools

- Refined schematic park zoning to fit with TDA zoning scheme

5.6. Patrolling and Law Enforcement

- Initiated regular land patrols in both regularly utilized areas of the park, and interior parts of the park, focusing on areas of high conflict, such as quarrying zones and coastal urban centers in the park buffer zone.

5.6.1 Monitoring

- Initiated limited wildlife monitoring program using camera traps.
- Established a framework for gazelle and large mammal monitoring program.
- Conducted a marine turtle nesting beach survey at critical areas subject to planned development in the Ras Hankorab eco-tourism development zone.
- Conducted a survey of seagrass communities in select ecologically sensitive sites (Ras Baghdadi and Marsa Umm el-Abbas).

- Established methodologies for primary data collection and storage, which are regularly transmitted to the Red Sea GIS unit in Hurghada.
- Established an extensive database for biological and non-biological aspects of the park, which is continually being updated and added to, including extensive photographic documentation of resources.

5.6.2 Law Enforcement

- Enforcement of the provisions of Law 102 for 1983 and Law 4 for 1994 has been a focal activity for the PAMU staff with many violations documented to date. These include hunting violations (including marine turtles, sea cucumber smuggling, illegal fishing gear, etc.), use of four-runner vehicles, spilling of used motor oils and building violations.
- Close contact and coordination with local coastguard and police has been achieved, which is critical to having effective law enforcement.

5.6.3 Site Action Plans

- Site action plans will be developed for small, discrete sites that are of particular concern due to significant conservation importance and sensitivity; these could be subject to exceptionally high human pressures. Draft site action plans have been prepared for Ras Baghdadi and Wadi El Gemal Island. The most important are identified below. Six further sites have been identified for site management.

5.6.4 Reporting

- A monthly report is prepared and submitted to both the Red Sea regional PA office in Hurghada and the NCS headquarters in Cairo.
- Topical reports are prepared on an *ad hoc* basis whenever the need arises.

5.7. Management Issues

5.7.1 Management of Existing Urban Centers

- Established contact and direct communication with town councils in Hamata and Abu Ghusson.

5.7.2 Public Awareness

- Location and preliminary design concepts for entrance signs selected.
- An interpretive sign scheme for WGHPA developed by AED. Scientific content reviewed and distribution/display mechanisms agreed.
- PAMU staff received training in public awareness.

5.7.3 Roads and Accessibility

- Several surveys were conducted to map and categorize various tracks according to their sensitivity to wildlife, importance to traffic, connectedness to habitations, sites

of interest, etc. Evolution of a comprehensive track and trail system for the park is underway.

- Several tracks leading to known sensitive sites were sealed off and arrangements are underway to seal off others.

5.7.4 Indigenous People

- Broad consultations with indigenous community representatives initiated.
- Two local residents, representative of indigenous ethnic groups in the area, have been recruited as community guards in the park, and three further individuals have been selected through consultation with the community.

5.7.5 Solid Waste

PAMU organized several clean-up campaigns for the downstream portion of Wadi el-Gemal. They have also:

- Established communications with local city councils and tourism developments and operators and informed them of the solid waste issues, indicating the need to control haphazard dumping and initiate the reduction of waste generation and recycling.
- Identified a proposed suitable site for a sanitary landfill at the northwestern edge of the PA to be developed as a model dump for the region.
- Distributed garbage bins at some commonly used sites, military posts and the local community school.
- Organized patrols to ensure that waste is disposed of as appropriately as possible under current circumstances.

5.7.6 Fishing and Collection of Marine Invertebrates

- Park staff regularly patrol the coastal strip and check for fishing violations.

5.7.7 Hunting

- Frequent patrols are conducted at important wildlife locations and habitats.
- Water holes important for wildlife have been identified.
- Personnel at military and police checkpoints have been informed of hunting restrictions in the area.
- Community guards participate in tracking hunting violations and advocating conservation among the local community.

5.7.8 Mining and Quarrying Activities

- Mining and quarrying areas in WGHPA have been identified, and the operational/contractual conditions at each site established.
- Established realistic quarrying zones in the PA.
- Produced draft quarrying and mining regulations, which specify codes to increase efficiency, reduce wastage and minimize environmental impacts.
- Communications initiated with the Red Sea Quarry Department and the Egyptian Geological Survey to institute and enforce new regulations for the issuance of operator licenses.

- Regular monitoring of all active quarry sites is conducted to the extent allowable with available resources.
-

5.7.9 Threatened Species

- Monitoring activities initiated to determine the conservation status and population sizes for some of the most critically threatened species (marine turtles, Dorcas gazelle and ibex)
- Regular patrolling of critical habitats and locations for threatened species is conducted to the extent allowable with available resources.

6 SUMMARY OF ACHIEVEMENTS IN 2003

Summaries of achievements in 2003 related to threats and objectives and strategies addressed in the SZCMP are provided in Tables 6 and 7.

Annex 1 Tables

Table 1: Red Sea Marine Park Rangers' Training

Course Title	Place	Period	#Trainees	Provided By	Funded By
Coral Reef Conservation and Sustainable Development	Japan	28/5– 20/8/2003	1		JICA
World Parks Congress	South Africa	8–17 Sept 2003	3	IUCN	AED
Sperm whale survey in Ionian sea	Italy	23 Sept– 4 Oct 2003	1	ACCOBAMS	ACCOBAMS/ IFAW
Sub-regional training course on preparedness for, and response to, accidental marine pollution for supervisors and on-scene commanders from the Mediterranean Arab countries	Alexandria	2003	1	REMPK	REMPK
Conference for preparing to attend World Parks Congress at South Africa	Spain	March 2003	1	IUCN	IUCN
GIS Second Regional Conference	Cairo	6–7 May 2003	2		DT2
Red Sea Protected Areas Managers	Jordan	21–19 Aug 2003	1		PERSGA
Advanced Remote Sensing Applications	Cairo	1 May 2003	1	CEDARE	PERSGA
Editing Website for RSMP	Cairo	19–20 Oct 2003	4	Orange Studio	AED
Advanced Arc GIS	Hurghada	2003	8	GEO SIENCE RESEARCH CENTER	DT2
Initial Training	Hurghada	13–21 May 2003	13	RSMP Senior Staff	EEPP/ PSU
Initial Training	Hurghada	26 May– June 2003	17	RSMP Senior Staff	EEPP/ PSU
Scuba Diving Course	Hurghada	2003	5	EEPP	EEPP
Marine Craft Steering	Hurghada	12–26 Oct 2002	15	Arab Academy For Science and Technology	DT2
TOEFL	Hurghada	2002	8		
Mapping Methodology	Hurghada	29 June–3 July 2002	14	ERSS	DT2
Mangrove Data Collection Methods	Djiputy	March 2002	1	PERSGA	PERSGA
GIS+ARC GIS	Hurghada	14–19 Apr 2002	9	Quality Standard	DT2
Advanced ARC GIS	Hurghada	20–24 Apr 2002	6	Quality Standard	DT2
Public Awareness	Sharm el Sheikh	16–25 June 2002	9	AED	AED
Nature Conservation Sector Induction Course	Sharm el Sheikh	27–29 July 2002	9	NCS Senior Rangers	EEPP - PSU

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Course Title	Place	Period	#Trainees	Provided By	Funded By
CZM	USA	23 May 2002–6 June 2002	2	Rhode Island University	DT2
PA Management	Australia	11/11/2002 to 12/12/2002	1		DT2
Scuba Diving Course	Hurghada	2002–2003	12	EEPP	EEPP
Under-water Photography	Hurghada	2002–2003	10	EEPP	EEPP
EECIS Data Management and Integration	Sharm el Sheikh	Aug 2002	4		
Park Management Internship	USA	5–21 Dec 2002	1	US. Virgin Islands National Park	DT2
International Coral Reefs. Conference	Indonesia	2002	3		DT2
Environmental Law	Hurghada	24–29 Jan 2004	9	Arab Academy For Science and Technology	DT2
ARC GIS for CZM	Hurghada	24 –28 Jan 2004	8	University of Florida	DT2
Image Processing and Interpretation (Group 1)	Hurghada	7–11 Feb 2004	7	NARSS	AED
Image Processing and Interpretation(Group 2)	Hurghada	14 18 Feb 2004	12	NARSS	AED
Marine Biology (Module 1)	Hurghada	14–19 Feb 2004	14	Arab Academy For Science and Technology and AUC	DT2
Marine Biology b (Module 2)	Hurghada	21–26 Feb 2004	14	Arab Academy For Science and Technology and AUC	DT2
Marine Biology (Module 3)	Hurghada	6–11 March 2004	14	Arab Academy For Science and Technology and AUC	DT2
Public Awareness	Hurghada	1–4 March 2004	17	AED	AED
4WD	Hurghada	March 2004	12		DT2
Introduction to Marine Biology	Hurghada	25 Aug–27 Sept 2001	11	Suez Canal University	DT2
U.S. Parks Tour	USA	15 days Aug 2001	8	DT2	DT2
English Language Course	Hurghada	2001	21	Fulbright Center	DT2
M.Sc. Oceanography, CZM	USA	Dec 1999 Dec 2001	1		DT2

Table 2: Equipment list provided for the two new offices of the southern sector

	Marsa Alam	Wadi El- Gemal	Item	Notes
1	1	1	Jeep Cherokee	
2	4	3	PC	
3	1	1	HP LaserJet 1100 printer	
4	1	1	Color HP DeskJet printer	
5	1		Xerox machine	
6	1	1	Digital Camera	
7	1	1	Sea & Sea U/W Camera	
8	1	-	Normal Camera	
9	1	1	GPS receiver	
10	1	1	Binoculars	
11	1	-	Hand-held radio	
12	8	6	Air cylinder	
13	1	-	Air Compressor	
14	1	-	Scanner	
15	1	-	VCR	
16	1	-	Overhead Projector	
17	1	-	Fax Machine	Needs maintenance
18	1	-	Bicycle	
19	1	-	Phone line	
20	1	1	Cell phone	
21	1		Stabilizer	

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22	-	Various	Camping equipment	2 large tents and 4 Sleeping bags.
23	-	1	TV set	
24	-	1	TV Satellite system	
25	-	2	Complete set of diving gear	
26	1	1	Zodiac/Speedboat	On the move.
27	-	1	Furnished portacabin with 6 rooms, 2 WCs, and 2 kitchens	Used as office and accommodation
28	-	1	Camera, and Camera trap	

Table 3: The annotated taxonomy of marine turtles (based on assessment of mitochondrial DNA sequence divergences), geographical distribution and conservation status of each species.

Phylogeny	Status	Geographic distribution
Family: Dermochelyidae Species: <i>Dermochelys coriacea</i>	ENDANGERED	Atlantic, Pacific and Indian (Including Red Sea)
Family: Cheloniidae Genus: <i>Chelonia</i> Species: <i>Chelonia mydas</i> Species: <i>Chelonia agassizi</i>	• • ENDANGERED ENDANGERED	• • Circum-tropical Tropical-Eastern Pacific
Genus: <i>Natator</i> Species: <i>Natator depressus</i>	ENDANGERED	Northern Australia
Genus: <i>Caretta</i> Species: <i>Caretta caretta</i>	ENDANGERED	Atlantic, Pacific, Indian
Genus: <i>Lepidochelys</i> Species: <i>Lepidochelys kempfi</i>	ENDANGERED	Gulf of Mexico, North Atlantic Atlantic, Pacific, Indian
Species: <i>Lepidochelys olivacea</i>	CRITICALLY ENDANGERED	Circumtropical
Genus: <i>Eretmochelys</i> Species: <i>Eretmochelys imbricata</i>	CRITICALLY ENDANGERED	

Table 4: Location and Number of Pilot Mooring Installations in the South ('03)

Location	No.		Location	No.
Gotat El Shawarit	3		Habili Dahara	4
Seyal Island	7		El Shalarit	4
Robi (Erg Abu Diab)	4		Shaab Ishta	4
Malahi	7		Shaab Kwayis	2
Sataya East	13		El Dahara	14
Sataya West	14		Gotta El Shalnat	3
Sataya Kebir	4		Shaab Gobar	4
Sataya Sogher	2		Toreft El Mashaak	2
Maksur	8		Gotat El Sharm	11
Abu Galawa Kebir	14		Wadi El Gamel Island	9
Abu Galawa Sogher	2		Wadi El Gamel Garden	2
Shaab Hamam	4		Gotat Ishta	2
Shaab Saeed	2		Ras Honkorab	7
Shaab Sioudia	6		Gotat El Bohar	4
Samadai Reef	21		Elphinstone	4
Abu Dahab	6		TOTAL Installations =	193

Table 5: List of training programs, conferences, and workshops including 2003

NO	COURSE TITLE	ATTENDANCE	PERIOD	SUPPLIED AGENCY
1	Training program for social specialists in primary stage	60 teachers	27/8/2002 3/9/2002 10/9/2002	The World Bank with the Ministry of Education
2	Workshops for environmental education		7–18/9/2002	AED; Red Sea Protectorates, and the Ministry of Education
3	The second territorial conference for GIS	2 researchers	6,7 May, 2002	The center for decision making and support, Cabinet of Ministers
4	The final conference of the society awareness project for environmental protection & maintaining public health	50 persons	February 2003	National organizations; Red Sea Protectorates
5	The first workshop for the management and protection plan in the southern Red Sea–Wadi el-Gemal Protected Area	40 persons	May 2003	EEPP; Red Sea Protectorates
6	Training courses and seminars for youth knowledge and increasing awareness of the protectorates and the environment and its value and the importance of keeping it safe	450 persons	1/6–30/7/2003	Red Sea Protectorates; Youth Houses
7	The international work campaign for Egypt youth – Hurghada	90 persons	9,10/7/2003	Sponsored by the Minister of Youth and the Red Sea Governor
8	Seminars and workshops for students and governmental organizations		During the year (twice a week)	Natural Protectorates and the Nile Center for Media
9	Training for rangers on using the Website	4 persons	18,19/10/2003	AED
10	The environmental competition for art and drawing tasks for school students	69 persons	1/6–30/7/2003	PERSGA; Red Sea Protectorates
11	The role of women and society in environment protection	40 persons	4/8/2003	Protectorates; the Woman Affairs of the National Party
12	“Keep the World Clean” campaign	120 besides school students	20–27/9/2003	The Arab Bureau for Environment and Youth; Red Sea Governorate
13	Open discussions about solid waste recycling	30 persons	14/10/2003	Nile Center for Media; Natural Protectorates; Environmental body in the governorate
14	Training course for hotel managers	40 persons	13,15/10/2003	Media Center; Natural Protectorates
15	Workshop on marine pollution and means of controlling it	25 persons	18/11/2003	Anti-pollution Center
16	The first workshop for dolphin protection in Samadai	50persons	14,15/1/2004	Natural Protectorates; EEAA

Table 6: Current human threats (addressed in the SZCMP) to the ecological values of the CMA and achievements in 2003.

Issue	Ecological consequence	Achievements 2003
<u>Anchoring/cable mooring</u>	Major changes in coral community structure. Anchors and chains can also scour seagrass meadows. Impacts localized to leeward sides of offshore reefs and in marsas. Can be managed with buoy moorings and zoning.	<ul style="list-style-type: none"> - 193 new mooring installed in MCA area. - Strengthened 50% of existed mooring by doubling pins and mantas. - Increased participation of stakeholders in maintenance and monitoring of moorings. - Expanded the coral monitoring program to CMA.
<u>Reef flat development</u>	Permanent, sometimes widespread modification of reef flat and displacement of associated organisms. Can be managed with rigorous and strict enforcement relating to the setback regulations.	<ul style="list-style-type: none"> - Strengthened patrolling of the shoreline by increasing the number of trained rangers in the CMA, and opened new office in Wadi el-Gemal
<u>Marine tourism Activities</u>	Depends on activity and location. Source of mechanical damage of corals and other benthic organisms. However, disturbance is typically localized to entry and exit points, trails, and close to moorings. Can be managed with education, zoning, and enforcement.	<ul style="list-style-type: none"> - Expanded the coral monitoring program to the CMA. - Strengthened patrolling and law enforcement process. - Established a network with volunteer stakeholders to report on violations. - Established and implemented site management plan for Samadai reefs (Dolphin House).
<u>Mangrove grazing and cutting</u>	The most obvious effect is a reduction in foliage cover. Grazing or trampling does not appear to cause death of adult plants, but may limit recruitment due to the trampling or eating of young plants. Possible to limit disturbance if Ababda agree to reduce grazing pressure on selected stands. The ecological consequences of harvesting are unknown. Potentially easily managed with Ababda and coastguard cooperation.	<ul style="list-style-type: none"> - Evaluated the impact by establishing and implementing mangrove monitoring program applicable by trained rangers. - Patrolling of all mangrove stands along the coast. - Educated and communicated with local people and coastguard.

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BOAT GROUNDINGS	Depends on the size of the vessel. Cause of mechanical damage to corals and potential permanent modification of the substratum. The direct impact is highly localized, but an associated fuel spill could affect a large area.	<ul style="list-style-type: none"> - Strengthened the law enforcement process. - Implemented a network of communication with users to increase the geographical patrolling range. - Established a volunteer ranger program to involve users in the patrolling process (should be implemented in 2004). - Conducted some educational campaigns for boat captains.
<u>Development of marsas</u>	The development of marsas has the potential to affect marine organisms living in these uncommon coastal features. Development may result in increased levels of turbidity and contamination of waters and sediments. Development will also lead to increased boating and diving activity in and adjacent to the marsas.	<ul style="list-style-type: none"> - Established and approved guideline for marsa construction EIAs by EEAA and TDA.
FISHING	Depends on: gear type; the intensity and frequency of fishing; and the biology or ecology of the species caught. All modify fish assemblage structure to some degree. Trawlers can also modify the benthos. Ecological consequences difficult to predict, but possibly severe. May result in benthic habitat change. For example, the reduction of herbivore numbers may give algae a competitive advantage over corals. Difficult to manage multi-species fisheries and difficult to assess the direct and indirect effects of fishing. Management will require a combination of fisheries regulations, no-take zones and enforcement.	<ul style="list-style-type: none"> - Surveyed fisheries activities and establish proposal for fisheries management action plan. - Defined the proposed no-take zone in WGPA (1). - Cooperated with the GAFR (2) to formulate a decree to prohibit fishing with nets on coral reefs.
<u>Invertebrate harvesting</u>	Holothurians (sea-cucumbers) are beneficial to the production of benthic microalgae because they produce ammonium and small quantities of phosphate as by products. They also contribute to the bioturbation of	<ul style="list-style-type: none"> -Finalized field survey on sea cucumber populations along the Red Sea coast in cooperation with Suez Canal University team. - Continued to prohibit sea cucumber catching. - Strengthened the patrolling on illegal catching of sea cucumber and shells

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	sediments. Populations of holothurians have been heavily exploited in much of the Egyptian Red Sea. Commercially important species are now uncommon or locally extinct.	in cooperation with the Coast Guard and volunteer stakeholders.
<u>Disturbance of nesting turtles/seabirds</u>	International and nationally significant seabird and turtle nesting rookeries are found on Wadi el-Gemal Island and on islands in the Qulaan Archipelago. These islands support nesting populations of the white-eye gulls, which are endemic to the Red Sea. The islands also support significant populations of the threatened sooty falcon and breeding populations of green and hawksbill turtles. Theoretically easy to manage by ensuring no or limited human access to islands. Management will require public consultation, regulations and enforcement.	<ul style="list-style-type: none"> - Surveyed, demarked and patrolled the high value turtle nesting beaches through the implementing turtle monitoring program. - Prohibited any type of development in highly valuable nesting beach such as Wadi el-Gemal and Marsa Umm el-Abbas.
<u>Marine mammal / tourist interaction</u>	Unknown	<ul style="list-style-type: none"> - Implemented site management plan for Dolphin house (Samadai reef). - Implemented applicable monitoring program for dolphin population in Samadai reefs by trained rangers. - Conducted awareness program for dive operators through two workshops and several meetings. - Involved the stakeholders in different management issues of Samadai reef. - Continued sighting of dugong and demarcated dugong feeding grounds.
<u>By-catch and boat strikes</u>	A small increase in dugong mortality might have significant impact on local populations.	<ul style="list-style-type: none"> - Continued recording mortality of dugongs through the established network with different stakeholders. - No record for mortality among dugongs during 2003.

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<p>NON-LOCAL VESSELS</p>	<p>Depends on the type, quantity and frequency of contaminants. The most common are petroleum hydrocarbons and plastics. The ecological impacts of routine ballast water discharge (as opposed to a major spill) and tar mats on coastal and marine organisms have not been adequately described. Discharge of ballast water is probably still a major source of oil pollution in the Red Sea despite the extensive laws restricting it (e.g. MARPOL and the London Convention). Evidence of oil waste in the CMA includes tar mats or tar balls along the coastline. Difficult to prevent, particularly for vessels discharging in international waters.</p>	<ul style="list-style-type: none"> - Established and implemented water quality monitoring program applicable by trained rangers. - Strengthened the patrolling and law enforcement process as well as increasing the geographical range of patrols.
<p>LOCAL VESSELS</p>	<p>Unknown, but the chronic discharge of oily bilge water is probably significant. Other contaminants include sewage, plastics, fishing nets and other garbage. Need the cooperation of vessel owners to effectively limit the discharge of contaminants from local vessels. Management will include public awareness and enforcement. However, ballast water and sewage receiving and storage facilities will be required at harbors to reduce discharge of these contaminants into the CMA.</p>	<ul style="list-style-type: none"> - Established and implemented water quality monitoring program applicable by trained rangers. - Strengthened the patrolling and law enforcement process as well as increasing the geographical range of patrols.
<p>Sewage</p>	<p>Possible localized contamination of waters on reef flats or in marsas adjacent to towns or hotels using septic</p>	<ul style="list-style-type: none"> - Established and implemented water quality monitoring program applicable by trained rangers.

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	<p>systems. Biological effects may include enhanced algae production and severe oxygen deficits in semi-enclosed waters like lagoons and marsas.</p>	<p>- Strengthened the patrolling and law enforcement process as well as increasing the geographical range of patrols.</p>
INDUSTRIAL WASTE	<p>Population and ecosystem levels effects unknown. Contamination with construction material is typically localized while plastics are widespread.</p>	<p>- Established and implemented water quality monitoring program applicable by trained rangers. - Strengthened the patrolling and law enforcement process as well as increasing the geographical range of patrols.</p>
GENERAL LITTER	<p>As above</p>	<p>- Established and implemented water quality monitoring program applicable by trained rangers. - Strengthened the patrolling and law enforcement process as well as increasing the geographical range of patrols.</p>

Table 7: CMA management objectives and strategies and actions taken during 2003 (* No action -partially done- *** done)**

Issue & Objectives	Strategy	Action
Current Issues		
Habitat Destruction		
<p><u>1) Boating/anchoring</u> Reduce the amount of coral damage caused by anchors, anchor chains and cable mooring.</p>	<p>Short-term EEAA installing moorings at frequently used reefs (in progress). EEAA implement mooring buoy strategy for the CMA. EEAA implement zoning scheme – addressed in CMA. Medium-term EEAA rangers undertake boat patrols, at random periods, to assess compliance with regulations pertaining to mooring use and no-anchoring zones. EEAA, in consultation with boat operators and the coastguard, implement a strategy to regulate the number of vessels permitted to visit popular dive sites per day within the CMA. EEAA undertake study to assess the environmental effects of cable mooring.</p>	<p>** * * ** **(Samadai) **</p>
<p><u>2) Coastal development</u> Reduce disturbance of reef flat habitats by illegal urban, tourist,</p>	<p>Short-term EEAA continue to enforce setback regulations according to Law 4 (1994). EEAA establish and maintain a register of locations in the CMA where reef flats have been</p>	<p>*** ***</p>

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<p>or industrial construction.</p>	<p>damaged by infilling or excavation for lagoons. EEAA rangers continue to undertake periodic surveys of reef flats adjacent to all resorts (including those under construction) to assess that illegal disturbance has not occurred. EEAA staff in Marsa Alam and El Quseir participate in the assessment of EIAs for proposed developments in and adjacent to the CMA.</p> <p>Medium-term EEAA undertake a Strategic Environmental Assessment (SEA) of the proposed tourism development concessions within the WGHPA.</p>	<p>***</p> <p>**</p> <p>**</p>
<p><u>3) Marine tourism activities</u> Reduce coral damage caused by SCUBA divers, snorkelers and reef walkers.</p>	<p>Short-term EEAA, in consultation with the Red Sea Diving Association and HEPCA, develop best-practice environmental guidelines for SCUBA diving, snorkeling, reef walking and boating for free distribution to all Egyptian marine-based tour operators. EEAA implement zoning scheme – as addressed in SZCMA. EEAA establish baseline and monitoring program to assess the status of benthic assemblages in heavily used marsas in the CMA.</p>	<p>**</p> <p>*</p> <p>***</p>
<p><u>4) Grazing</u> Assess the impact of camel activity (trampling and</p>	<p>Short-term EEAA undertake quantitative baseline study on mangrove stand structure at grazed and ungrazed stands.</p>	<p>**</p>

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<p>grazing) on mangrove stands.</p>	<p>Medium-term EEAA undertake study to assess the effects of camel grazing and trampling on mangrove stands in the CMA.</p>	<p>**</p>
<p><u>5) Mangrove cutting</u> Reduce the cutting of mangroves.</p>	<p>Short-term EEAA inform senior coastguard personnel of the environmental importance and legal status of mangroves in Egypt, and that it is illegal to cut mangroves. EEAA rangers meet with coastguard personnel based near mangroves to remind them of the legal status of mangroves. Medium-term EEAA undertake study to describe the type and intensity of Ababda use of mangroves.</p>	<p>*** *** ***</p>
<p><u>6) Boat groundings</u> Reduce the number of boat groundings.</p>	<p>Short-term EEAA review navigational requirements and aids for all vessels operating in the CMA.</p>	<p>***</p>
<p><u>7) Development of marsas</u> Stop development of marsas.</p>	<p>Short-term EEAA advised TDA and Red Sea Governorate to ban all development of resorts and other human habitation in and adjacent to marsas in the CMA that are currently free of development. EEAA ban all development of resorts and other human habitation in and adjacent to marsas in the PA that are currently free of development.</p>	<p>** ***</p>

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Exploitation of Marine resources		
<p><u>1) Fishing</u> Assess and limit the impact of fishing on populations of marine species and habitats in the CMA.</p>	<p>Short-term EEAA/MoA implement a fisheries management strategy for the CMA that will include no-take zones. EEAA implement zoning scheme – as addressed in the SZCMA.</p>	<p>** **</p>
<p><u>2) Invertebrate harvesting</u> Assess and limit the impact of invertebrate harvesting on populations of marine species and habitats in the CMA.</p>	<p>Short-term EEAA/MoA implement a fisheries management strategy for the CMA that will include no-take zones. EEAA implement zoning scheme as addressed in CMA.</p>	<p>** *</p>
Threatened Species		
<p><u>1) Disturbance of nesting marine turtles and seabirds</u> Assess and limit the impact of human activity on nesting populations of seabirds and marine turtles in the CMA.</p>	<p>Short-term EEAA develop guidelines for tourists, fishermen and others visiting Wadi el-Gemal Island and the islands of the Qula'an Archipelago. EEAA implement zoning scheme and site plans as addressed in CMA.</p>	<p>* *</p>

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<p>2) <u>Marine mammal/tourist interactions</u> Assess and limit the impact of human activity on spinner dolphins at Dolphin House.</p>	<p>Short-term EEAA, in cooperation with local tourist operators, review the current management strategy for Dolphin House. EEAA monitor the population of spinner dolphins that frequent the lagoon of Dolphin House. EEAA develop policy relating to interactions between divers/snorkelers and dugongs.</p>	<p>*** *** ***</p>
<p>3) <u>By-catch and boat strikes</u> Assess and limit the impact of human activity on dugongs and marine turtles in the CMA.</p>	<p>Short-term EEAA identify critical habitat for dugongs and marine turtles in the CMA. EEAA develop strategy to minimize disturbance and mortality of dugongs and marine turtles in the CMA. EEAA implement zoning scheme as addressed in CMA.</p>	<p>*** ** *</p>
<p>Ship-originated pollution</p>		
<p>Stop discharge of waste into the sea from vessels.</p>	<p>Short-term EEAA consult with key stakeholders to develop mutually agreed strategies to reduce the discharge of waste from tourist and fishing vessels. EEAA consult with the Red Sea Governorate to ensure existing and future harbors receive liquid and solid waste disposal facilities.</p>	<p>** **</p>

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Land-originated pollution		
<p><u>1) Sewage</u> Assess the impact of septic systems on inshore benthic organisms.</p>	<p>Short-term EEAA undertake study to assess whether septic systems at Marsa Alam and Hamata are contaminating adjacent coastal waters. EEAA monitor new resorts to ensure the developers comply with their licenses governing the treatment and disposal of sewage.</p>	<p>** **</p>
<p><u>2) Industrial waste</u> Stop industrial waste entering the CMA.</p>	<p>Short-term EEAA, in accordance with Law 4 (1994), undertake EIAs of proposed industrial development in and adjacent to the CMA. Medium-term EEAA consult with the Red Sea Governorate to develop and implement a Solid Waste Management Plan.</p>	<p>** **</p>
<p><u>3) General litter</u> Stop general litter entering the CMA</p>	<p>Short-term EEAA consult with the Red Sea Governorate and TDA to ensure all construction sites have waste disposal facilities. Medium-term EEAA consult with the Red Sea Governorate to develop and implement a Solid Waste Management Plan.</p>	<p>** *</p>

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Indigenous People		
Ensure Ababda participation in management decisions.	Short-term EEAA inform Ababda communities about the proposals made in this plan that may affect their activities.	**
	Medium-term EEAA employ Ababda as community rangers.	**
POTENTIAL FUTURE ISSUES		
Introduced Marine Species		
Assess whether introduced species have become established in the harbors and describe the extent of introductions.	Medium-term EEAA undertake biological survey of the harbors at Abu Ghussou, Marsa Alam, and Hamata to describe the occurrence of introduced marine species.	*
Major Oil Spill		
Limit the ecological and social impact of an oil spill on the CMA.	Short-term EEAA Hurghada provided EEAA/NOSCP/ GIS Office with maps of mangroves and other sensitive habitats in the CMA...	**
	EEAA develop a contingency plan to combat an oil spill in the CMA.	***
	Medium-term EEAA establish a rapid oil-spill response storehouse at El Quseir or Marsa Alam which will hold suitable equipment to combat a three-tier size spill.	*

Annex 2

Figures

Fig. 1. Coral monitoring program, based on permanent quadrates and analyzing the photographs using image analysis technique

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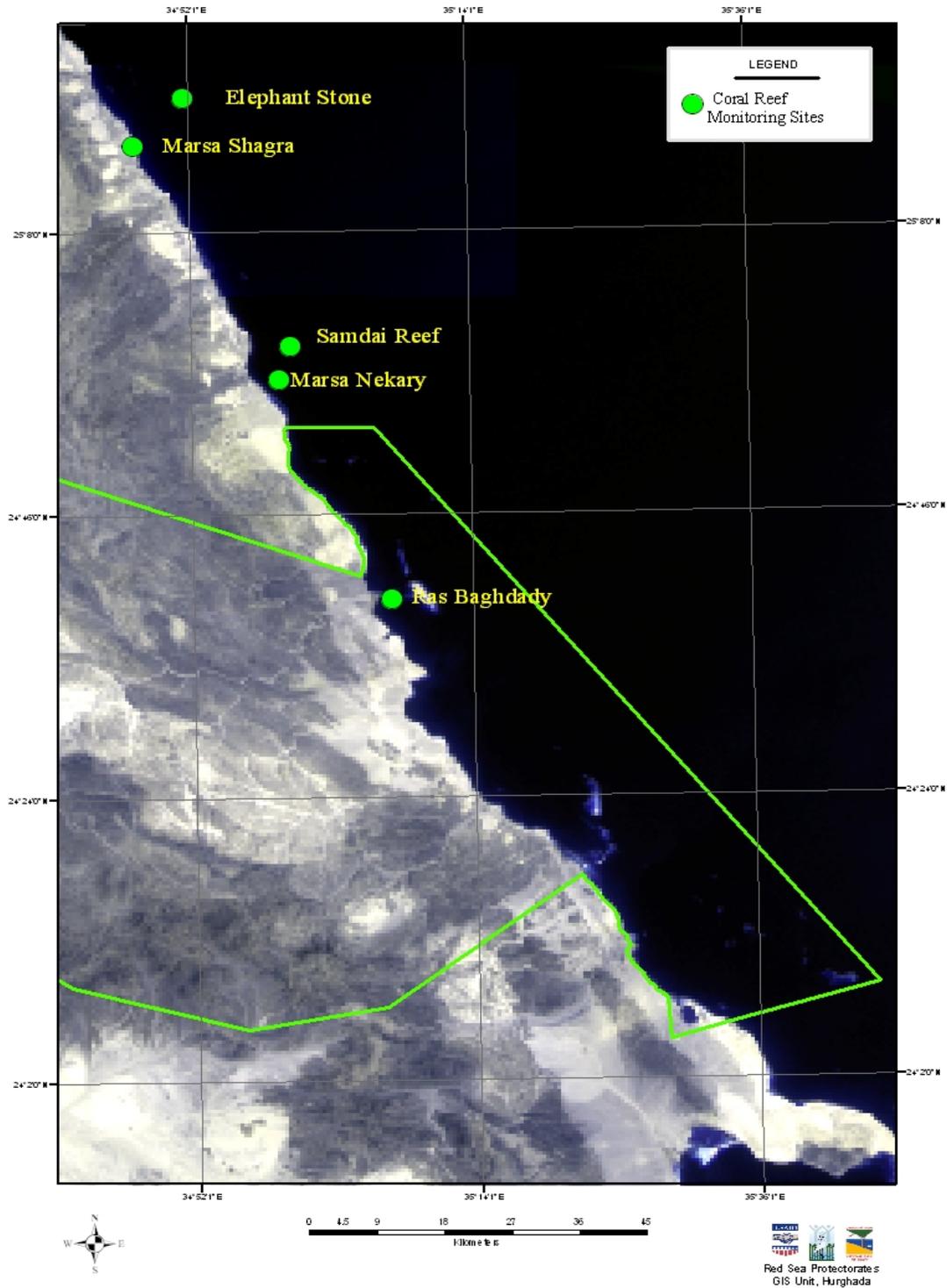


Fig. 2. Coral reef monitoring sites within the CMA

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Fig.3.. Selected mangrove stands along the coast of the CMA

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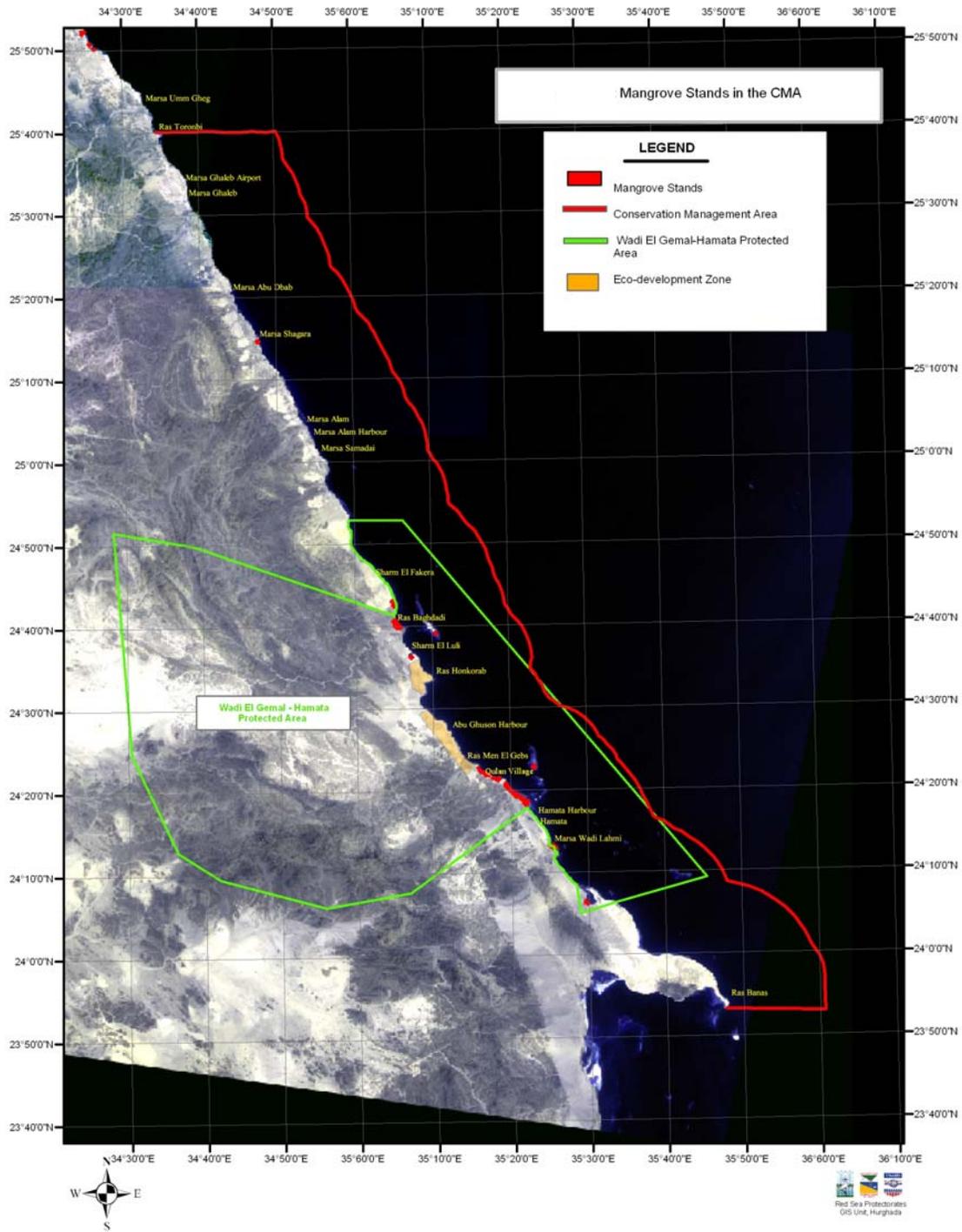


Fig. 4. Mangrove stands on the shore of the CMA

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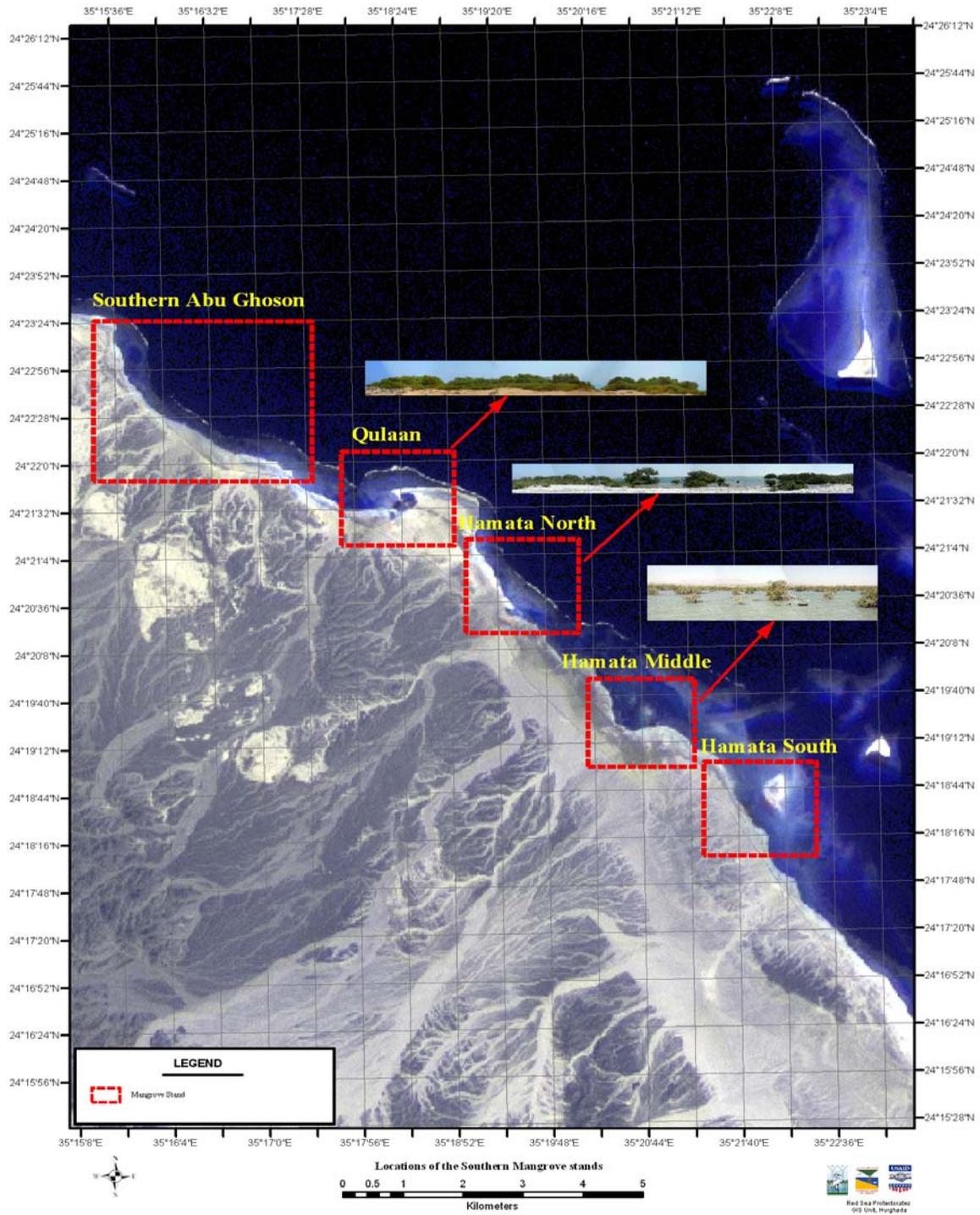


Fig. 5. Mangrove stands locations within the WGHPA

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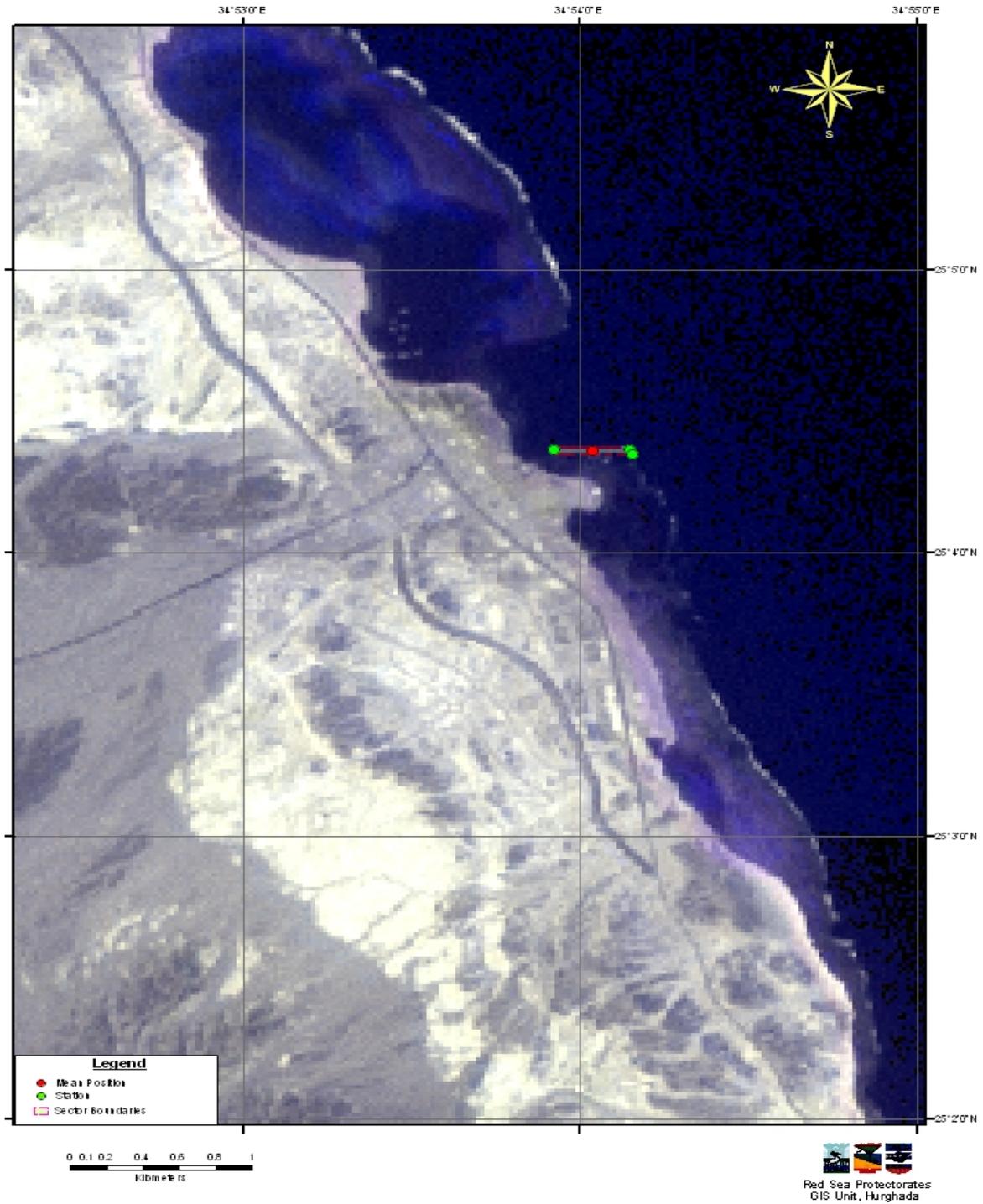


Fig. 6. Water quality monitoring fixed station off Marsa Alam to evaluate the impact of septic tanks (if any) as addressed in the SZCMP.

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Fig. 7. Illegal fishing by using destructive methods, sharks and sea cucumber fishing in the Red Sea area.

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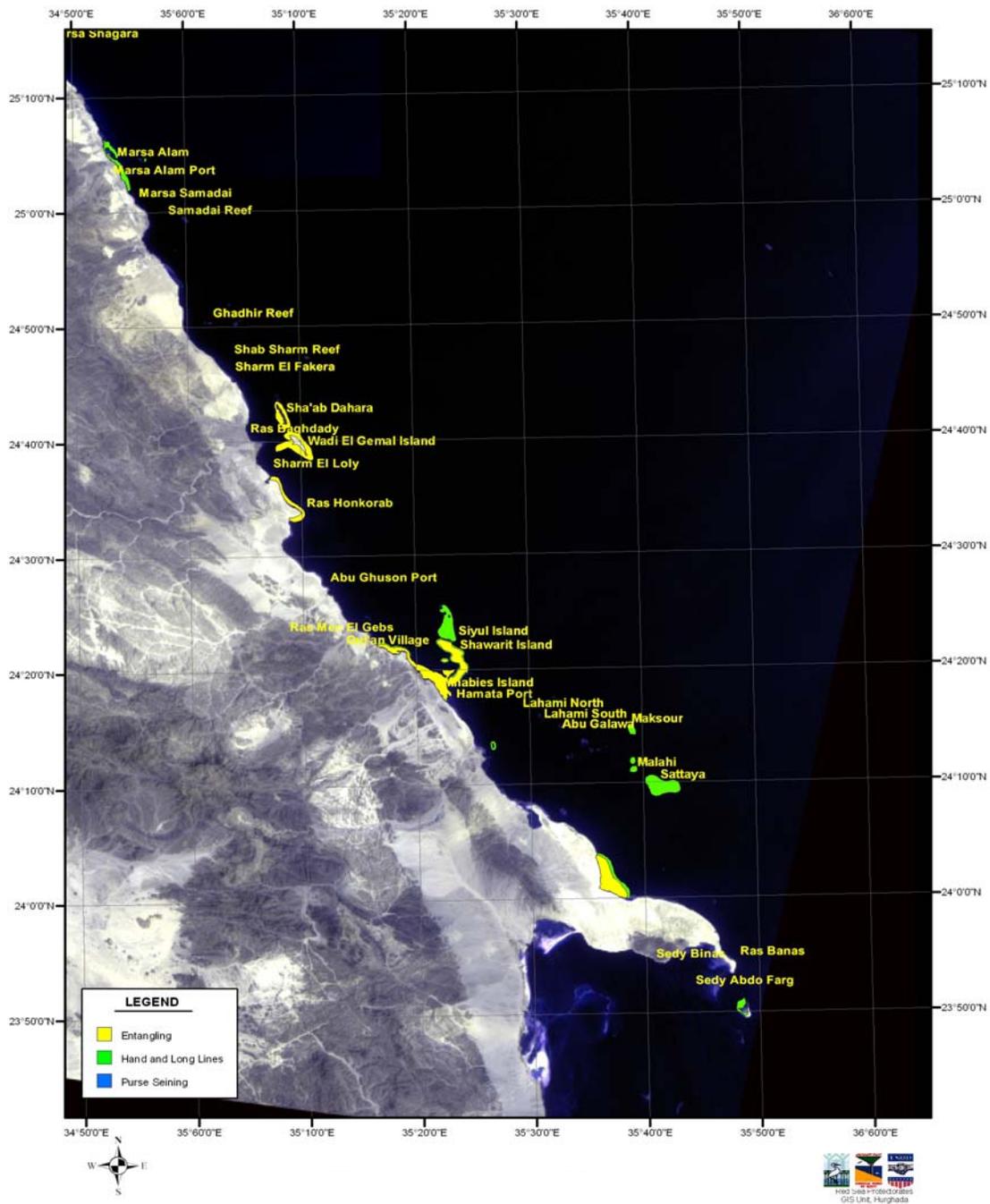


Fig. 8. Demarcation of the most valuable fishing grounds in the CMA, 2003.

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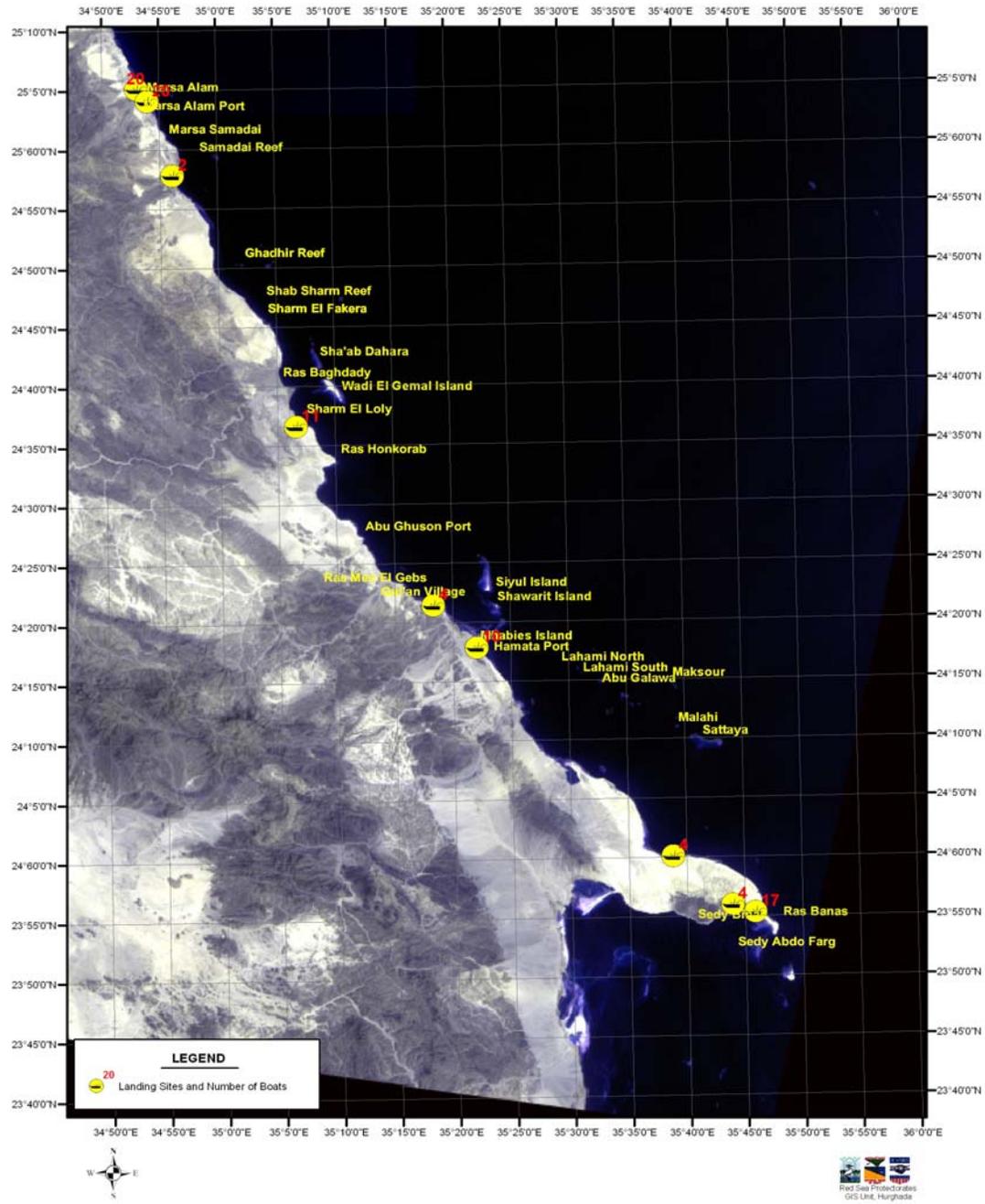


Fig. 9. Highly valuable fish landing sites demarked within the CMA, in 2003

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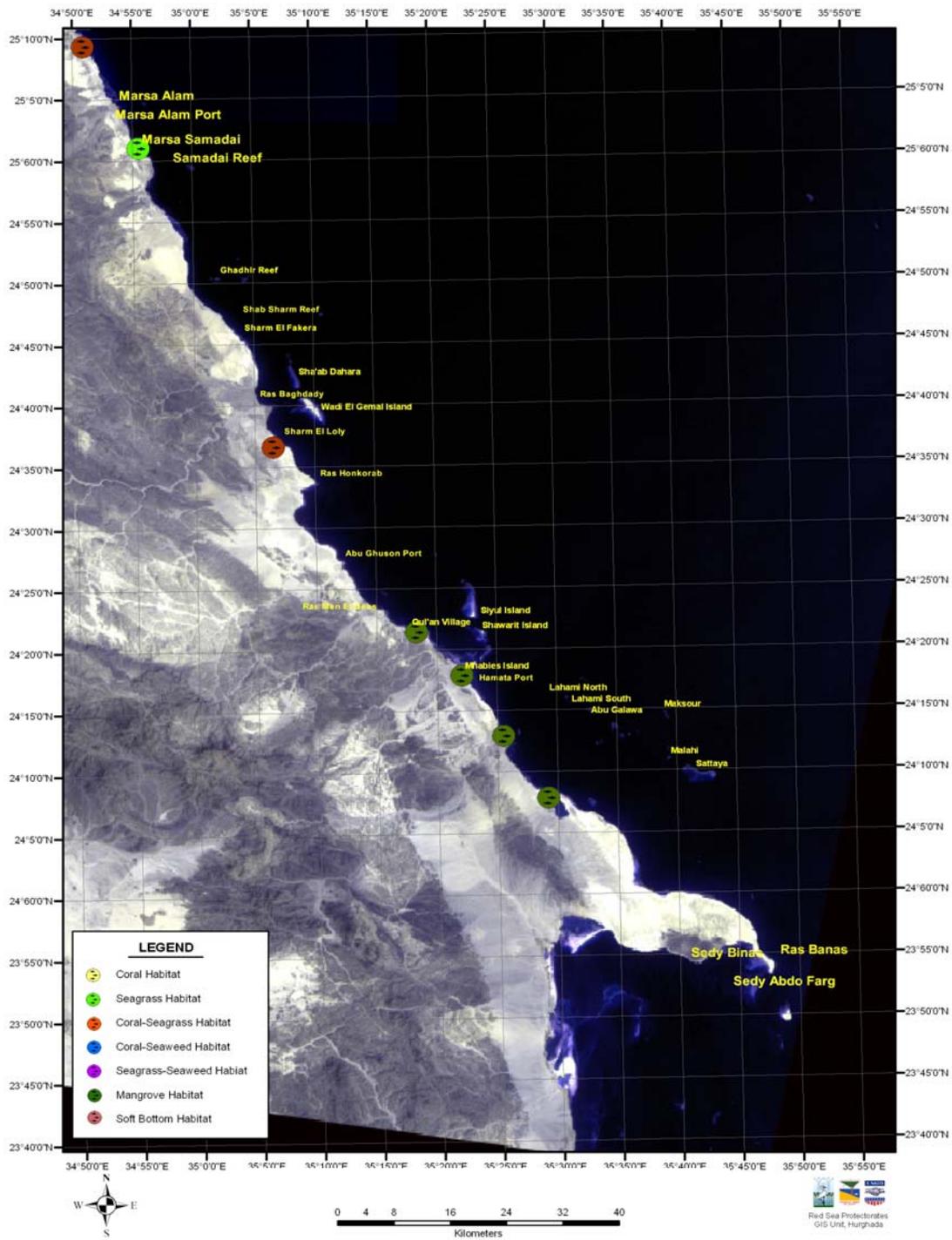


Fig. 10. Highly valuable fish nursery grounds within the CMA, 2003

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Fig. 11. Monitoring of the nesting beaches of marine turtle was one of the most important RSP ranger's activity during 2003.

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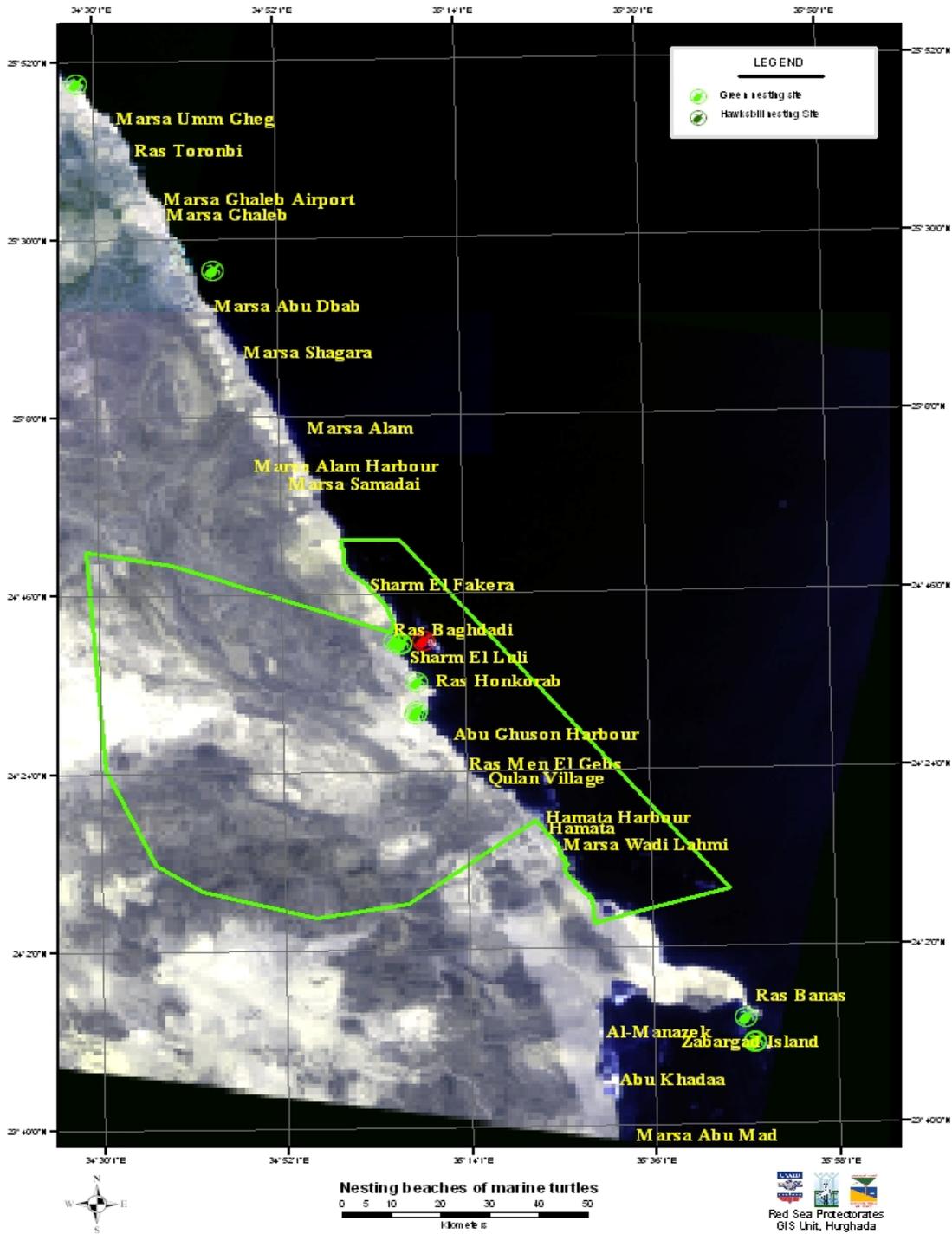


Fig. 12. Marine turtles nesting sites along the shoreline of the CMA.

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Fig. 13. Spinner dolphin population in Samadi Reef (Dolphin House), an effective site specific management plan was implemented By RSP

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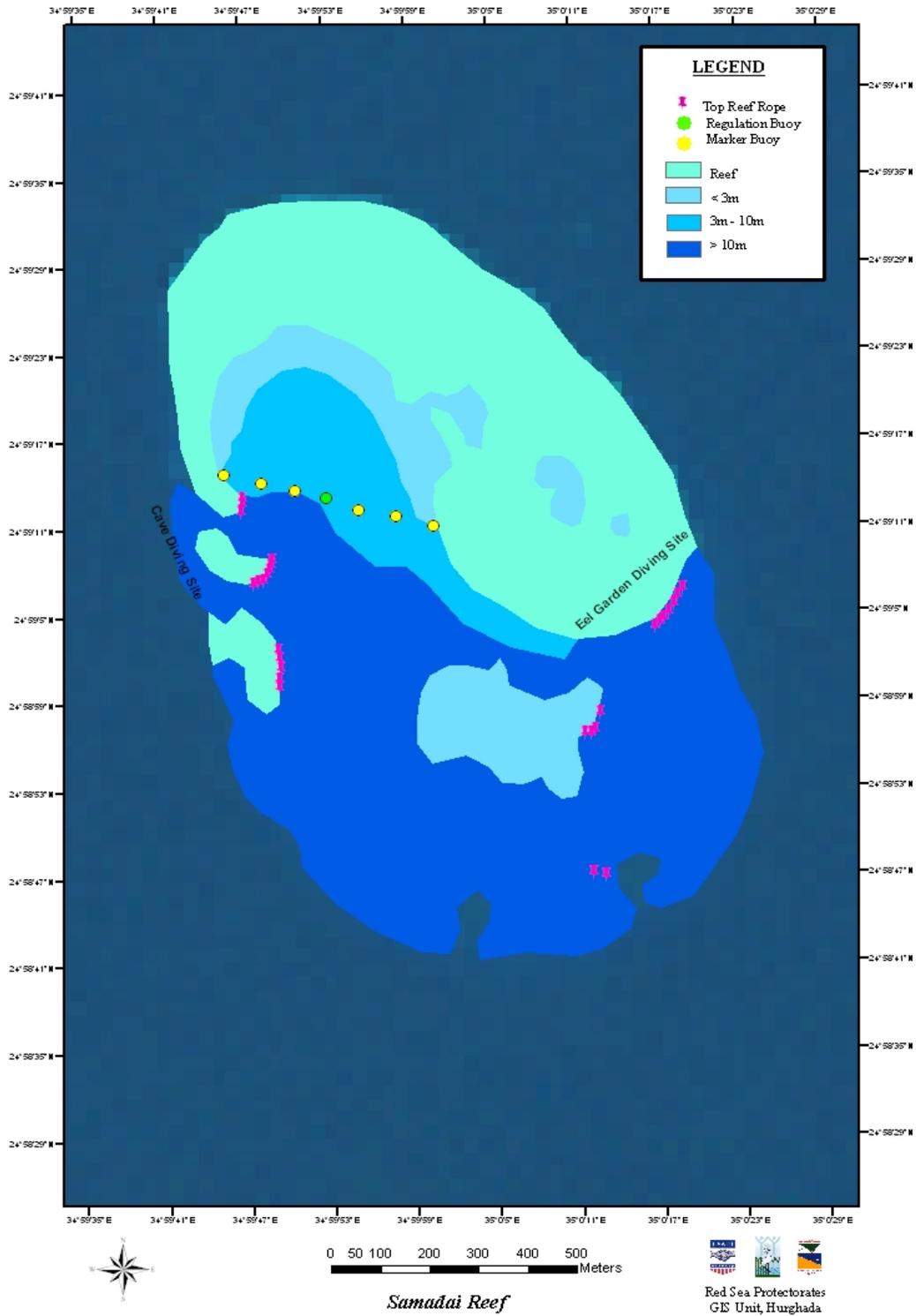


Fig. 14. Map of the Samadi reef (Dolphin House)

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Fig. 15. Dugong populations as threaten species are sighting along the coast of the Red Sea

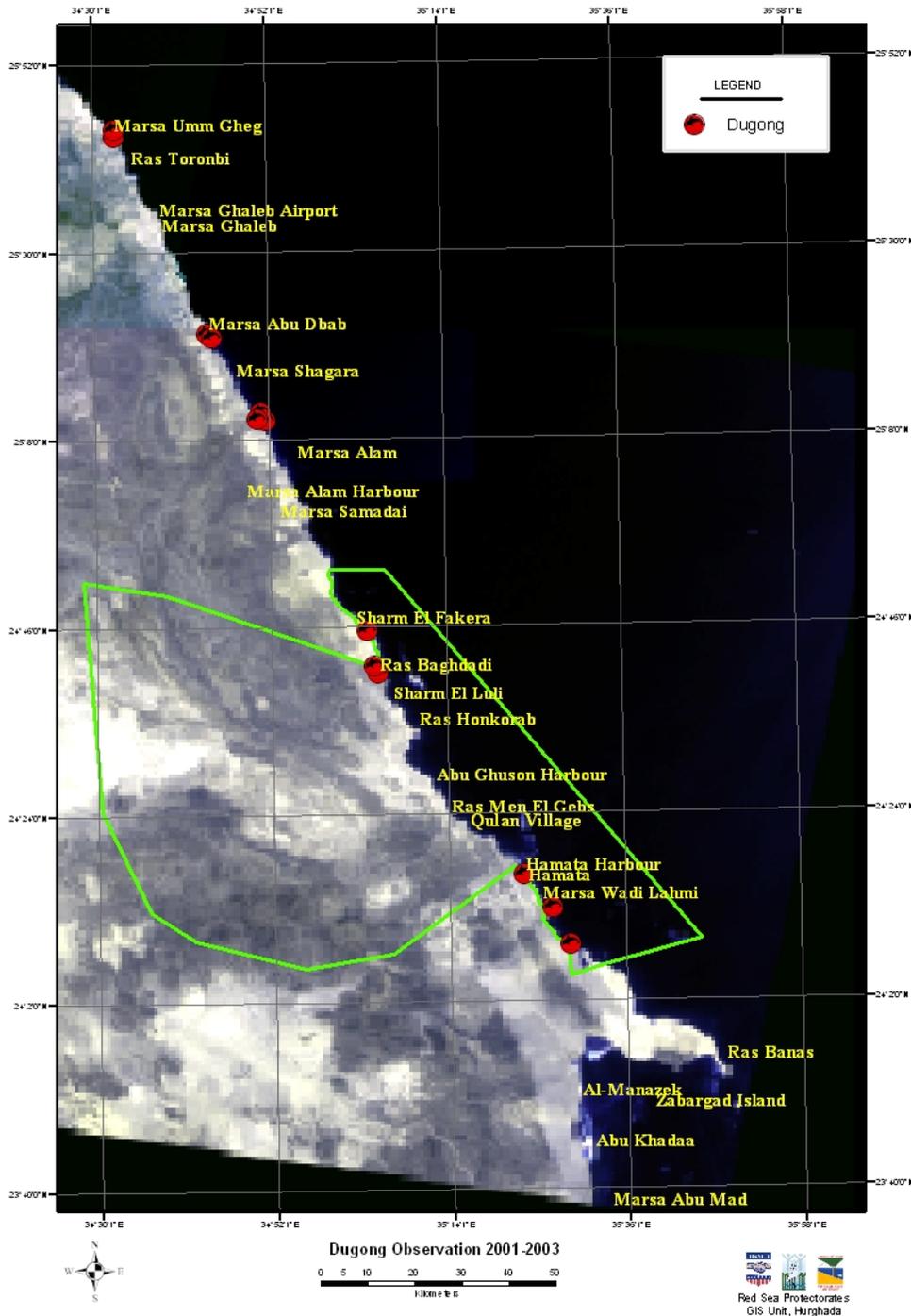


Fig. 16. Sighted locations of Dugong in the CMA

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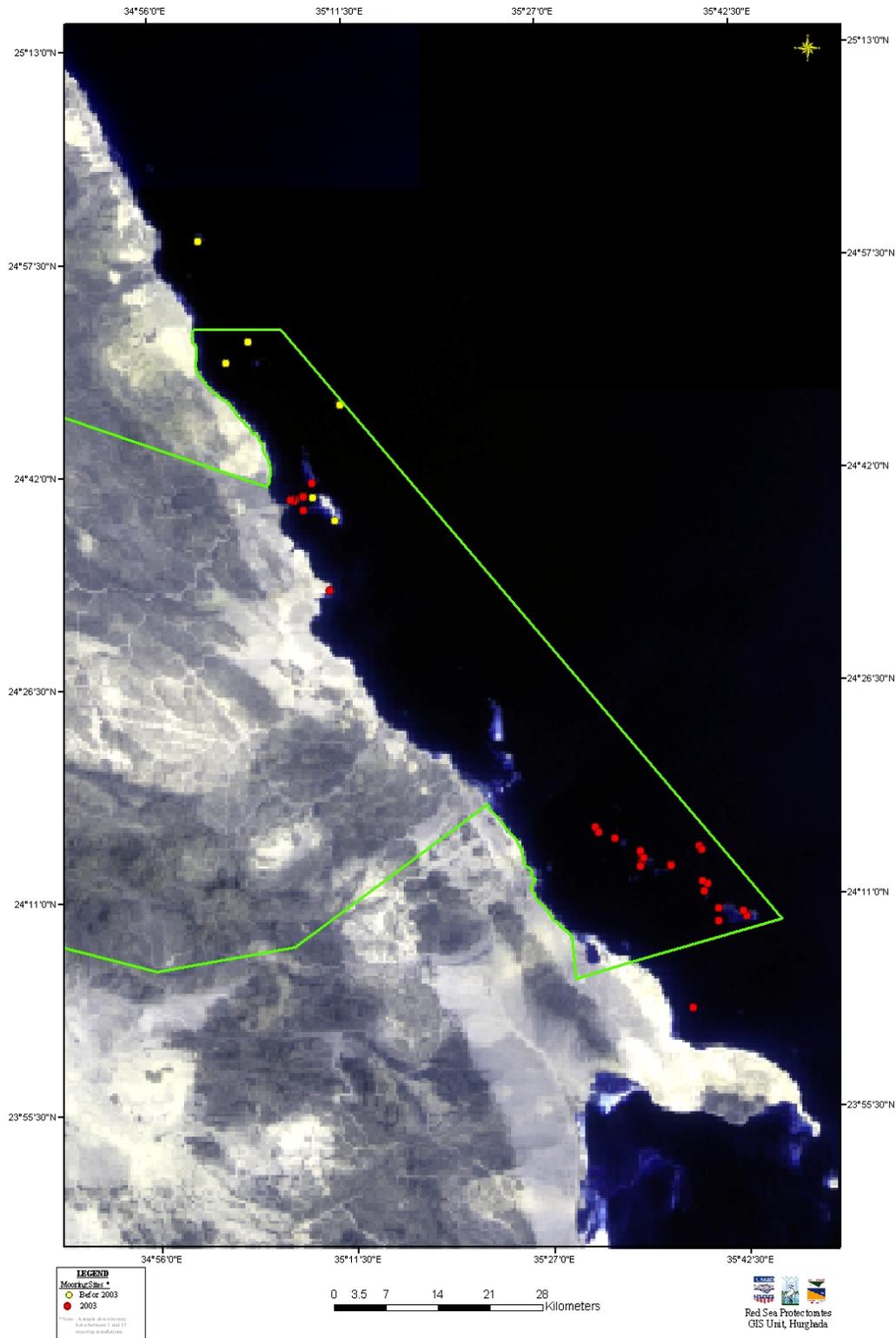


Fig. 17. Mooring installed before and after 2003, in the CMA