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Final Report

from the

Hurghada Field Office

On Program Activities From

January 1998 to August 1999

VOLUME 1 of 2

Product of the USAID/Cairo-Funded Policy Management Group (PMG)'s Program

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PMG FINAL REPORT FROM HURGHADA ACTIVITIES

Executive Summary

I Setting

The USAID Policy Management Group (PMG) program was a 20-month funding- and operational-bridging mechanism between two other USAID/Cairo projects separated in time The PMG program ran between the Environmentally Sustainable Tourism (EST) Project which ended in December 1997, and the Egyptian Environmental Policy Project (EEPP) which began September 1st 1999 The Environmentally Sustainable Tourism Project had among its primary objectives to support the Egyptian Environmental Affairs Authority (EEAA) in opening a new field office in Hurghada for its Nature Protectorates Unit and to support the installation, maintenance and use of more than 300 mooring buoys to protect the coral reefs of the Red Sea Primary objectives of the PMG Program were to continue and expand support for the expansion of the ranger's operations in the Red Sea, to manage the installation and maintenance of the existing and an expanded mooring program to increase the capacity of the rangers through training, to procure additional equipment for the expanded ranger program to provide additional advice and technical support to EEAA Protectorates Unit and HEPCA as requested and to assist in the preparation of documents and workshops that would lead to the Declaration of the Great Red Sea Marine Park The Hurghada PMG staff consisted of one ex-patriate ¾-time consultant as Red Sea Marine Park Advisor, 3 Egyptian professional support staff and 2 addition administrative support staff The PMG staff had no authority or direct supervisory responsibilities for the EEAA Red Sea offices, staff or activities, but were responsible for supporting the EEAA operations when asked, for providing technical and policy advise, and for maintaining the office premises and equipment in addition to the tasks summarized above The major accomplishments of the PMG Program are summarized below and presented in more detail in the main report

II Rangers' Operations

Under the PMG Program the number of rangers stationed and supported in Hurghada and Quseir increased from 3 men in Febraury 1998 to 9 men in August 1999, totalling 11 EEAA Staff when the two skippers are included This expansion has pleased EEAA, as the Minister of Environment announced in September 1999 that the Red Sea Program is successful, and that she has authorized the further expansion of the program to 20 Rangers with recruiting to begin immediately In 1998, the Rangers' headquarters were moved to a larger facility on the Corniche in Hurghada and a new headquarters was opened in Quseir with staff and equipment The rangers in Hurghada executed a marine patrol approximately 184 out of 244 days between January 1999 and the end of August 1999 The purpose of the patrols include monitoring the use of the mooring systems, and monitoring for compliance with Law 4 and Law 102 Additional procurement of $120 000 was completed in support of the Rangers field operations, including 2 new vehicles a small boat with an engine and air compressor for use on field missions, office computers, building signs cameras and SCUBA equipment Training included sending 2

Rangers overseas (Australia) for short courses, and providing a continuous program of water and scuba skills to develop and enhance the abilities and safety of the rangers in addition to developing the design of an extensive training program to be implemented independantly under the USAID Development Training II Program A Safari Program for controlled recreational diving access to the Red Sea Islands was developed in collaboration with the Red Sea Governorate, resulting in a total of 65 new diving safaris to the islands in one year, carrying more than 1000 visitors, generating an income to the Environmental Fund of almost $40 000 Other miscellaneous activities were also supported by the PMG Program, including obtaining underwater photographic evidence of boat accidents reviewing an Environmental Impact Assessment, maintaining the boats and vehicles for the EEAA Red Sea Program, managing all of the Red Sea building facilities for the Rangers, and providing administrative support for drafting and translating of documents, telephones, and petty cash, etc

III HEPCA and the Moorings Program

With the support of the USAID PMG Program, HEPCA as an organization has become more organized and has begun expanding its activities outside of the mooring program HEPCA has received another USAID-supported grant to promote environmental awareness, continues to publish a regular newsletter, and is involved in several local marine-related committees The Executive Director of HEPCA was sent to the USA for a short-term training program for NGOs, and the staff have received follow-up training on mooring-installations and are involved in a set of computer-training classes administered under the DT2 Project but facilitated by the PMG program As of the end of the EST and PMG projects, there were 500 moorings installed at more than 100 dive sites in the Red Sea, stretching from El Gouna down past the Marsa Alam region, and including the five far offshore islands Almost 60% of those moorings were installed during the last 20 months of the PMG transitional project Some of the original EST inventory of mooring hardware remains although most of the reef-top hardware has been deployed This mooring system is the largest system operated under a single jurisdiction and management in the world The HEPCA Technical Team, under the USAID contract has installed and maintained the system with close coordination and approval from EEAA This has included more than 7000 documented visual inspections of the moorings (from the boat or in water) with subsequent maintenance work, as needed A detailed ACCESS (PC) database of the work was created that enabled HEPCA and USAID to make cost projections and budgetary decisions, as well as assisting the Technical Team to plan their maintenance work In November of 1998 a Mooring Workshop was held in Hurghada to discuss the existing issues and the future of the Red Sea and National Mooring Programs, thereby providing EEAA with input and options for their decision-making on this issue Subsequent to the workshop, PMG staff prepared and presented EEAA with a more detailed 41-page mooring report with a complete background of the program, and specific workplan recommendations most of the latter which have since been accomplished

IV Coral Reef Monitoring Program

During the EST Project Phase (1996-97), a Rapid Underwater Assessment was executed at more than 40 reef sites being actively used for diving to assist in determining where the first mooring systems should be placed to maximize conservation objectives One aspect of the data collected, the ratio of hard coral-cover to soft coral-cover to other substrate-cover (named the Coral Reef Index), was calculated as an indicator for monitoring the coral status at popular diving sites A statistically significant subset of the sites (11 sites in Hurghada and 10 in Safaga) were re-monitored under the PMG Program in 1998 and the Coral Reef Index Ratios were compared Although the differences seen are within the natural variability of the reef ecosystem, most sites in Hurghada and Safaga indicated good news a slight increase or no-net-loss of the area covered by hard or soft corals between 1996 and 1998 In addition the invertebrate survey by Dr Kilada for EEAA was supported by the PMG, the repeated monitoring efforts of the British Marine Conservation Society were coordinated and their data acquired by EEAA and the project as was the work of other independent researchers

V EEAA Crown-of-Thorns Starfish Control Program

This activity in the Red Sea was supported signifcantly by the PMG program in 1998 and at a reduced level in 1999 Support in 1998 included providing divers, scientists and record-keeping for the field operations to collect more than 7500 animals and data, providing logistical coordination and support, analysizing the size-frequency data for more than 2000 animals collected, and developing numerous reports and recommendations on the issue at the request of the EEAA Protectorates Office In 1999 the PMG support was primarily policy-related, and in providing an experienced diver for 2 week-long safaris and numerous day-dives

VI The Declaration of the Great Red Sea Marine Park and Zoning

Several iterations of supporting documents for the justification and declaration of the Red Sea Marine Park were prepared by the PMG program at the request of the EEAA In September 1999 the Minister of the Environment announced that the Declaration of this Park is a priority of her agency and that the documents were ready within her agency to do so As a major step toward declaring and operating a larger Red Sea Marine Park, the concepts of zoning as a management tool were presented early in 1999 to the local stakeholders A two-phase Zoning Workshop (3 days in Feb 1999, 2 days in March 1999) was held in Hurghada to educate participants in the use of zoning, and to draft a preliminary zoning plan with inputs from the EEAA's and PMG's local staff and consultants Harrigan and Damon These results were presented informally to various Ministerial offices for discussions, resulting in a request for a second workshop at the Ministerial (or sub-ministerial) level to discuss these positive results for further action A sub-set of the results (a short overview paper and figures) was prepared for EEAA's presentation in Hurghada as part of their participation in the Governor s July 4th 1999 Symposium on Environmental Management in the Red Sea The follow-up workshop on zoning or resource allocation will likely be a priority under the new EEPP workplan

VII Other Major Accomplishments/Events

- In March 1998 the PMG Project developed, with the EEAA and the EU Sinai Project, the first joint field effort to install bow (front) moorings on the Far Islands and Southern Coast for the Opening of the Far Islands to diving safaris The PMG project provided recommendations to EEAA and the Red Sea Governorate in developing the Far Islands Diving Safari Program, and supported the Inauguration Ceremonies for the Opening of the Far Islands event on May 31st This Safari Program is generating the only non-penalty income, at present, from the Red Sea EEAA Program
- In February 1999, after the completion of the Global Environmental Facility (GEF)'s Red Sea Coastal Resources Management, the PMG Program gained access to and added to the GIS (Geographic Information System) database created by the GEF Project This information was used to create and amend maps and figures for the Zoning Workshop
- All of the maintenance and repair of the SCUBA equipment, boats, cars, computers, office equipment, headquarters facilities and other field equipment is and has been supported completely by the PMG project and its staff
- In July 1998 the PMG hosted the U S Ambassador Daniel Kurtzen for a one-day visit to the project, including a meeting with the Red Sea Investors and a snorkeling trip out to Giftun Island
- In the Fall of 1998, the PMG provided logistical support for the visit of USAID Sally Sheldon and Madame Minister of the Environment to Hurghada to visit the Rangers' program

VIII Structure of this Report

This Hurghada-portion of the PMG Final Project Report consists of a summary of the various components of the project (Rangers Operations, HEPCA and the Mooring Program Coral Reef Monitoring, Crown-of-Thorns Starfish Control Program, and the Declaration of the Red Sea Marine Park and Zoning), supported by Annexes that contain most of the program details in tabular form with text or as independent reports

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ANNEX 2	*PMG Procurement and Operations Budget Inventories*	
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ANNEX 3	Summary of Water Skills Training for Red Sea Rangers	
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ANNEX 5	*HEPCA Member Newsletters and News Briefs*	32 Pages
ANNEX 6	*Mooring Reports and Summaries*	
6A	*Summary of the Number of EEAA Red Sea Moorings*	1 Page
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ANNEX 7	*1998 Monitoring Report and Coral Reef Index*	
7A	*Summary of Monitoring Surveys Completed*	9 Pages
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7C	*Full Report & Data from the 1998 Reef Monitoring Program*	47 Pages
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ANNEX 8	*Reports and Data from the Crown-of-Thorns Starfish Program*	
8A	*Compiled Field Reports and Briefing Papers*	18 Pages
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PMG FINAL REPORT FROM HURGHADA ACTIVITIES

MAIN REPORT

I Introduction

A *Background*

The Egyptian Red Sea Coast, located principally within the Red Sea Governorate stretches without dispute along more than 800 km from Ras Zeit in the north to Ras Banas in the south, and for an additional few hundred kilometers along a disputed Sudan border to the south This area has grown rapidly during the last decade, and is the focus for major economic development with Egypt Less than 10 years ago Hurghada, the major village along the coast, consisted of a fishing village and fewer than 3 hotels Hurghada is now one of Egypt's major cities, boasting an international airport, more than 200 daily diving-boats, more than 130 hotels (many that either filled or excavated their natural shoreline and fringing reef), and a large tourism-based economy This region is still expanding, particularly to the south, centered around the undeveloped coastline and the new Marsa Alam airport now under construction Until 1997, EEAA Protectorates had no presence in the Red Sea Governorate except for the shared environmental staffer in the Red Sea Governorate offices Until 1998, there were no fees collected in the Red Sea by the EEAA Protectorates except for violations This gap was a focus of the USAID supported-program in the Red Sea

B *The EST Project*

The Environmentally Sustainable Tourism (EST) Project (1996-Dec 1997) was a "pilot project" to try certain aspects of a conservation support program within the Red Sea Governorate in partnership with the Egyptian Environmental Affairs Authority's Nature Protectorates Unit and the Tourism Development Authority It also had as an objective to more fully assess the policy and other needs for a proposed USAID project that would include sustainable tourism activities Most of the EEAA Protectorates activities under this project were defined by a Memorandum of Understanding between USAID, EEAA Protectorates and HEPCA The EST Project operated out of a small office in Hurghada (in the Marriott Hotel) with a small staff The Project had among its primary objectives to support the Egyptian Environmental Affairs Authority (EEAA) in opening a new field office in Hurghada for its Nature Protectorates Unit supporting 4-6 rangers, and to support the installation, maintenance and use of more than 300 mooring buoys by HEPCA for EEAA to protect the coral reefs of the Red Sea The EST Project implemented and supported a number of TDA activities regarding ecolodges, best practices for developers and other topics and provided organizational development assistance to the non-governmental organization HEPCA The EST project also implemented a Rapid Underwater Assessment and a collection of first-order baseline data on the status of the coral reefs for installing moorings and monitoring their effectiveness in reducing the destruction of the reefs The EST Project was completed in December 1997 and a twelve-volume report was prepared and submitted from that project Many of

the PMG Hurghada-based activities were a continuation of the EST Project s operational activities until the new project, EEPP was to be initiated

C *The PMG Program*

The USAID Policy Management Group (PMG) program was effectively a 20-month funding- and operational-bridging mechanism between two other USAID/Cairo projects (EST and EEPP) separated in time It was funded by a number of incremental modifications of an original short-term project Its activities began in Janaury 1998 and were completed at the end of August 1999 The Egyptian Environmental Policy Project (EEPP) began in September 1999 This report attempts to summarize the elements of the Hurghada-based activities of the PMG Program

Among the primary objectives of the PMG were to support the existing activities and expansion of the ranger's operations in the Red Sea, to manage through HEPCA the installations and maintenance of an expanded mooring program to increase the capacity of the existing and increasing numbers of rangers through training, to procure additional equipment for the expanded ranger program to provide advice and technical support to EEAA Protectorates Unit and HEPCA as requested, and to assist in the preparation of documents and workshops that would lead to the declaration and operation of the Great Red Sea Marine Park The activities were defined by an iterative workplan with USAID, HEPCA and the EEAA Protectorates Unit The only written agreement guiding HEPCA was the original Memorandum of Understanding executed under EST Memos and single-page signed workplans governed necessary changes in the program such as the sharing of responsibilities between EEAA, EU, HEPCA and USAID regarding the installation of moorings at the Far Islands Due to the indefinate duration of the bridging program, a consistant and regular reporting system was not fully implemented throughout the program period Reports on the status and progress of activites were submitted in multiple forms including a number of weekly or bi-weekly briefs to USAID 6 monthly reports (1998-99) directly to EEAA, individual activity reports (Monthly Mooring Reports, Workshop Reports, Crown-of-Thorns Collecting Reports Trip Reports, etc), quarterly reports and through numerous meetings and written correspondence with the counterparts

The people involved in the PMG/Hurghada-based elements of the program included PMG staff Cairo and local governmental counterparts (primarily from the EEAA Protectorates Office), HEPCA, the Red Sea Investors and other Hurghada private sector stakeholders The Hurghada component of the PMG included a staff of one American ex-patriate as the Red Sea Marine Park Coastal/Advisor (Dr S Tighe, 3/4 time non-resident, Feb 1998-Aug 1999) three Egyptian professional staff (Dr H Mansour, Marine Scientist, Jan – Dec 1998, M Habib, Water Skills Trainer and Operations Manager, Oct 98-Aug 99, and S El Halawani Office Manager, Jan 1998-Aug 1999) It also included 2 Egyptian support staff one project driver (A Kamal) and one office assistant/janitor (Samir A) This field unit reported to the Natural Resources Manager (N Winer) and the Chief of Party (various) of the PMG office in Cairo Principle EU and EEAA counterparts were Michael Pearson and Ahmed Shehata in Cairo A Jeudy and O Hassan in Sharm el Sheik and the two Senior Rangers in Hurghada and Quseir A Afifi and A

Eliwa The HEPCA counterpart was the Executive Director, C Yanny (Jan 1998 – Mar 1998) and H Tomoum (Apr 98-Aug 99) There were also various contacts with members of the Red Sea Investors Association individual operators of the hotels, diving centers, aquacenters and other private sector representatives (fisherman, boat skippers boat owners, marine businesses, etc) Occasionally, there was direct contact with the offices of the Red Sea Governor, the Mayor, TDA/Cairo and TDA/Hurghada and other relvant stakeholders

D The GEF Project

Running simultaneously but separately with many of the same stakeholders as the USAID projects was the Global Environmental Facility's (GEF's) Red Sea Coastal Zone Management Program Initiated in the mid 1990s, but not completed until September 1998, this was a World Bank-sponsored project that generated a number of activities in Hurghada and within the Red Sea, as well as produced a six-volume set of Reports and a GIS (Geographical Information System) computerized mapping, sociological and ecological database The GEF Project included over 70 sampling stations along the coast with marine ecological transects, reef and mangrove maps, other flora and fauna inventories and distributions, a Reef Recreation Management Plan, a Marine Protected Area Plan and a Coastal Zone Management Plan The PMG program coordinated with the GEF managers and consultants wherever possible The PMG program was also given access to this GIS database to create and amend maps and figures for the Zoning Workshop The GEF Project also is supporting two civil works buildings, one in Hurghada for EEAA Administration and one in Quseir for a TDA Visitors' Center, now under development

E Structure of this Report

This Hurghada-portion of the PMG Final Project Report consists of a summary of the various components of the project (Rangers Operations, HEPCA and the Mooring Program, Coral Reef Monitoring, Crown-of-Thorns Starfish Control Program, and the Declaration of the Red Sea Marine Park and Zoning), supported by Annexes that contain most of the program details in tabular form with text or as independent reports

II Support for the Rangers' Operations

With the support of the PMG Program, the EEAA Red Sea Protectorates expanded in manpower, facilities, equipment, skills and experience The number of rangers stationed and supported in Hurghada and Quseir increased from 3 men in February 1998 to 10 men in August 1999, totalling 11 EEAA staff after the two skippers are included (in August, one ranger left the program, bringing the total down to 9 rangers) Five of the 7 new rangers were fresh recruits and trained by the existing staff of rangers, 2 were moderately experienced rangers (1-2 years) re-assigned from the Sinai In May 1998 PMG supported the opening of a new EEAA Protectorates headquarters in Quseir To accommodate the increase in rangers to increase the visibility of the EEAA Headquarters and to facilitate better PMG-EEAA coordination the PMG program also supported and implemented a

move of the EEAA Hurghada headquarters in July 1998 from a small flat off of the main road to adjoining office space with the PMG staff in a larger building on the Corniche in Dahar Indicative of the positive results of the larger ranger corps and the support from USAID the Minister of Environment announced in September 1999 that the Red Sea Program is successful and that she has authorized the further expansion of the program to 20 Rangers effective immediately

The Red Sea rangers executed a marine patrol approximately 184 out of 244 days between January 1st and August 31st, 1999 The purposes of the patrols include monitoring the use of the mooring systems and monitoring for compliance with Law 4 and Law 102 Additional boats were leased for monitoring activities, accident investigations and other objectives Additional procurement of $120 000 was completed in support of the Rangers' field operations including 2 new vehicles a small boat with an engine, computers, building signs, cameras and SCUBA equipment Training support included sending 2 Rangers overseas (Australia) for short courses, and providing a continuous program of water and scuba skills to develop and enhance the abilities and safety of the rangers, in addition to developing an extensive training program to be implemented independantly under the USAID Development Training II (DT2) Program A safari program to control recreational diving access to the Red Sea Islands was developed in collaboration with the Red Sea Governorate, resulting in a total of 65 new diving safaris to the islands within a year that carried more than 1000 visitors, generating an income to the Environmental Fund of almost $40,000 Other miscellaneous activities were also supported by the PMG Program, including obtaining underwater photographic evidence of boat accidents, reviewing an Environmental Impact Assessment, maintaining the boats and vehicles for the EEAA Red Sea Program and providing administrative support for drafting and translating of documents, managing local workshops and meetings, managing the Ranger s headquarters building and facilities, and administering petty cash Details of the major elements follow

A Marine Patrols (See ANNEX 1)

For the most part, patrols were the daily priority of the Red Sea Rangers, weather or special events permitting The PMG's responsibility was to support this effort logistically and with advice when asked During 1999 a daily patrol sheet was usually filed internally by the rangers, or patrols were noted in the Senior Ranger's journal An informal log was also kept by the PMG staff in the office journal A summary of the January to August 1999 patrols is presented in ANNEX 1 This was compiled from the two sets of logs since there were a few discrepancies The rangers noted that their record was approximately 75% accurate, as record keeping between shifts was not consistant The PMG/EST journal entries, which had patrol notations for approximately 20-40% of the days, were included in the Annex primarily if there was a difference between the logs

There was a marine patrol from Hurghada for 164 days (67%) out of 244 days reported in 1999 Most of the patrols were done in the 6 8 meter Rigid Hull Inflatable boat (RHIB) named MOLLY 1 (84%), and there is only one reported use of another boat rented for patrol during this period Even if both boats were working the skipper s preference was for Molly 1 For the 80 days when there was no patrol reported the reasons (in

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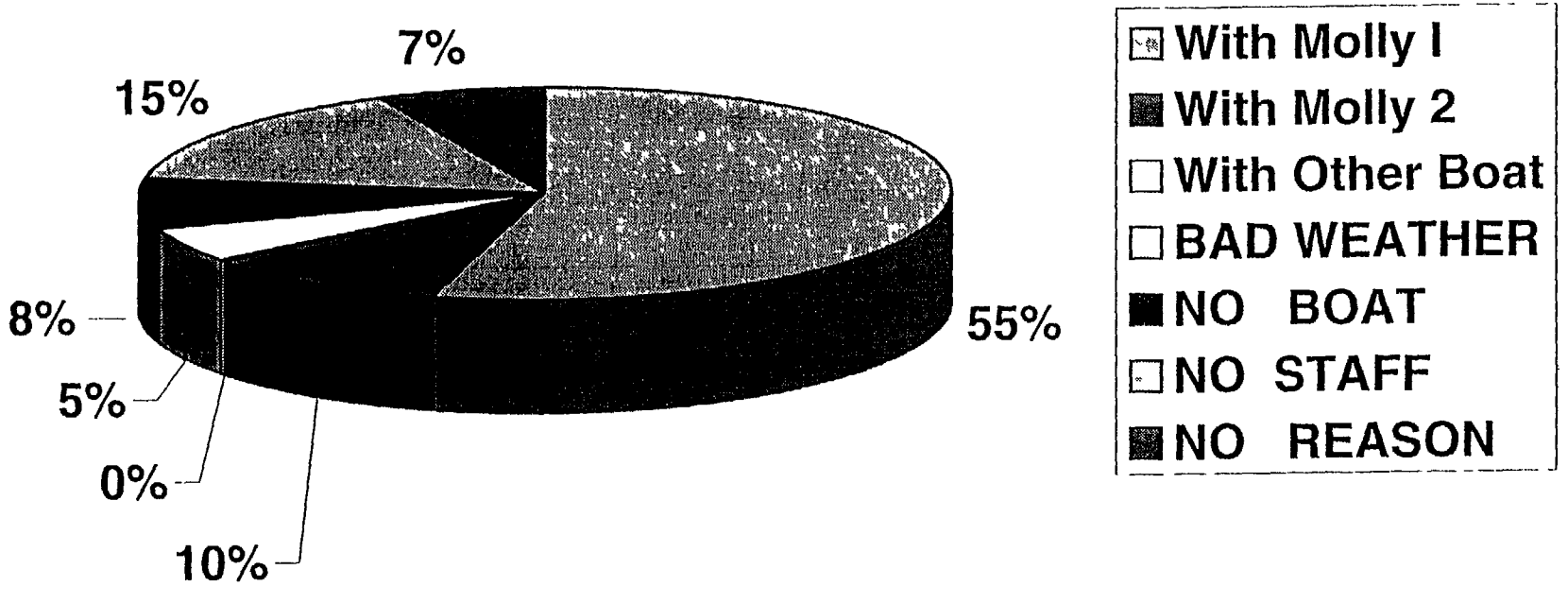
FIGURE 1. Summary of 244 Days of Marine Patrols (Jan – Aug 1999) in Hurghada Percentage of days spent on patrol with Molly 1, Molly 2 or another boat, and the percentage of days with no patrols due to bad weather, lack of a patrol boat, lack of staff and for no reported reason



descending order of frequency) were lack of ranger staff (38%), lack of a patrol boat (25%), unreported reasons (21%) and bad weather (16%) (Figure 1)

RECOMMENDATION

Now that there are more than two years experience in the Red Sea Protectorates operations, it is recommended that a more formal and consistant record be collected of operations enabling the EEAA managers to determine the primary causes of missed patrols, staffing levels and tasks, and corrective actions (different boats, more staff improved maintenance program etc)

B Procurement (See ANNEX 2)

Under the original EST program the procurement for the Red Sea included major purchases to establish the office and operations of the new headquarters, including vehicles, boats, SCUBA equipment and more It also supported all of the mooring hardware and services Under the PMG, the procurement was likewise extensive considering the bridging nature of the activity These procurements included a) items purchased for the direct use of the EEAA Rangers b) items used by the EST and PMG Project staff (desks, computers, etc), c) items items purchased in the USA for the mooring program that belong to EEAA but reside presently with the HEPCA Technical Team, and d) items purchased in Egypt for HEPCA that are retained by HEPCA

This budget included operational support for purchasing major items of equipment as well as small items and consumables Approximately $120 000 was budgeted for EEAA Procurement approximately $139 000 for EEAA Ranger Operations, and approximately $208,000 was budgeted for the Mooring Support Program (implemented by HEPCA) Examples of some of the major items procured under PMG include the purchase of 2 new vehicles, additional SCUBA and photographic equipment for 4 additional rangers, office equipment for a second ranger s headquarters in Quseir, a smaller inflatable boat with an engine and an air compressor for use on field missions, VHF radios to monitor boating activity in the area, and injection guns to control Crown-of-Thorns Starfish Smaller items and consumables acquired under the budget included all the film and processing for the rangers' field operations, fuel for the rented vehicles, rented cars, office supplies, maintenance on equipment, etc The major items still in inventory from the EST and PMG projects are summarized in the following annexes

- ANNEX 2A is a summary of the money allocated and spent under the PMG program for EEAA and HEPCA Procurement and Operations
- ANNEX 2B is a summary of the major inventory from both projects that belongs to EEAA and the PMG operation, including mooring hardware, (i e items classified as a) through c) above)
- ANNEX 2C is an inventory of the major EST and PMG items purchased in Egypt for HEPCA that will remain with HEPCA (i e items classified as d) above)

The inventory lists were complied from the PMG s Financial Advisor s inventories from inventories made and verified of the ranger s field equipment in May and June from an inventory made and verified of HEPCA s storage container and boat made in May 1999

and the inventory of office equipment kept in PMG/Hurghada The inventories of EEAA/PMG furniture, of household items and of the HEPCA office items were not verified this year The inventory lists are estimated to be 90% accurate or better

RECOMMENDATION

The growing list of inventory, the rotation schedules of the rangers, and the frequency that items move or are out of service for maintenance/repair makes it difficult to track the inventory manually It is suggested that a simple off-the-shelf inventory-management program or a custom-made ACCESS Database program (written by Bob Cozens or an equivalent local contractor) be acquired and implemented The inventory-control program could be a local one for the Red Sea operations or one linked to an EEAA Protectorates' central program (once determined) It is also suggested that a single EEAA person locally become responsible for the daily status and location of the property

C *Training (ANNEX 3)*

Under the PMG/Hurghada program, training support included coordinating with USAID/Cairo's Development Training II (DT2) Project on a training needs assessment and early implementation, sending Egyptians overseas for short-term training courses, providing on-site training in water skills and diving safety, supporting English language courses for the Rangers and the HEPCA team, and providing on-the-job training for the rangers and HEPCA during regular working activities and when requested Details follow

DT2 SUPPORT and COORDINATION

PMG helped to facilitate the design and implementation of a major set of training activities under the Development Training 2 (DT2) Project which will include Protectorates staff, HEPCA Staff and other relevant counterparts as participants The Training Needs Assessment and Training Plan for USAID's objective that includes the PMG counterparts was completed and approved in Spring 1999 These training solutions will include numerous in-country short courses (e g , Professional Development, Computer Training, EIA training), 6 masters degrees (of which 3 are for Rangers), a US-study-tour and short course for an Egyptian team on Marine Protected Area Management and other similar activities Training under DT2 occurred throughout the PMG duration, but at a much smaller scale until the needs assessment and training plan were approved For instance, the Underwater Photography courses and the international short courses for the rangers and HEPCA were implemented under the DT2 Project At the conclusion of the PMG Program, DT2 Training implementation had begun to accelerate For example, a large Computer Skills Training Program began in the Summer of 1999 and will continue until the Spring 2000 - this includes many EEAA Protectorates staff (in Cairo, Sinai and Hurghada), HEPCA staff and other Red Sea counterparts as participants

OVERSEAS SHORT-COURSES

Marine Park Management The PMG/DT2 programs supported equitably and collaboratively with the EU Gulf of Aqaba Protectorates Program to send 2 Red Sea-based and 2 Sinai-based rangers to Australia in mixed teams during Nov-Dec 1998 Each team participated in a 1-week short course with other international marine managers

focussing on 'Elements of Tropical Marine Ecosystem Management' or on "Practical Approaches to Protected Area Management' This was followed by a specially-tailored 2-week study-tour for the pairs of rangers with the Great Barrier Reef Marine Park Authority and AIMS in conjunction with the International Tropical Marine Ecosystems Management Symposium (ITMEMS) Dr Tighe attended the ITMEMS sessions in December 1998 to learn and discuss information on Crown-of-Thorns Starfish control programs, coral reef monitoring programs marine park management plans and mooring systems from the 250 ITMEMS participants who are resource managers and scientists (November-December 1998) ***NGO Management*** H Tomoum, the new Executive Manager of HEPCA, participated in a 3-week short-course program on developing and running a non-governmental organization taught by the Institute for Public-Private Partnerships in Washington, DC (Aug 1998)

ON-SITE SCUBA AND WATER-SKILLS TRAINING

Once a new set of rangers arrived in Hurghada and had passed their probation period (approximately October 1998) the PMG Project hired a native Egyptian full-time water-skills and Master SCUBA instructor The Hurghada Red Sea Marine Park Advisor, with this instructor and the Senior Red Sea Ranger developed a monthly training schedule to accommodate the rangers' work and rotation schedules Since then, the Trainer has completed over 50 certifications for the rangers and skippers, including Open Water and Advanced Open Water SCUBA, Medic First-Aid, Diving Rescue (with M Shafai), Equipment Specialty, Deep Dive Specialty, and Peak Performance and Buoyancy Eight of the 10 EEAA Red Sea staff have completed a 2-day underwater photography course in Hurghada This skill-level is a pre-requisite for the rangers to be allowed to check out an underwater camera for an assignment Most of the courses are standard recreational diving courses under the guidelines of PADI (Professional Association of Diving Instructors) with added skills and dives required by the the Trainer and Advisor, in concurrance with the lead EEAA SCUBA trainer for the EU Gulf of Aqaba Program (M Shafai) Over the year, there were 3-14 (average 9) days per month of training in Hurghada The Trainer even taught one ranger to swim whose has now gone on and completed 2 SCUBA courses As the most experienced diver in the office, this member of the PMG staff significantly supported the rangers in their water-related field decision-making and field operations, and accompanied them as underwater photographer, during Crown-of-Thorns Starfish excursions, in moving the boats for servicing, etc Records for the training were kept primarily upon course completion, supported by the general office log and the Advisor's logs Therefore, the specific training dates reported in ANNEX 3 are approximate dates only, although reporting improved during the year of the training activity

- ANNEX 3A is a summary of the Training Status of each of the 10 rangers and 2 skippers that participated in the Water and SCUBA Skills training under PMG It indicates when each skill had been achieved by the Ranger or Skipper and whether it was supported by USAID/PMG or another source of training
- ANNEX 3B is a chronological summary of the 12 months of local training for water-skills and SCUBA

15

ENGLISH-LANGUAGE TRAINING

Various mechanisms have been implemented since Fall 1998 to teach English language to the new rangers This has included hiring a tutor, sending the Rangers to the local public language-training classes taught at the school, and purchasing training CDs and videos Some of the rangers will need to get better, more focussed language training by going to Cairo for a concentrated course Unfortunately, the standard courses offered by USAID are only a couple of hours per day over several months, so an alternate source of language training needs to be identified to minimize the ranger s time away from the Red Sea

ON-THE-JOB TRAINING

Short (one or two hours as required) training sessions were conducted on-the-job on an ad-hoc basis Of course the more experienced rangers trained the less-experienced in many aspects of the day-to-day work PMG training included, for instance, a seminar for Rangers by the Advisor on how to write reports, and a hands-on sessions for the rangers with Peak Marine on the operation, care and maintenance of the new inflatable purchased by the project for EEAA It also includes the frequent, ad hoc, weekly informational meetings and planning discussions between the Advisor, the lead rangers and the HEPCA Executive Director, or other various groups of counterparts For instance, the Advisor sat for several hours with HEPCA's Executive Director to coach him through a revision of a proposal that had been repeatedly returned Upon completion, the proposal was accepted with minor revisions and HEPCA is now near completion of the activity As another example, the Advisor discussed at length with the Senior Ranger various options and strategies for him to assign daily and weekly assignments for the rangers now that there were more staff becoming available than just those required for patrolling Numerous minor skills, from using EXCEL, to making computer back-ups, to creating useful forms for various purposes are transferred on a daily, weekly and monthly basis by all the PMG staff to HEPCA and EEAA local staff

RECOMMENDATIONS

- Now that the DT2 Program is approved, it is important to sit down with EEAA and the EU Protectorates Program(s) and EEPP to develop a strategy and specific training program that is coordinated with the other efforts and resources This could include the timing and sequence for the general set of activities, as well as a strategy for indivdual rangers or other counterparts Someone designated as the Training Coordinator from EEPP and from the EEAA Protectorates would be ideal For instance, should a short-course in coastal resources precede an international study-tour? How experienced should a new ranger be before they are sent overseas for training? Who will be the science rangers and who will be the outreach rangers? What is the preferred ratio of training-to-experience for rangers during different stages of their tenure with EEAA? Can the EU Gulf of Aqaba program train some people in Australia if we train some people in the USA?
- Continue (and expand to include other types of training) the Monthly Training Plan with local EEAA Staff to assure that the people who need the specific training scheduled will be on-site during that month

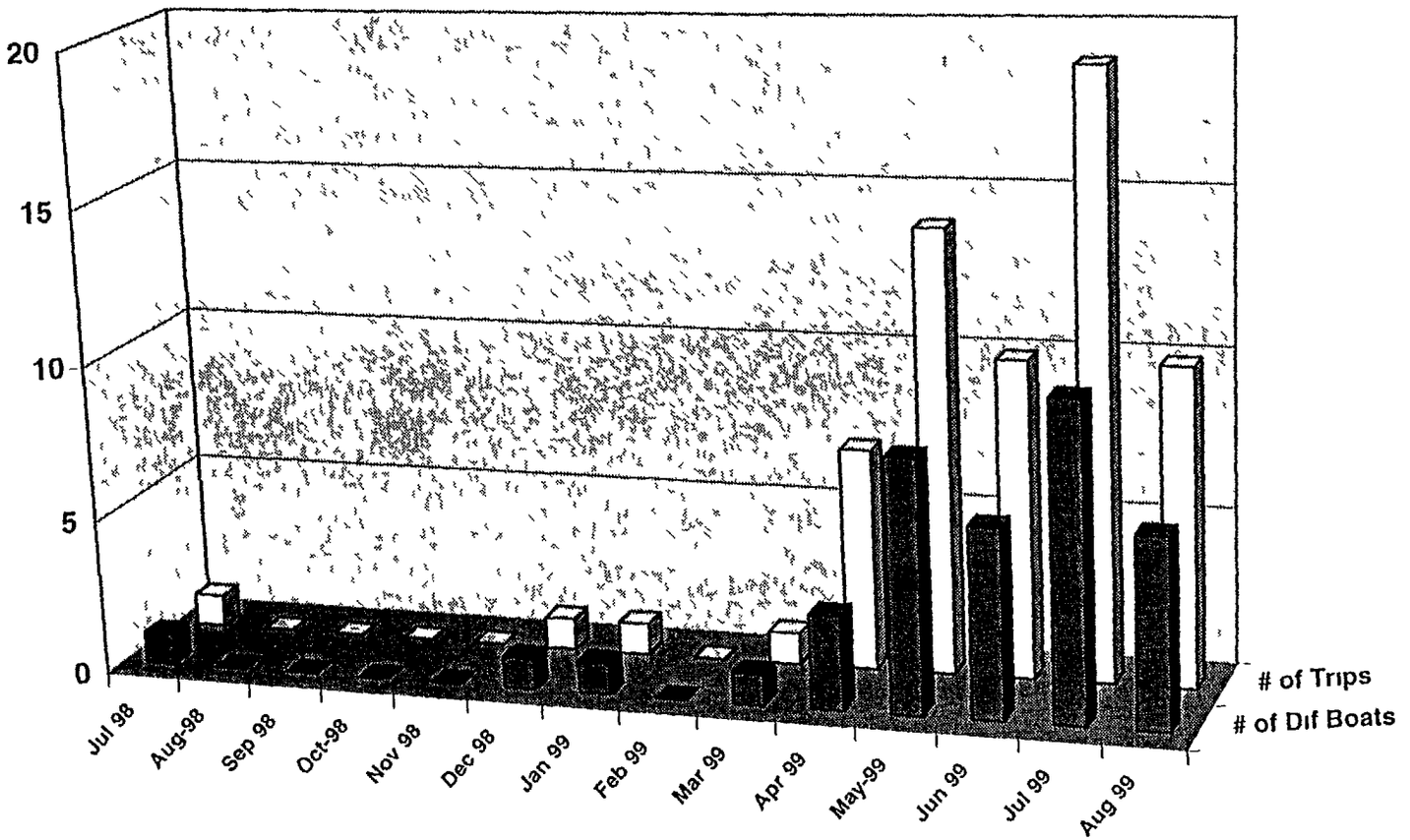
- Maintain the Water-Skills Trainer in Hurghada/Quseir as a Full-Time Position without additional operational tasks to his portfolio With 11 or more new EEAA staff joining the program (double the number trained last year), this is definitely a Full-Time role
- Train several of the Rangers to the level of Divemaster (make this a pre-requesite for leading a monitoring or COTS field task or safari) and a couple of rangers to SCUBA Instructor level From this more highly trained staff should emerge an EEAA Diving Supervisor either for the Red Sea or for EEAA Protectorates Central

D Far Islands Diving Safari Program (ANNEX 4)

In February 1998, EEAA requested USAID/PMG's assistance in establishing a mooring system on the Far Islands that were being re-opened to visitors and in establishing a safe and conservation-based diving safari program to the islands In March 1998, the PMG program developed, with EEAA and the EU Sinai Project, their first joint field effort to install bow (front) moorings on the Far Islands and Southern Coast for the Opening of the Far Islands to diving safaris The Marine Park Advisor lead a 14-day diving safari that included the 6-man HEPCA Technical Team, one EEAA Sinai Scientific Ranger, 1 EEAA Sinai Professional Diver and 1 EEAA Sinai Diver-Trainee This team installed 74 moorings throughout the islands and coastal safari route, and collected baseline ecological coral transects and quadrants A thorough, jointly-authored trip report was produced This safari was followed by a couple of shorter EU-led safaris with their professional divers to install large stern (rear) moorings for the larger safari boats and for overnight moorings The PMG program also provided multiple, iterative sets of recommendations to EEAA and the Red Sea Governorate during the development of the policies for the Diving Safaris to the Far Islands This included supporting the Inauguration Ceremonies for the Opening of the Far Islands event on May 31st, 1998

The implementation of the Safari Program was slow due to the strict permitting requirements of the office of Marine Transportation However, by the end of 1998 safaris were visting the islands, coordinated by the inter-governmental (with HEPCA) Safari Committee under the Red Sea Governorate's oversight Since the first safari in July 1998, there have been a total of 65 new diving safaris to the islands that carried more than 1000 visitors generating an income to the Environmental Fund of almost $40 000 Rangers accompanied almost every trip or convoy at the beginning, but now rarely go due to other duties and a growing trust between EEAA and the boat operators In the early months there were reports of numerous un-official (non-permitted) safari visits to the islands but this seems to have diminished as the official visits increase There are also reports of shark-feeding at one island site (a clear violation and a very dangerous practice) This reckless behavior is difficult to control without better on-site observation The safaris often do not leave in a group convoy since the demand for access is not as high as predicted, due in part to the somewhat industry-incompatible contraints of the program ANNEX 4A was compiled from 2 separate EEAA records and reports a summary of the timing and fees of the various safaris taken during the life of the PMG program FIGURE 2 indicates the growth in the frequency and number of safaris since the beginning of the program FIGURE 3 shows the monthly income received to the EEAA from the Far

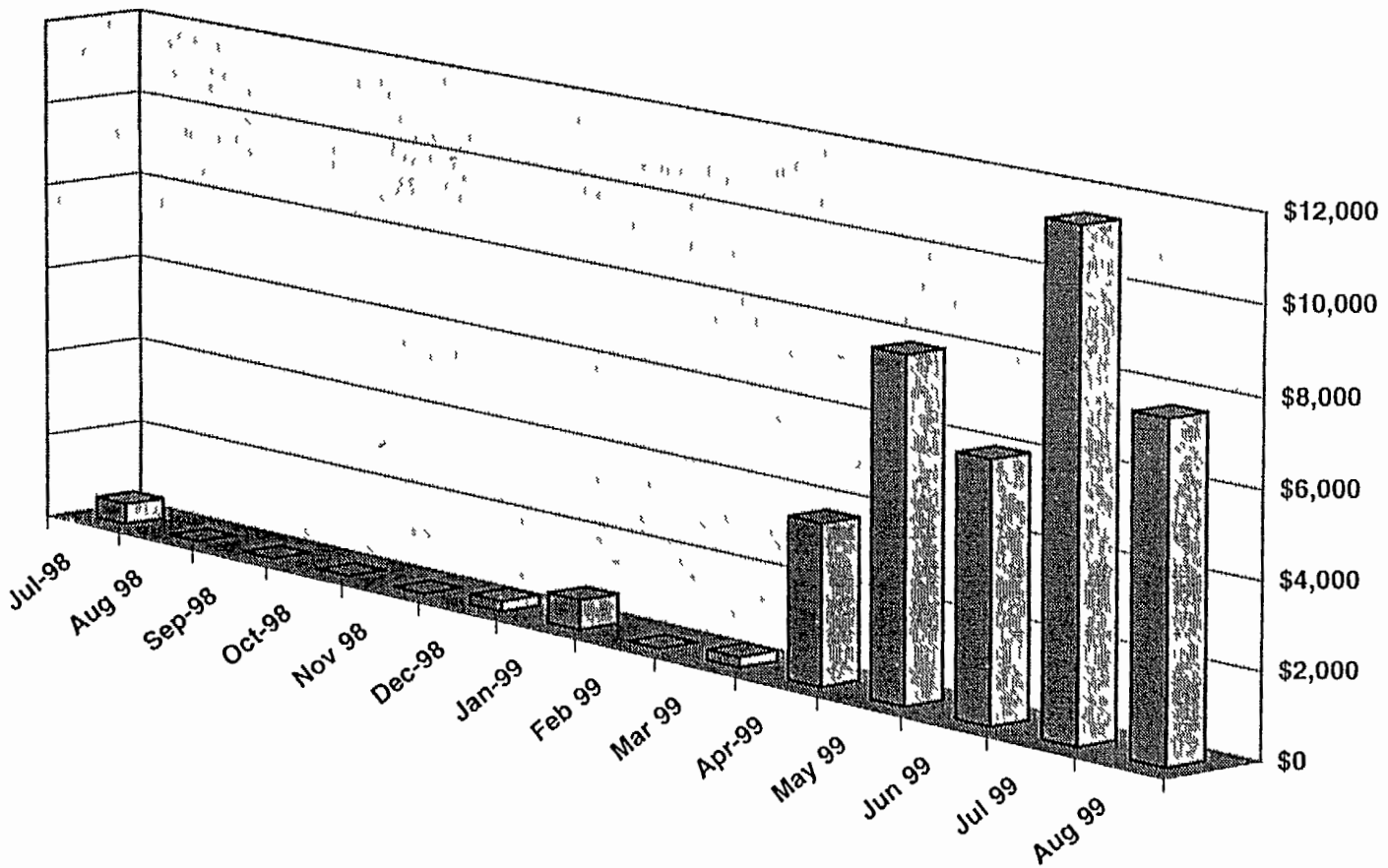
FIGURE 2 Summary of Frequency and the Number of Far Island Safaris from July 1998-Aug 1999 The frequency and the number of qualified boats increased rapidly over the observed months Sixty-five trips were completed officially, with fees, from a total of 12 different



ANNEX4 SafariTrips Chart1 Freq of Safaris

PMG/st Sep 99

FIGURE 3 Summary of the Income by Month Derived by the Far Islands Safari Program The Safari Program collected a total of more than $40,000 from the 65 trips made to the Far Islands during the PMG Program (average of $615/safari)



Islands Safari Program The PMG Program has had little input into the Safari Program once it was established

RECOMMENDATION

Now that there has been some experience with the Safari Program, we recommend that the program be evaluated and revised during the 1999-2000 winter months (there will be few if any safaris from January to April due to the factors of weather and low-season) If the safari operators are involved in a meaningful way, perhaps there would be ways to increase sustainable visits to the islands (thereby increasing income to the Environmental Fund) without increasing the governmental efforts significantly Options that could be re-discussed include safaris leaving from more than one location, a reporting requirement, structured industry assistance with maintaining the moorings, ranger versus island staff providing oversight, use of helipcopter or air overflights to monitor the program, environmental outreach (a brochure and Safari Video were proposed, outlined with initial design but were not budgeted under PMG), among others

E Other Activities in Support of EAAA Ranger Operations

The staff and program of the PMG also supported numerous other activities for the EEAA Red Sea Ranger program This support was both formal and informal in approach but was daily in frequency The PMG Office Manager (S El Halawani) and the support staff (A Kamel, S A) handled all of the daily requests for petty cash and procurement, for management of the Rangers' Headquarters in Hurghada and Quseir (office cleaning, rent, utilities, maintenance), for errands to purchase and process film, for renting vehicles or boats, maintenance on the vehicles, for logistical arrangements for consultants and visitors, conferences and workshops They also handled most telecommunications such as telephone answering and faxing, they copied and translated documents, and completed other routine office activities The Natural Resource Manager/Marine Scientist (Dr H Mansour, through Dec 1998) assisted in field operations until the Operations Manager was hired He also completed the field surveys and data reduction for the 1998 Coral Monitoring Program (described below), and the collections and database for the 1998 Crown-of-Thorns Starfish Program (described further below) The SCUBA Trainer and Operations Manager (M Habib, after Oct 1998) went on numerous field missions including Crown-of-Thorns Starfish collections and surveys, investigations of boat accidents routine patrols and scientific monitoring visits, he provided frequent liaison communications between the rangers and the diving centers and assisted in the maintenance and logistics of the boats and field equipment The Marine Park Advisor (Dr S Tighe) managed the Hurghada PMG support of operations completed a formal review of an EIA for EEAA, drafted memos and forms with and for the Senior Ranger on a regular basis, prepared numerous formal and informal status reports and drafted policy recommendations for the Rangers and EEAA/Cairo These tasks listed here are a sample of the efforts of the Hurghada-based PMG team in support of the Rangers

III HEPCA And the Mooring Program

A General HEPCA Activities (ANNEX 5)

The PMG was involved in two major activities with HEPCA (Hurghada Environmental Protection and Conservation Association) moorings and organizational development of the NGO Although HEPCA chose not to include their own summary of activities and progress in this report, copies of 11 of the HEPCA monthly member newsletters and two of the *HEPCA News in Brief* (the one-page excerpt published in the *Hurghada Bulletin* and *Red Sea Bulletin)* are included in ANNEX 5 For reference, the Newsletter from July 1999 has a brief summary of the NGO's activity in the previous 12 months Several major events or accomplishments for HEPCA outside of the mooring program (described below) were

- a change in the Executive Manager from Cary Yanny to Hesham Tomoum in March 1998, followed by the participation of H Tomoum in a 3-week short course on non-governmental organizational management taught in Washington DC August 1998,
- the contribution of HEPCA funds to the support of the Technical Team for the mooring program, reducing the USAID contribution by a small but symbolically significant amount,
- the inclusion of HEPCA on more than one inter-governmental committee that relates to the management of marine activities,
- the participation of HEPCA in the Crown-of-Thorns Starfish Control Program by donating collecting bags and sticks by helping to coordinate the participation of the diving centers and by participating in the COTS collection dives,
- the complete changeover of staff at HEPCA except for the Technical Team
- the graduation of HEPCA to the NGO status where it can apply for grants directly from Donor organizations,
- a series of very successful island clean-up programs that removed almost 10 tons of trash in 6 visits and
- the receipt of a grant from another USAID Project to provide introductory diving medical training and environmental awareness programs to the marine community and school children

In addition, HEPCA became involved with a number of new activities within the community, and survived a number of financial audits to verify the improved overall good standing of the books There was little long-range strategic planning and few organizational development activities completed with HEPCA and the PMG under HEPCA s new management, perhaps this will change when the middle-range future of HEPCA is clearer regarding its relationship to the mooring program that absorbed a great deal of priority and effort during the PMG program

B The Mooring Program (ANNEX 6)

At the end of the PMG project there were 500 moorings covering more than 100 dive sites in the Red Sea stretching from El Gouna down past the Marsa Alam region and including the five far offshore islands Almost 60% of those moorings were installed during the last 18 months of the PMG transitional project A significant amount of mooring line (10s of spools) and several USA-manufactured 18' diameter polyurethene

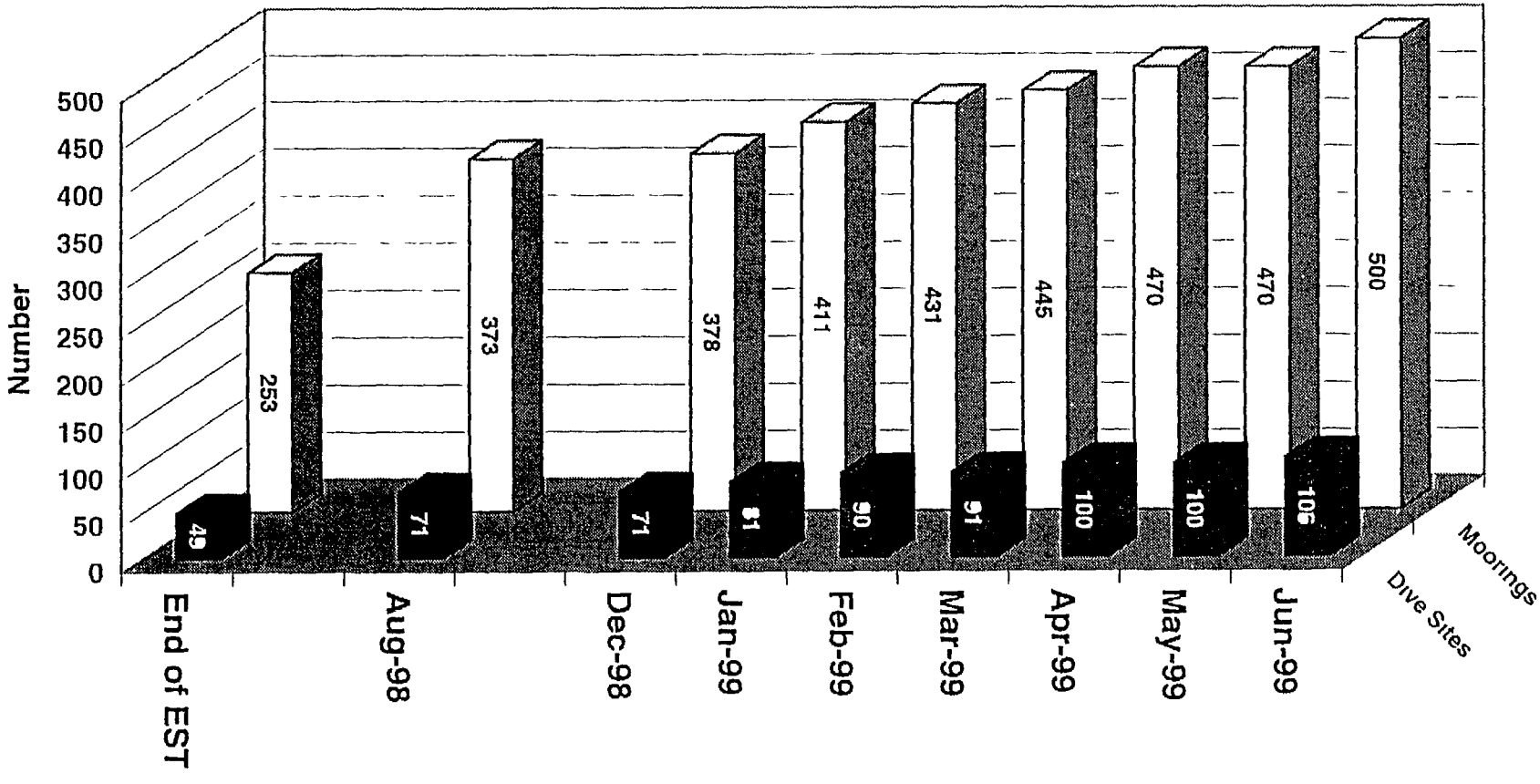
buoys and small manta rays remain in the EEAA-owned, project-managed inventory at the end of August 199 Most of the reef-top hardware has been deployed A summary of the new installations over time is included as an attachment (See FIGURE 4) This mooring system is the largest single system operated under a single jurisdiction and management in the world Even the Great Barrier Reef Marine Park Authority acknowledges that their mooring programs, run by the individual provinces, are smaller (300 or so moorings each)

The HEPCA Technical Team, under the USAID contract, has constantly maintained the physical mooring system This included more than 7000 documented visual inspections of the moorings (from the boat or in water) with subsequent maintenance work, as needed Each mooring required maintenance at different rates, depending on location and usage, varying from every 14 days to periods longer than a month Workplans were developed with the local Red Sea Rangers and with EEAA/Cairo, and a ranger was present, whenever possible, during installations In some cases, particularly in Safaga and the more distant moorings, a small group of diving centers and boat operators have volunteered and have contributed their efforts to maintain particular moorings A detailed ACCESS (PC) database of the work exists that has enabled HEPCA and USAID to make cost projections and budgetary decisions, as well as assisting the Technical Team to plan their maintenance work For instance, during the peak season (early August through the end of October), it is predicted that 30% of the moorings would be lost or broken per month without regular or full-time maintenance And although HEPCA and the rangers still receive occasional reports of moorings that need maintenance or replacement, the Technical Team can predict when most sites will need maintenance There are presently no fees collected by the Protectorate program related to moorings except possibly for diving safaris to the Far Islands The installation equipment has performed very well, but due to its age and condition, certain major pieces should be replaced to increase the efficiency and effectiveness of the mooring work A solid system is presently in place, the challenge ahead is how to maintain it, pay for it, expand it, and manage it under EEAA and with the Red Sea stakeholders

In November of 1998 a Mooring Workshop was held in Hurghada to discuss the existing issues and the future of the Red Sea Mooring Program thereby providing EEAA with input and options for their decision-making on this issue The participants included the owners of the mooring system (EEAA rangers and O Hassan), the teams implementing the mooring program (HEPCA and PMG staff), representatives from local government and the users (dive centers, boat owners and skippers) J Halas and W Harrigan participated as Technical Experts for the PMG program The outputs consist of several recommendations, options, and consensus on a number of topics related to the mooring program and its use Included topics are

- financing the mooring program,
- technology developments,
- codes of conduct,
- guidelines for using the private sector and volunteers
- interest in expanding the present system to twice its size,
- how to select and prioritize the installation of new moorings and

FIGURE 4 The Number of Red Sea Moorings and Moored Dive Sites Over Time This figure depicts the increase in the number of moorings installed and dives sites covered by moorings from the end of the EST Project in December 1997 to the end of the PMG Project in August 1999 The number of Dive Sites increased from 49 to 106, and the number of Moorings installed (and operational) increased from 253 to 500



- using moorings as a zoning tool

Among other outcomes from the workshop, the first privately-financed moorings for the Protectorate were agreed–upon to be installed by the El Gouna resort with HEPCA Upon installation, these 50+ moorings will become the property of the EEAA, and will be maintained by the USAID-supported contract with HEPCA

Few specific recommendations (e g , what exact dive sites to moor in the next few months) emerged from the workshop because the decisions are EEAA's to make within their constraints, not from the stakeholders present However, a process and recommendations for deciding this and other issues were proposed Subsequent to the workshop, PMG staff prepared and presented EEAA with a more detailed 41-page mooring report with a complete background of the program, and specific workplan recommendations in 1999, much of the latter which has since been accomplished In addition, specific short-term and long-term recommendations, with budget estimates, were included in Part 3 of that report Pending EEAA feedback, the Red Sea Mooring Program has continued a regular routine of month-to-month workplans in 5 areas (El Gouna, Hurghada, Safaga, the Southern Coast and the Far Islands) that focus on maintenance and include additional installations when possible and where requested and approved by the local EEAA office

A set of tables follows as ANNEX 6A to 6E with detailed status reports of the Mooring System as of April 31, 1999 These Tables, listed below, can be replaced with those reflecting the Final Status (as of August 31, 1999) once the balance of the data has been entered into the ACCESS Database, or it can be made available as a Updated Mooring Report The data entry was slowed as there was attrition in the HEPCA Technical Team, and it was difficult to find a replacement when the future operation of the mooring program was so uncertain

- *ANNEX 6A New Installations and Dive Sites Moored Over Time (1996-1999)* This is a one-page summary of the Number of New Mooring Installations over Time in the 5 Red Sea Sectors
- *ANNEX 6B Final Mooring Status* This lists of each of the 500 moorings with their final status, date last visited (3 Sections Hurghada Safaga, Islands & South)
- *ANNEX 6C Final Mooring Summary* This is a one-page report for each of the 3 regions with the number of visits made, total number of divers hours and material costs for the region over the EST period (Pre Dec 1997) and for PMG (Jan 1998-Aug 1999) (3 Sections Hurghada, Safaga, Islands & South)
- *ANNEX 6D Installation Report* This is a detailed list of each of the 500+ moorings with the type of mooring (pin or manta, type of buoy), date installed, comments on installation form (3 Sections Hurghada, Safaga, Islands & South)
- *ANNEX 6E Reef Installation-Summary by Dive Site* This lists of each of the Dives Sites that are Moored (approx 100 total) with the current number of moorings at each site (3 Sections Hurghada, Safaga, Islands & South)
- *ANNEX 6F Site Name and GPS location* This is a list of the GPS (latitude and longitude) locations of each dive site with moorings This data could be used to create

a mooring map from the existing GIS database used for the zoning activity by the PMG project (3 Sections Hurghada Safaga, Islands & South)

RECOMMENDATIONS

These have been forwarded to USAID and EEAA in the Mooring Report of March 1999 Few if any recommendations from that time have changed significantly The only additional recommendation is that the ACCESS Database program be altered now that EEAA and HEPCA have experience with it Perhaps with the beginning of the next calendar year, the mooring reports can be integrated with a set of other Red Sea Headquarters Operational Monthly Reports (Patrols, Maintenance, Etc) For instance the database itself requires few changes perhaps just making some of the regular 'comments" into boxes to be checked, making compilation and analysis more easily automated Particularly, the formats and contents of the reports could be easily changed to be more useful to the Park Managers, while still serving the needs of the mooring technical team

IV Coral Reef Monitoring Program (ANNEX 7)

A Monitoring Data Available

A number of baseline, one-time and repeated coral-reef and marine surveys have been implemented within the last few years in the Hurghada and Red Sea areas Copies of all of the recent work described below have been placed into the EEAA or the PMG/USAID archives by the original sources These include

- transects and quadrant surveys at various dive sites executed by the EEAA Sinai rangers (1997-99),
- a set of 1996 baseline rapid assessments of the diving sites executed by the USAID/EST Project to determine where the moorings should go (repeated in part in 1998 by the PMG Program for USAID project monitoring),
- a set of baseline surveys for the 1998 Global Environmental Facility (GEF) Red Sea Coastal Resources Management Program
- an annual monitoring program in Hurghada by the U K -based Marine Conservation Society (MCS, 1996-1999),
- various sites and dates for the global demonstrative Reef Check Surveys (1997-1999), and
- a number of independent scientific surveys for research and management

These recent surveys are in addition to a body of earlier research and work in the governmental archives, in published journals and in the private archive of researchers There has been no known attempt yet to compile (much less to integrate) this existing information into a single set of baseline data with follow-on repeated surveys Likewise there is no known analysis of the integrated data This task of integration may be a preferred pre-requisite to building a structured monitoring program for the Red Sea region

B *Data by Region and Source*

Most of the surveys have been done in the Hurghada area A summary of the known different methods and sources of surveys in Hurghada for 1996-1999 are presented in ANNEX 7A listed by the sites where the work was completed Only the USAID/EST and PMG projects and the EEAA/Sinai have current data for the far islands The GEF Project, the EST Project and EEAA/Sinai have current data for the southern coastal sites We report here the outcomes only of the PMG Hurghada/Safaga Monitoring Program and its comparison to the 1996 data collected under the EST Project

C *The EST Rapid Underwater Assessment and the Coral Reef Index*

In 1996 the USAID/EST Project utilized a Rapid Underwater Assessment (RUA) within the Red Sea area to collect ecological data A rapid assessment was necessary to cover the large area of reefs in a short period of time Although several different types of information were collected, this was not intended to be used as a sole indicator of the health of the reef ecosystem nor as the definative monitoring baseline study Rather, the purpose of the Rapid Assessment was to provide information to prioritize various diving sites to receive moorings under the new USAID-supported EST program The RUA included reporting a number of parameters, one of which was coral abundance The method used to determine coral abundance was the amount of area covered by corals within fixed quadrants at 4 meters water-depth In 1996, 48 sites total were assessed in Hurghada and Safaga In 1998 the ecological surveys were completed using the same 1996 rapid assessment methodology Due to limited time and resources, the number of sites surveyed (11 in Hurghada and 10 in Safaga) and the number of parameters studied were reduced, and included only the parameter of coral abundance

The coral abundance data was collected in the format of a percentage of area within the quadrant covered by corals Since there is significant variability in nature and in observers (e g , the difference between 52% and 59% cover is frequently not significant), and the relationship between ecosystem health and area covered is not necessarily linear, scientists report the health relationship as a general index of cover on a scale from Category 1 to 5, with the following conversion

Category 1	0-10% Cover	Category 4	51-75% Cover
Category 2	11-30% Cover	Category 5	76-100% Cover
Category 3	31-50% Cover		

A **Coral Reef Index** was used in this project to describe the relationship between the amount of area covered by the different reef substrates (hard corals, soft corals, dead and broken corals, sands, etc) and is reported as the **Category** (1-5) of

Cover of Hard Coral Cover of Soft Coral Cover of Other Substrates

Sites with the greatest amounts of hard corals (most preferred) and soft corals are considered to be the most desireable for tourism and ecosystem health Each dive site has its own Coral Reef Index, which can be statistically averaged or combined to give a regional Index and variability among sites For example, the 1998 Assessment for Hurghada shows that the average ratios of cover and Coral Reef Index (CRI) are

Parameter	Hard Coral Cover	Soft Coral Cover	Other Cover
% Cover	36%	11%	53%
Category of Cover	2 6 (+/-0 8)	1 5 (+/ 0 5)	3 4 (+/ 0 7)
Coral Reef Index	3	2	3

Therefore the reported averaged Coral Reef Index for 1998 in Hurghada for eleven sites is **3 2 3** for Hard Soft Other The observed variability between individual quadrants and individual dive sites is about 14% cover or 0 7 CRI Category Units This is also the approximate natural variability in the reef environment based upon a statistical test conducted by Dr Tighe when defining the minimum number of survey sites recommended (N=6) for this parameter

The direction of change in the coral coverage (increase or decrease or no change in coverage between 1996 and 1998) at the individual dive sites is presented in ANNEX 7B, in Figures 3-8 of ANNEX 7C and are summarized in the table below The hypothesis is that by installing moorings, the loss of hard and soft-coral cover due to anchor damage would cease, and possibly, given enough time, allow the reef to regenerate corals, thereby eventually gaining area covered in living corals A related consequence is that there would be no increase in the amount of area covered by "other substrates" (since rubble and dead or broken coral often dominate this type of substrate)

The Coral Reef Index for each of the 21 sites from 1996 and 1998 are presented in ANNEX 7B The comparison of the average CRI for Hurghada and for Safaga between 1996 and 1998 is summarized below and in Figure 5

REGION and YEAR of SURVEY	Category Value for Hard Coral Cover	Category Value for Soft Coral Cover	Category Value for Other Substrate Cover	Coral Reef Index
Hurghada 1996	2 3	1 3	3 6	**2 1 4**
Hurghada 1998	2 6 +/-08	1 5 +/-0 5	3 4 +/-0 7	**3 2 3**
Safaga 1996	3 0	1 3	3 2	**3 1 3**
Safaga 1998	3 0 +/-0 8	1 6 +/-0 7	3 1 +/0 8	**3 2 3**

When the sites within a region are averaged, these results indicate minor but not statistically significant changes in the Coral Reef Index over time Some of the variability is also due to the ecological patchiness of the reef system and the level of localized use by divers and boats therefore it might be more meaningful for managers to track the Coral Reef Index at the individual sites An example of this follows below

Carless Reef the only site in Hurghada with a significant decrease in Hard Corals between 1996 and 1998, also showed a significant increase in Soft Corals This loss of hard coral-cover may be due to the negative impact of the Crown-of-Thorns Starfish herds that were observed and collected from Carless Reef, and the increase in soft corals may represent the successful new recruitment of *Xenia spp* an early settler on disturbed areas Even if the reported changes are not all statistically significant it is very encouraging to note that in most of the 21 dive sites living coral coverage has increased

and other substrate has not increased As coral is very slow-growing, any positive change in this short time period is very promising

Region (# of Sites Surveyed)	# of Dive Sites and Direction of Changes in the Area Covered by Hard Corals	# of Dive Sites with Changes in the Area Covered by Soft Corals	of Dive Sites with Changes in the Area Covered by Other Substrate
Hurghada (11)	8 Sites Increase (2 Significant) 3 Decrease (1 Significant)	5 Up (1 Significant) 6 Down (None Significant)	6 Up (None Significant) 5 Down (3 Significant)
Safaga (10)	6 Sites Increase (1 Significant) 3 Sites Decrease (2 Significant) 1 Sites Show No Change	7 Up (2 Significant) 2 Down (1 Significant) 1 No Change	2 Up (None Significant) 5 Down (1 Significant) 3 No Change

There are fewer difference over time for the Safaga sites, but similar discussions regarding the interpretation of this data is possible, although the study of more parameters over time would allow us to better analyze the causes and magnitude of these changes

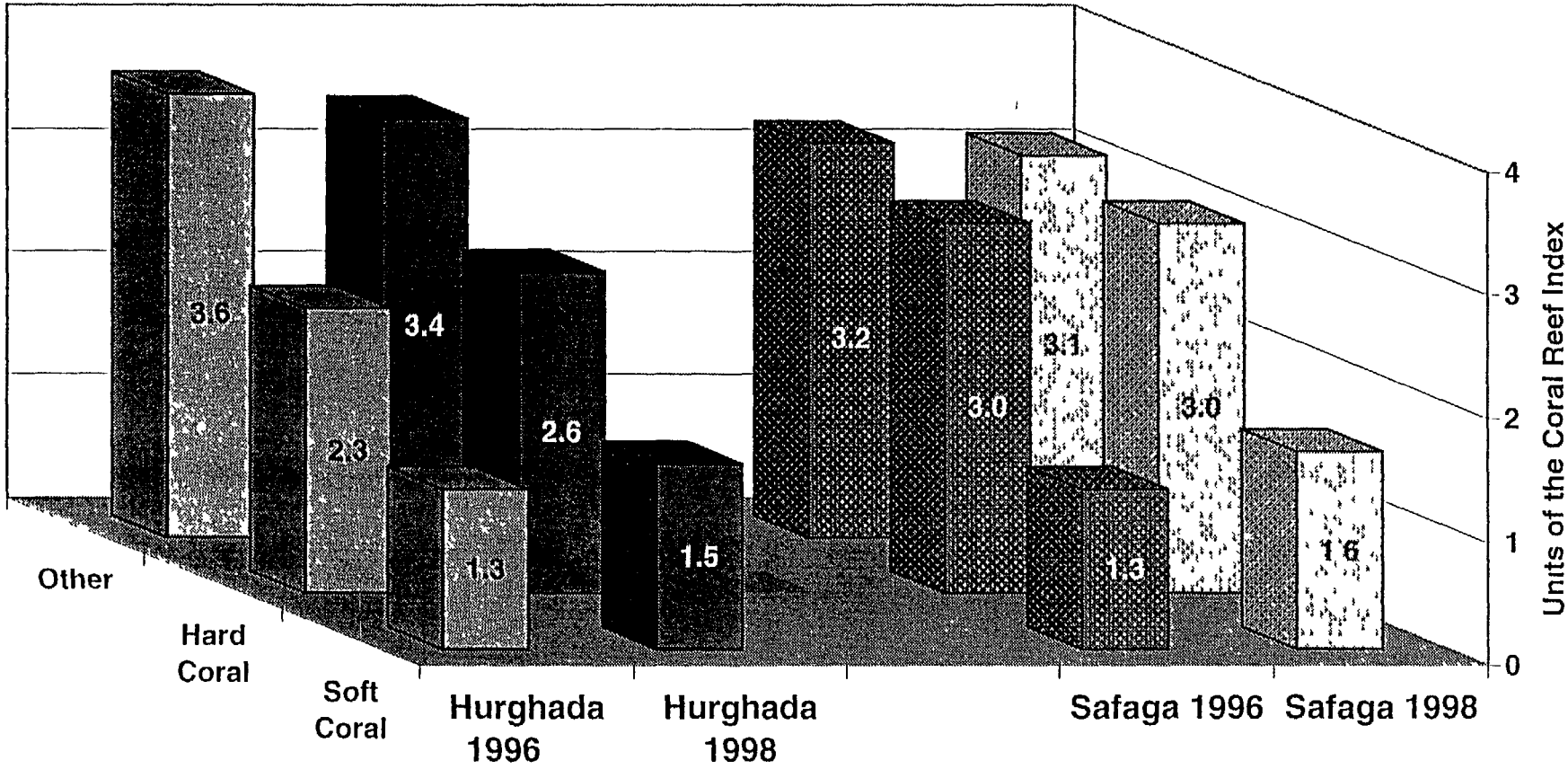
This report represents an executive summary of the results from our two years of repeated coral reef assessments in Hurghada and Safaga, and an explanatory example of the types of inferences we may make from this survey work It does not report on all the changes on the reef, however For instance, a great deal of new soft coral was observed and noted by many divers in 1998, and those changes are not reflected in these figures In part, that may be explained by the difference in depth between where most of the coral damage by anchoring occurred and where the increase in soft corals was seen (shallow reef-tops) versus the depth of our monitoring stations (4 meters, selected as the depth interval of the reef where the greatest biodiversity and coral coverage occurs) In the future, more recently-moored dive sites, any sites to be added to the mooring program, and more control areas on the reefs should be included for monitoring A workshop that discusses a larger-scale monitoring effort to address specific management questions could be scheduled early under the new EEPP program This would hopefully also serve as another move to more-closely link the Sinai and Red Sea marine park programs

V Crown-of-Thorns Starfish Program (ANNEX 8)

A Background

Since early 1998, there has been a very noticeable increase in the numbers of the Crown-of-Thorns Starfish in the Red Sea Localized herds have been noted in at least 5-10 dive sites along the Hurghada-Marsa Alam reefs and several other sites have been reported in the Gulf of Aqaba The presence of this starfish in large numbers has alarmed the recreational divers and some governmental leaders, and is seen as a threat to the dive industry if international tourists think the reefs are damaged regardless of whether the damage is significant or not The work in the Hurghada area by EEAA Protectorates and the PMG staff is the first ever on record to survey, control or monitor COTS in the region ANNEX 8 contains a set of briefings, trip reports, status reports, scientific data and operational data that were generated or assisted by the PMG program during the 1998 and 1999 Crown-of-Thorns Starfish seasons

FIGURE 5 Coral Reef Index for Hurghada and Safaga (1996-1998) This shows that the average amount of area covered by hard corals and soft corals (Coral Reef Index) in 11 Hurghada sites and 10 Safaga sites either increased slightly or remained the same between 1996 and 1998 The average area covered by other substrate either decreased slightly in both locations, which is desireable since other substrates often includes dead coral or rubble When the sites from each region are averaged together, the differences are not statistically significant, however the trends are highly encouraging



The Crown-of-Thorns Starfish (COTS) is a natural resident of the reefs in the Indo-Pacific that grazes preferably on the faster-growing table-tops corals Occasionally, this starfish like some other echinoderms, is found in very large numbers (herds of tens to hundreds of thousands animals) that cause great concerns because of the large areas of living coral that is consumed by these animals (5-13 square meters of coral/year per adult animal) After more than 20 years of research, surveys, controls, and failed policies around the world, there is still some controversy regarding the cause of the large congregations are they natural or are they human-induced from overfishing, pollution or other causes?

The general scientific concensus is that the occurance of occasional large herds of COTS is a natural phenomenon created by a combination of natural variables (e g , few predators, good food supply, nutrients, low salinity, warm temperatures, open substrate to settle upon, coral to feed upon), and that human actions can compound conditions that are favorable for the successful survival and recruitment of COTS larvae on the reefs In the last few decades, herds have been observed in more than 29 countries in the Indo-Pacific, due either to an increase in COTS herds or to the increase in people observing them There is some evidence for a relationship between the increased frequency or intensity of these large congregations in tropical areas, near high coastal terrain or near human populations, although very remote areas are also affected For this reason, when describing the COTS phenomenon, we discourage using alarming terms such as "plague", "outbreak" and "infestations", and prefer using the less-biased terms such as "herds" and "congregations "

As research progresses on the cause of the COTS herds, the questions turn to management of the impacts of the COTS herds Should the COTS be left alone and let nature takes its course, should the COTS populations be controlled through removal of the animals, or should our efforts be focussed towards controlling the potential human impacts that might be causing the herds? Since COTS are not a pest introduced to the environment, most reef managers have a policy of not interfering in the natural process Numerous studies have shown that it is not practical, nor desirable to remove ALL of the COTS from the reefs, particularly in large reef areas like the Great Barrier Reef and the Red Sea Because of the uncertainty about the possible role of human activities, it is recommended that controls of the population of COTS be limited to small areas that are important to research or tourism It is meaningful, however, to survey and monitor the occurances scientifically when and where feasible Various types of controls have been used over the years each has its good and bad points ALL require a long-term commitment (more than 1 year) More information regarding the life history of the Crown-of-Thorns Starfish and other material about this issue are included in ANNEX 8

B The 1998 COTS Season and Control Program

This management dilemma faced the Red Sea and Gulf of Aqaba managers during the life of the PMG program, and upon request, we provided assistance during both the 1988 and 1999 COTS seasons The 'season" refers to the warm water months of approximately June through October when the starfish aggregate at the top of the reef for communal spawning and for feeding Although some animals are found on the reef-top year-round,

in many cases the animals disperse or partially 'hibernate" (starfish can survive several months without food) away from sight during the colder months

In 1998, the EEAA took the lead for managing the COTS issue in the Red Sea The primary objectives of their efforts were

- to survey and monitor the reefs, both before during and after COTS herds were seen in order to identify the locations of large herds and to learn of any local patterns,
- to implement some focussed cleaning efforts on favorite and economically valuable dive sites to reduce the damage done to the reefs and to protect the tourism industry,
- to share the effort with the stakeholders in the dive industry who want to protect the value of dive sites for their guests and business,
- to conduct research and monitoring efforts of the affected sites
- to leave 'normal" populations of COTS on the reefs for a balanced ecosystem, and
- to use the data collected to better understand the patterns and cycles of the COTS for improved management of the marine ecosystems and coral reefs

The PMG's involvement was to support the EEAA Rangers and Managers in any manner requested, which included participating in discussions that developed the control program and policies, presenting information to governmental and public audiences, participating in the field program by coordinating logisitics and as divers (31 dives were completed by PMG staff), paying for occasional safari and day-boats for surveys and collections, and by managing the scientific and operational databases from the field program Key accomplishments from the field program are summarized below and listed more fully in ANNEX 8

- 20 dive sites were surveyed in Hurghada, Safaga and the south
- More than 7500 COTS were collected from 10 affected sites (Hurghada Carless Reef, Shabrour Um Gamar, Abu Makagdig Southern Area Erg Monika, Erg Malek, Torfa Tany, Abu Dabab 1, 2, and 6, Shaab Naba) Several other sites had COTS present, but not in the large densities that are considered a 'herd" There were a few safari sites in the south that were not surveyed due to lack of resources
- More than 2000 animals were measured, and that data compiled and analyzed with simple statistics
- 21 dive centers, one private party HEPCA and EEAA contributed boats and divers
- More than 30 days and more than 350 dives of surveying and collection were completed between July and October 1998
- More than 100 different divers volunteered and participated as well as 6 EEAA Rangers, 4 HEPCA divers and 2 USAID/PMG staff members

There were only three to four rangers total stationed in Hurghada and Quseir before August 1998 so it is quite impressive that this level of effort was completed The Red Sea COTS program was much smaller than the Gulf of Aqaba control program, partially due to staff size, but also due to the different situations in the two areas The Gulf's control program began earlier collected more animals and collected more scientific data than the Red Sea program However, the Gulf of Aqaba Protectorate s program had previous experience with the COTS herds, both in 1997 and a few years earlier so the level of community awareness was higher among other factors There was a dedicated ranger to

coordinate the logistics of the field program with the diving centers and the research staff The diving community is smaller there, and better organized than in the Red Sea so private sector commitment and coordination is somewhat easier The size and number of locations of COTS herds were much greater in the Gulf of Aqaba than in the Hurghada/Safaga area of the Red Sea On the other hand, only two of the Red Sea sites with large herds were within the range of day-diving boats, the other sites were located in the south along the diving safari route so were less accessible for single day volunteers, surveying and collections All of the Gulf of Aqaba sites were within the range of day-diving boats There was also some difficulty in getting boats and volunteer divers from the Red Sea diving centers from mid-September to the end of October due to the coincidence of this period with the peak diving tourism season Overall, the 1998 Red Sea COTS experience was one of learning and awareness-building for both the newer rangers as well as for the community and local governmental authorities

C The 1999 COTS Season and Control Program

In 1999 it became clear that the Crown-of-Thorns Starfish herds were still present in the Red Sea, both at the locations where they had been in 1998 (although in much smaller numbers at the sites where there had been significant collections) and in new locations Working with the Red Sea Governorate, the EEAA and other stakeholders (e g , HEPCA, the diving centers) several different policies and control programs were proposed and tried, with the program evolving into the following recommendations the Red Sea would be divided into 4 sectors, each with a lead diving center or centers that was responsible for organizing COTS collection trips to their sites and reporting their activity to the EEAA Rangers and the Red Sea Governorate The four sectors were defined as

1 Hurghada and North
2 Safaga
3 Qusier, Marsa Alam, Wadi El Gemal
4 Ras Banas, Halayeb, Shalatin

During June 1999, 90 dive sites were surveyed by two safaris and the diving centers, and a conference was called by the Governor on July 4, 1999 to plan the control strategy The plan called for continued cleaning in the 6 northern affected areas by individual diving centers and for 5 one-week safaris to clean the southern sites (3 rangers per safari boat, no females allowed) during the month of July

The role of the PMG was minor during this year's COTS control program There were requests from EEAA for participation in several discussions and in drafting informational flyers and briefings for the public and others However, there was no funding for the Red Sea Marine Park Advisor during June and early July, and no USAID nor PMG management presence at the July 4th meeting and strategy sessions Therefore, the PMG's operational role was merely to support the Ranger's logistical preparation for the safaris, and to participate (M Habib for a total of 14 days away and several days in Hurghada) in one June and one July safari, and several local day-collecting trips The operational and scientific data was all kept by the EEAA Rangers Their safari and status reports on the COTS program are translated and included in ANNEX 8 In addition, the PMG office manager (S El Halawani) managed most of the logistial preparations for the

Governor's July 4th conference including invitations programs, facilities, translations of the reports of the conference, etc

The outcomes of the overall 1999 Red Sea program, according to these EEAA reports are summarized below

- Six dive sites (of 57) in Hurghada and Safaga were affected with COTS herds and were cleaned More than 1900 animals were removed from them as of the end of the PMG project
- A 7-day Safari in June to the Quseir-to-Wadi El Gemal Sector found herds at 5 of the 13 sites surveyed and collected 3000 animals
- Two safaris in early July collected more than 6650 animals from the Quseir-to-Wadi El Gemal Sector
- One additional safari in late July to the Quseir-to-Wadi El Gemal Sector collected more than 5000 animals
- The Ras Banas – Shalatin Sector was surveyed during a 10-day safari in June (with the cooperation of Suez Canal University) Thirteen stations were visited along the coast and on Halayeb and Shalatin Islands, all were completely clear of Crown-of-Thorns Starfish, and no herds were observed
- Little or no size or other scientific data was collected or analyzed regarding the animals collected and removed during 1999

RECOMMENDATIONS

There are three suggestions for approaching any continued action regarding the Crown-of-Thorns herds in the Red Sea

1 It might strengthen the ability of the government to implement a well-designed program if the authority and leadership was focused in one place, and that place was the office or agency most able and logical to implement the overall program If there is no active, authorized leader then no one becomes responsible for the task weakening coordination and motivation of the many different participants Once a center is designated, there needs to be a consensual COTS management program and the necessary resources dedicated to implement it

2 Prepare a well-designed, formal public outreach program that increases the awareness of all parties (government tourists, private sector) about the nature of the COTS phenomenon and the current policies of the EEAA and Red Sea Government The diving centers and others frequently remarked that the policies changed too often, and that there was no clear, consistant plan or a way of communicating that plan to those delegated to implement it Problems caused by rumors and exaggeration were a constant challenge to the rangers and the PMG staff who were trying to implement the program

3 Develop a formal COTS monitoring and research strategy and then allocate the human and other resources necessary to implement it For instance there is now little or no 1999 data to determine the age-class of the animals collected in the Red Sea This means that the managers can not attempt to answer whether the 1999 animals are the same age/size class (i e same spawning group) as the prior year, or whether they represent a new year-class, or a mix of multiple age/size classes The science program could track the age/size and location information and other

parameters (such as spawning time, fecundity, areal damage, areal recovery, starfish migration) to assist the local and international research community towards understanding and better-managing the COTS phenomenon Annual findings could be submitted to the Australian COTS researchers

VI Declaration of the Great Red Sea Marine Park and Zoning (ANNEX 9)

It is a major component of the overall PMG and EEPP programs to assist the EEAA Protectorates Program in getting the Red Sea Marine Park declared, and in developing a Marine Park Management Plan or planning tool for the Park Under the PMG program there were resources only to begin developing the input elements to such a process As an example, the scope of work for preparing an analysis of Marine Park Management Plans (or planning tools) was developed and approved by EEAA, but due to the PMG extension, the activity was not implemented This activity may become a component of the EEPP workplan Another example is that in 1998 several iterations of supporting documents for the justification and declaration of the Red Sea Marine Park were prepared and edited at EEAA's request by the Marine Park Advisor (with some input from EST Project documents) Possibly as a result of this and other EEAA efforts, in September 1999 the Minister of the Environment announced that the Declaration of this Park is a priority of her agency, and that the documents are ready within EEAA for the Declaration o move forward

As a major step toward declaring and operating a larger Red Sea Marine Park, the concepts of zoning as a management tool were presented early in 1999 to the local Red Sea stakeholders In February 1999, the PMG held a short training and orientation session (3 days) in Hurghada lead by the Marine Park Advisor and 2 Consultants (B Harrigan, C Damon) The participants were a core group of marine stakeholders from the Government Sector, the Private Sector and an NGO This session was followed a few weeks later by nominated representatives from 5 groups (EEAA Protectorates, TDA, Fishermen, Snorkelling Centers, Diving Centers) presenting their response to 3 questions posed at the first workshop

- Who should represent your sector on a zoning committee?
- What activities are compatible and what activities are incompatible with the activity of your sector? and
- Where should your activity have high and low priority zones for operations?

After excellent discussions about the various inputs, the participants of this follow-on workshop developed a draft preliminary zoning plan for the Red Sea as a working example From this activity, a detailed Trip Report with the draft zoning plan was submitted by Harrigan and Damon, and was followed by a sub-set of the results in the form of a short overview paper and figures These were used at least in part, for EEAA's July 4th presentation in Hurghada as a key element of their participation in the Governor's Symposium on Environmental Management in the Red Sea

These results were presented informally to various Ministerial offices for discussions, resulting in a request for another workshop at the Ministerial (or sub-ministerial) level to

discuss these positive results for further action The full high-level workshop has been designed and was awaiting the completion of the July 1999 Governor s Symposium for implementation It will likely be a high priority activity under the new EEPP workplan

Additionally, for the first time, the Global Environmental Facility (GEF's) Project s GIS database was accessed and expanded by a follow-on activity The layers added to the GIS database include scanned Nautical Charts, Monitoring Locations and Preliminary Draft Zoning Boundaries for the proposed new Red Sea Marine Park Some new figures created by this database are found in ANNEX 9

RECOMMENDATION

The Ministerial workshop will likely be a priority under the new EEPP workplan It might be worth re-visiting the High-Level Zoning/resource Allocation Workshop design and the plans to declare the park in order to assist EEAA in developing the best strategy for integrating these two actions The workshop should be implemented, (hopefully with a meaningful participation by the local stakeholders), and the outcomes presented to the full set of Hurghada-based stakeholders A strong outreach plan and program to promote the Zoning and other plans would be very beneficial The Zoning Plan (as well as any program) should be reviewed and adapted regularly, as experience and events require

VII Final Status and Recommendations

The PMG program ended on August 31, 1999 In Hurghada, several elements will continue over into the new EEPP Project until re-organization is implemented or the EEPP workplan is created These include supporting the local operations and facilities of the Red Sea Rangers for a staff of 11, soon to be expanded to 20 persons (per Madame Minister in an announcement in September 1999)

The requirements to maintain a good operation include paying close attention to rapidly changing field conditions and events (such as boat groundings, etc) and a rapid decision-making process to adapt the operation to handle these events There was very little in either the PMG or EEAA operational design to accommodate this rapid decisionmaking need This is forgivable as the PMG was not meant to be so long-lived, but it did limit certain accomplishments For instance, the Marine Park Advisor was not present full-time (~60-80% time) so she regularly returned to Hurghada in the middle of a new EEAA or HEPCA operation, and she did not have authority over the rangers or HEPCA (as appropriate) to require reconsidering the strategy or taking remedial action Also, there was no middle or senior staffer of the EEAA Protectorates on-site for more than a few days a year nor the assignment by EEAA/Central of a staffer of greater rank than the excellent but less-experienced senior rangers to Hurghada This Red Sea program s demands are too great, and the early stages of this Protectorate too critical in terms of reputation-building for a continued lack of senior staff

Without having the PMG staff in the chain-of-command or in daily structured meetings with the EEAA or HEPCA decision-makers it was very difficult for the groups to mesh information was given to PMG erratically as a courtesy and only when requested (this situation improved somewhat during the life of the PMG Program) Advise from PMG

was rarely requested from the rangers or HEPCA despite many instances when there was time and opportunity (and need) to do so Although relationships between the PMG and EEAA staff or PMG and HEPCA's Executive Director were good to excellent most of the time, many of the informal or minor recommendations to the senior rangers and HEPCA were rarely discussed up-the-line of EEAA/HEPCA, nor followed up, nor implemented This is probably because the issues (staff rotations and assignments, for instance) were too low in priority for Cairo or the HEPCA Board to deal with at the time, because the rangers had little real authority to act, because HEPCA had little-to-no long-term staff and because PMG had no authority to do more than encourage the changes

With the ever-changing staffers in EEAA and HEPCA, it is difficult to implement consistant policies and procedures For instance, access to the rangers files was approved by one senior ranger, but not allowed by another There is a real need for a senior EEAA staffer with the continuity and authority to direct and enforce day-to-day operations and discipline, to work with te USAID technical advisors, and to maintain a solid record of activities from that program For HEPCA, there is a need for decentralization of tasks and more effort to maintain and build a middle-level professional team As a minor note, the PMG procurement was not established to accommodate short turn-around times needed in marine field operations, which caused a number of delays and problems This should not be an EPIQ issue under EEPP, but rather an EEAA issue

With limited personnel and material resources available, and with the constantly changing time-line for PMG it is highly commendable that the accomplishements of EEAA's Red Sea Program and HEPCA were so great during the period of the PMG Program

RECOMMENDATIONS

- Remember that the Red Sea Protectorates is an on-going operation that requires rapid decision-making and adequate day-to-day management attention unlike other aspects of the policy-focussed EEPP The new project and EEAA's expansion should be structured to accommodate these needs for safety reasons as well as credibility
- Remember that the Red Sea program is already in progress and may be more prepared to begin program activities under EEPP (developing new programs, structuring reporting standards, etc) than other aspects or counterparts of the EEPP It would be a shame to lose the momentum of the Red Sea program because other components of the EEPP are still in a phase of start-up activities
- Appoint a local EEAA Red Sea Park Manager (or Co-Manager with the EEPP Marine Park Expert as in the Italian Lake Wadi Rayan model) to act as a consistant resident supervior with some decision-making authority (with weekends off)
- Safety First There is no diving safety program for the Red Sea rangers, and this is a critical gap A program needs to be developed and implemented immediately, preferrably before the new rangers are inaugurated A plan to do this with a NOAA Diving Safety Officer, the Red Sea Advisor or a member of the American Association of Underwater Scientists as part of a Hurghada Diving Safety Month was drafted in a short proposal and presented to EEAA, USAID and the Red Sea

Governor in the Summer of 1999 The latter two approved it in concept the EEAA has not yet expressed their views on the topic

- Establish a multi-purpose Marine Committee with indivduals who can make at least some level of decisions for their organization This will avoid the confusion of the number of less-effective single-purpose committees presently in place in Hurghada
- Get the EEAA Red Sea Park Manager and the Protectorates Central staff to attend professional conferences and meetings outside of Egypt, to subscribe to a half-dozen relevant magazines and to begin a routine of regular discussions and learning sessions with counterparts that are not crisis-based This includes developing activities like a ranger exchange program with a Marine Park in Kenya or something else that has an appropriate level of professional development
- Stucture the involvement of the private sector in the management tasks of the Park This could include using diving centers for monitoring, mooring maintenance, COTS control (more formal than now) outreach, or getting the hotels to promote water conservation and the awareness of the rules of the Marine Park This can build a stronger sense of stewardship of the resource

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ANNEX 1:

Summary of Marine Patrols in Hurghada (Jan-Aug 1999)

(8-Page Table and 1 Chart)

This Annex consists of two elements:

a) An 8-page table that reports whether a patrol was executed or not for each day during the period, the type of vessel used, and the probable cause for any canceled patrols; and

b) One pie chart that summarizes the frequency of the different patrol outcomes. This pie chart is included as Figure 1 in the main body of the report.

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ANNEX 4A Red Sea Protectorates Island Safari Program Data During the USAID/PMG Project

No	Ref #	Name of the boat	Date Reservation Made	Safari Dates (from-to)	Safari Destination	# of Days for Safari	# of Egyptian Visitors @ 5LE/day	# of Foreign Visitors @ $5/day	# of Tickets for Foreign Visitors	Income from Foreign Visitors
36	99 33	Royal Emperor	06/22/1999	6/25 7/2	The Brothers	7	0	14	98	$490
37	99 34	Oyster	06/25/1999	7/3 7/10	The Brothers	7	0	20	140	$700
38	99 35	Number One	06/28/1999	7/4-7/11	The Brothers	7	0	21	147	$735
39	99 36	Royal Emperor	06/29/1999	7/2 7/9	The Brothers	7	0	18	126	$630
40	99 37	Ms Nouran	06/29/1999	7/2-7/9	The Brothers	7	0	16	112	$560
41	99 38	Number One	07/05/1999	7/11 7/18	The Brothers	7	0	20	140	$700
42	99 39	Royal Emperor	07/07/1999	7/11-7/18	The Brothers	7	1	12	84	$420
43	99-40	Mermaid	07/08/1999	7/12 7/19	The Brothers	7	0	14	98	$490
44	99 41	Shalakamy Explorer	07/12/1999	7/17 7/24	The Brothers	7	0	18	126	$630
45	99 42	Number One	07/12/1999	7/17 7/24	The Brothers	7	0	21	147	$735
46	99 43	Ms Nouran	07/14/1999	7/16 7/23	The Brothers	7	0	7	49	$245
47	99 44	Number One	07/20/1999	7/25 8/1	The Brothers	7	0	20	140	$700
48	99 45	Ms Nouran	07/19/1999	7/23 7/30	The Brothers	7	0	16	112	$560
49	99 46	Shalakamy Explorer	07/20/1999	7/23 7/30	The Brothers	7	0	21	147	$735
50	99 47	Royal Emperor	07/20/1999	7/23 7/30	The Brothers	7	0	18	126	$630
51	99 48	Fortuna 2	07/23/1999	7/26 8/1	The Brothers	7	0	12	84	$420
52	99 49	Sir Costoo	07/21/1999	7/25 7/31	Zabargad	12	0	18	216	$1,080
53	99 50	Axel	07/20/1999	7/25 7/31	The Brothers	7	0	7	49	$245
54	99 51	Number One	07/27/1999	7/31-8/6	The Brothers	7	0	22	154	$770
55	99 52	Royal Emperor	07/27/1999	8/1 8/13	Zabargad & Rocky	12	0	16	192	$960
56	99 53	Royal Emperor	08/02/1999	8/15 8/27	Zabargad & Rocky	12	0	15	180	$900
57	99 54	Shalakamy Explorer	08/09/1999	8/13 8/19	The Brothers	7	2	19	133	$665
58	99 55	Ms Nouran	08/10/1999	8/16 8/28	Zabargad & Rocky	12	1	15	180	$900
59	99 56	Mermaid	08/09/1999	8/13 8/25	Zabargad & Rocky	12	0	16	192	$960
60	99 57	Oyster	08/09/1999	8/27 9/2	The Brothers	7	0	19	133	$665
61	99 58	Number One	08/10/1999	8/14 8/21	The Brothers	7	0	20	140	$700
62	99 59	Royal Emperor	08/16/1999	8/27 9/2	The Brothers	7	0	15	105	$525
63	99 60	Number One	08/17/1999	8/21 8/27	The Brothers	7	0	21	147	$735
64	99 61	Number One	08/24/1999	8/28 9/4	The Brothers	7	0	19	133	$665
65	99 62	Oyster	08/25/1999	9/5 9/11	The Brothers	7	0	18	126	$630
TOTALS						495	25	1027	7819	$39,095

ANNEX 4A Red Sea Protectorates Island Safari Program Data During the USAID/PMG Project

No	Ref #	Name of the boat	Date Reservation Made	Safari Dates (from-to)	Safari Destination	# of Days for Safari	# of Egyptian Visitors @ 5LE/day	# of Foreign Visitors @ $5/day	# of Tickets for Foreign Visitors	Income from Foreign Visitors
1	98 1	Orchid	07/04/1998	7/25 8/1	The Brothers	7	0	14	98	$490
2	98 2	Oyster	12/03/1998	12/5-12/11	The Brothers	7	3	7	49	$245
3	98 3	Oyster	12/25/1998	1/2-1/8	The Brothers	7	0	20	140	$700
4	99 1	Oyster	03/20/1999	3/26 4/1	The Brothers	7	1	7	49	$245
5	99 2	Royal Emperor	04/04/1999	4/9 4/15	The Brothers	7	0	13	91	$455
6	99 3	Number One	04/05/1999	4/10-416	The Brothers	7	2	19	133	$665
7	99-4	Royal Emperor	04/09/1999	4/18 4/24	The Brothers	7	0	20	140	$700
8	99 5	Number One	04/13/1999	4/18 4/24	The Brothers	7	0	13	91	$455
9	99 6	Oyster	04/18/1999	4/23 4/30	The Brothers	7	0	10	70	$350
10	99 7	Number One	04/20/1999	4/24-4/30	The Brothers	7	2	19	133	$665
11	99-8	Royal Emperor	04/22/1999	4/25 5/1	The Brothers	7	0	13	91	$455
12	99-9	Number One	04/27/1999	5/1 5/7	The Brothers	7	2	18	126	$630
13	99 10	Ms Nouran	04/28/1999	5/1-5/7	The Brothers	7	2	10	70	$350
14	99 11	Oyster	04/30/1999	5/7-5/13	The Brothers	7	0	16	112	$560
15	99 12	Mermaid	05/04/1999	5/7-5/13	The Brothers	7	0	13	91	$455
16	99 13	Number One	05/04/1999	5/8 5/14	The Brothers	7	2	17	119	$595
17	99-14	Axel	05/03/1999	5/4 5/16	Zabargad	12	0	22	264	$1,320
18	99 15	Karim 2	05/06/1999	5/9 5/15	The Brothers	7	0	16	112	$560
19	99-16	Sir Costoo	05/08/1999	5/9 5/15	The Brothers	7	0	16	112	$560
20	99 17	Royal Emperor	05/11/1999	5/14-5/20	The Brothers	7	0	9	63	$315
21	99 18	Number One	05/17/1999	5/22-5/30	The Brothers	7	2	20	140	$700
22	99 19	Oyster	05/22/1999	5/28 6/4	The Brothers	7	0	11	77	$385
23	99-20	Royal Imperor	05/20/1999	5/22-5/28	The Brothers	7	0	14	98	$490
24	99-21	Number One	05/25/1999	5/29 6/6	The Brothers	7	2	17	119	$595
25	99 22	Royal Imperor	05/25/1999	5/28 6/4	The Brothers	7	0	11	77	$385
26	99 23	Mermaid	05/26/1999	6/1 6/12	Zabargad	12	0	9	108	$540
27	99 24	Number One	05/31/1999	6/5 6/11	The Brothers	7	2	19	133	$665
28	99 25	Royal Imperor	06/01/1999	6/4 6/16	Zabargad	12	1	15	180	$900
29	99 26	Sir Costoo	06/06/1999	6/13 6/20	The Brothers	7	0	16	112	$560
30	99 27	Number One	06/07/1999	6/12 6/19	The Brothers	7	0	20	140	$700
31	99-28	Axel	06/08/1999	6/9 6/16	The Brothers	7	0	7	49	$245
32	99 29	Ms Nouran	06/14/1999	6/18 6/24	The Brothers	7	0	16	112	$560
33	99 30	Royal Emperor	06/15/1999	6/18 6/24	The Brothers	7	0	17	119	$595
34	99 31	Smaher	06/21/1999	7/4 7/11	The Brothers	7	0	14	98	$490
35	99 32	Number One	06/21/1999	6/26 7/3	The Brothers	7	0	21	147	$735

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ANNEX 4:

Summary of the Far Islands Diving Safari Program

2-Page Table, 2 Charts (Fig 2, Fig 3 of Report)

This Annex consists of two parts

a) A table that presents each official Safari to the Red Sea Islands during 199 and 1999 (through Aug 99), the name of the boat, the number of passengers, the destination of the safari and the fees paid.

b) Two Charts that summarize the increase in the number of boats and trips per month in the official safari program, and the amount of fees collected per month.

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DIVING & SWIMMING CALENDAR

MONTH -	ACTUAL TRAINING CONDUCTED IN AUGUST 99																													
DAY -	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
ADVANCED OPEN WATER COURSE				X	X																										
PADI DEEP DIVE SPECIALITY									X	X																					
PADI DIVE MASTER ORIENTATION																								X							
AYMAN AFIFI (R)																															
ABDULLA ELIWA (R)																															
YASSER IBRAHIM (R)	NO LONGER IN THE RANGER CORPS																														
SAIED E AHMED (R)																								X							
HESHAM HARB (R)																															
WAEL ABD EL FATAH (R)									X	X																					
MOHAMED ABASS (R)																															
TAMER KAMAL(R)									X	X																					
ALI SALAM (R)									X	X														X							
MOHAMED ABD EL GHANY (R)				X	X																			X							
SALAH SOLIMAN (S)									X	X																					
SAYED SALEM (S)																															

Some Dates are Approximate

DIVING & SWIMMING CALENDAR

MONTH -	ACTUAL TRAINING CONDUCTED IN JULY 1999																														
DAY -	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
ADVANCED OPEN WATER COURSE						X	X																								
EXPERIENCE DIVES	X			X																									X		
COTS SOUTH SAFARI										X	X	X	X	X	X	X	X		X	X	X	X	X	X							
RANGERS & SKIPPERS NAME																															
AYMAN AFIFI (R)																															
ABDULLA ELIWA (R)																															
YASSER IBRAHIM (R)																															
SAIED E AHMED (R)										X	X	X	X	X	X	X	X														
HESHAM HARB (R)										X	X	X	X	X	X	X	X		X	X	X	X	X	X							
WAEL ABD EL FATAH (R)																															
MOHAMED ABASS (R)										X	X	X	X	X	X	X	X		X	X	X	X	X	X							
TAMER KAMEL (R)										X	X	X	X	X	X	X	X														
ALI SALAM (R)										X	X	X	X	X	X	X	X														
MOHAMED ABD EL GHANY (R)						X	X			X	X	X	X	X	X	X	X														
SALAH SOLIMAN (S)																			X	X	X	X	X	X							
SAYED SALEM (S)																															
INDIVIDUAL NOT RECORDED	X			X																									X		

Some Dates are Approximate

DIVING & SWIMMING CALENDAR

ACTUAL TRAINING CONDUCTED IN JUNE 1999

MONTH -																												
DAY -	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
OPEN WATER COURSE	X	X																					X	X	X	X	X	X	X	
COTS SOUTH SAFARI															X					X										
EXPERIENCE DIVES								X																						
RANGERS & SKIPPERS NAME																														
AYMAN AFIFI (R)																							X	X	X	X	X	X	X	
ABDULLA ELIWA (R)																							X	X	X	X	X	X	X	
YASSER IBRAHIM (R)																														
SAIED E AHMED (R)																														
HESHAM HARB (R)																														
WAEL ABD EL FATAH (R)																							X	X	X	X	X	X	X	
MOHAMED ABASS (R)																														
TAMER KAMEL (R)																														
ALI SALAM (R)																														
MOHAMED ABD EL GHANY (R)	X	X																					X	X	X	X	X	X	X	
SALAH SOLIMAN (S)																														
SAYED SALEM (S)																														
AHMED KAMAL(EST)	X	X																												
INDIVIDUAL NOT RECORDED								X							X					X										

Some Dates are Approximate

X = TRAINING DAY

EST/MH and ST

DIVING & SWIMMING CALENDAR

MONTH -	ACTUAL TRAINING CONDUCTED IN MAY 1999																													
DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
OPEN WATER SCUBA COURSE																X	X	X									X				
SWIM TRAINING			X			X					X																				
EXPERIENCE DIVES																				X											
RANGERS & SKIPPERS NAME																															
AYMAN AFIFI (R)																															
ABDULLA ELIWA (R)																															
YASSER IBRAHIM (R)																															
SAIED E AHMED (R)																															
HESHAM HARB (R)																															
WAEL ABD EL FATAH (R)																															
MOHAMED ABASS (R)																															
TAMER KAMEL (R)																															
ALI SALAM (R)																															
MOHAMED ABD EL GHANY (R)			X			X										X	X	X									X				
SALAH SOLIMAN (S)																															
SAYED SALEM (S)																															
INDIVIDUAL NOT RECORDED																				X											

Some Dates are Approximate

ANNEX 3B CHRONOLOGICAL SUMMARY OF PMG WATER TRAINING PROGRAM for RED SEA RANGERS

DIVING & SWIMMING CALENDAR

MONTH -	ACTUAL TRAINING CONDUCTED IN APRIL 1999																												
DAY -	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
MEDIC FIRST AID COURSE																					X	X								
RESCUE DIVER COURSE (w/MS)																	X	X	X	X										
EXPERIENCE DIVES															X															
TREADING WATER TRAINING																									X					
SWIM TRAINING							X						X												X					
400 METERS SWIMMING TEST				X																										
UNDERWATER PHOTO COURSE										X	X																			
RANGERS & SKIPPERS NAME																														
AYMAN AFIFI (R)																					X	X								
ABDULLA ELIWA (R)				X													X	X	X	X	X	X								
YASSER IBRAHIM (R)				X													X	X	X	X										
SAIED E AHMED (R)				X													X	X	X	X	X	X								
HESHAM HARB (R)				X																	X	X								
WAEL ABD EL FATAH (R)										X	X									X										
MOHAMED ABASS (R)										X	X									X										
TAMER KAMEL (R)																														
ALI SALAM (R)							X						X																	
MOHAMED ABD EL GHANY (R)							X						X								X	X			X					
SALAH SOLIMAN (S)																					X	X								
SAYED SALEM (S)																					X	X								
INDIVIDUAL NOT RECORDED															X															

Some Dates are Approximate

DIVING & SWIMMING CALENDAR

MONTH -	ACTUAL TRAINING CONDUCTED IN MARCH 1999																													
DAY -	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
EQUIPMENT SPECIALITY																X															
PEAK PERFORMANCE SPECIALITY																															
DEEP DIVE SPECIALITY				X		X					X			X																	
SWIM TRAINING	X																							X							X
RESCUE COURSE (W/ M Shafai)																	X	X													
EXPERIENCE DIVES									X	X											X							X			
RANGERS & SKIPPERS NAME																															
AYMAN AFIFI (R)																															
ABDULLA ELIWA (R)											X			X		X															
YASSER IBRAHIM (R)																															
SAIED E AHMED (R)											X			X		X															
HESHAM HARB (R)																X															
WAEL ABD EL FATAH (R)																															
MOHAMED ABASS (R)																															
TAMER KAMAL(R)																X															
ALI SALAM (R)																X															
MOHAMED ABD EL GHANY (R)	X																							X							
SALAH SOLIMAN (S)																X															
SAYED SALEM (S)																															
INDIVIDUALS NOT RECORDED				4		4			X	X							X	X			X							X			X

Some Dates are Approximate

DIVING & SWIMMING CALENDAR

MONTH -	ACTUAL TRAINING CONDUCTED IN FEBRUARY 1999																											
DAY -	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
ADVANCED OPEN WATER COURSE							X	X	X																			
PEAK PERFORMANCE SPECIALITY						X																						
SWIM TRAINING											X				X										X			
MEDIC FIRST AID COURSE													X	X														
UNDERWATER PHOTOGRAPHY SPEC															X	X												
EQUIPMENT SPECIALTY																		X										
EXPERIENCE DIVES																X												
ZONING WORKSHOP (II)																						W	W					
RANGERS & SKIPPERS NAME																												
AYMAN AFIFI (R)						X												X				W	W					
ABDULLA ELIWA (R)																						W	W					
YASSER IBRAHIM (R)																		X										
SAIED E AHMED (R)																												
HESHAM HARB (R)						X									X	X												
WAEL ABD EL FATAH (R)						X	X	X	X									X				W	W					
MOHAMED ABASS (R)						X	X	X	X									X										
TAMER KAMEL (R)															X	X												
ALI SALAM (R)						X	X	X	X													W	W					
MOHAMED ABD EL GHANY (R)																									X			
SALAH SOLIMAN (S)						X	X	X	X													W	W					
SAYED SALEM (S)																						W	W					
INDIVIDUAL NOT RECORDED											X		X	X	X	X												

SOMES DATES ARE APPROXIMATE

DIVING & SWIMMING CALENDAR

MONTH -	ACTUAL TRAINING CONDUCTED IN JANUARY 1999																														
DAY -	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
EXPERIENCE DIVES	X		X					X		X					X		X			X		X							X		
ZONING WORKSHOP (I)																												X			
RANGERS & SKIPPERS NAME																															
AYMAN AFIFI (R)																															
ABDULLA ELIWA (R)																												X			
YASSER IBRAHIM (R)																															
SAIED E AHMED (R)																															
HESHAM HARB (R)																												X			
WAEL ABD EL FATAH (R)																															
MOHAMED ABASS (R)																												X			
TAMER KAMEL (R)																															
ALI SALAM (R)																												X			
MOHAMED ABD EL GHANY (R)																												X			
SALAH SOLIMAN (S)																												X			
SAYED SALEM (S)																												X			
INDIVIDUAL NOT RECORDED	X		X							X					X		X			X		X							X		

DATES APPROXIMATE

Ramadan and the Feasts No Training at Request of Rangers

ANNEX 3B CHRONOLOGICAL SUMMARY OF PMG WATER TRAINING PROGRAM for RED SEA RANGERS

DIVING & SWIMMING CALENDAR																															
MONTH -	ACTUAL TRAINING CONDUCTED IN DECEMBER 1998																														
DAY -	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
FIN SWIMMING	X								X					X														X			
EXPERIENCE DIVES													X							X		X					X		X		
RANGERS & SKIPPERS NAME																															
AYMAN AFIFI (R)																															
ABDULLA ELIWA (R)																															
YASSER IBRAHIM (R)																															
SAIED E AHMED (R)																															
HESHAM HARB (R)																															
WAEL ABD EL FATAH (R)																															
MOHAMED ABASS (R)													X	X																	
TAMER KAMAL(R)																															
ALI SALAM (R)													X	X																	
MOHAMED ABD EL GHANY (R)																															
SALAH SOLIMAN (S)													X	X																	
SAYED SALEM (S)																															
Individual Not Recorded	X								X											X		X					X	X	X		

DATES APPROXIMATE

NOTE Little training was done during Ramadan due to lower levels of EEAA field staffing and at the request of EEAA Rangers

ANNEX 3B CHRONOLOGICAL SUMMARY OF PMG WATER TRAINING PROGRAM for RED SEA RANGERS

DIVING & SWIMMING CALENDAR

MONTH -	ACTUAL TRAINING CONDUCTED IN NOVEMBER 1998																													
DAY -	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
TREADING WATER TRAINING		X			X				X							X														X	
SWIM TRAINING		X			X				X							X														X	
PHYSICAL FITNESS	X			X				X		X	X				X							X		X		X					
OPEN WATER SCUBA COURSE								X		X	X				X							X		X							
MOORING WORKSHOP																	W	W	W												
RANGERS & SKIPPERS NAME																															
AYMAN AFIFI (R)		X			X				X							X														X	
ABDULLA ELIWA (R)																	X	X	X												
YASSER IBRAHIM (R)																	X	X	X												
SAIED E AHMED (R)																															
HESHAM HARB (R)																	X	X	X												
WAEL ABD EL FATAH (R)		X			X				X							X	X	X	X							X				X	
MOHAMED ABASS (R)		X			X			X	X	X	X				X	X	X	X	X			X		X		X				X	
TAMER KAMAL(R)		X			X				X							X	X	X	X							X				X	
ALI SALAM (R)		X			X			X	X	X	X				X	X	X	X	X			X		X		X				X	
MOHAMED ABD EL GHANY (R)																															
SALAH SOLIMAN (S)		X			X			X	X	X	X				X	X	X	X	X			X		X		X				X	
SAYED SALEM (S)																	X	X	X												
INDIVIDUAL NOT RECORDED	X			X																							X				

DATES APPROXIMATE

ANNEX 3B CHRONOLOGICAL SUMMARY OF PMG WATER TRAINING PROGRAM for RED SEA RANGERS

DIVING & SWIMMING CALENDAR

ACTUAL TRAINING CONDUCTED IN OCTOBER 1998

MONTH -																														
DAY -	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
TREADING WATER TRAINING																				X							X		X		
SWIM TRAINING															X							X									
PHYSICAL FITNESS												X									X							X			
OPEN WATER SCUBA COURSE															X					X		X							X		
RANGERS & SKIPPERS NAME																															
AYMAN AFIFI (R)																															
ABDULLA ELIWA (R)																															
YASSER IBRAHIM (R)																															
SAIED E AHMED (R)																															
HESHAM HARB (R)																															
WAEL ABD EL FATAH (R)																				X							X		X		
MOHAMED ABASS (R)												X			X					X	X	X					X	X	X		
TAMER KAMAL(R)																				X							X		X		
ALI SALAM (R)												X			X					X	X	X					X	X	X		
MOHAMED ABD EL GHANY (R)																															
SALAH SOLIMAN (S)												X			X					X	X	X					X	X	X		
SAYED SALEM (S)																															
INDIVIDUAL NOT RECORDED																															

Dates Approximate

DIVING & SWIMMING CALENDAR

ACTUAL TRAINING CONDUCTED IN SEPTEMPER 1998

MONTH -																														
DAY	1	2	3	[illegible]	[illegible]	6	[illegible]	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
UNDER WATER PHOTOCOURSE																X	X						X	X							
RANGERS & SKIPPERS NAME																															
AYMAN AFIFI (R)																							X	X							
ABDULLA ELIWA (R)																							X	X							
YASSER IBRAHIM (R)																X	X														
SAIED E AHMED (R)																X	X														
HESHAM HARB (R)																															
WA L ABD EL FATAH (R)																															
MOHAMED ABASS (R)																															
TAMER KAMAL(R)																															
ALI SALAM (R)																															
MOHAME ABD EL GHANY (R)																															
SALAH SOLIMAN (S)																															
SAYED SALEM (S)																															

Dates are Approximate

EST/MH and ST

X = TRAINING DAY

ANNEX 3A TRAINING STATUS OF RED SEA RANGERS in WATER SKILLS and SCUBA as of Aug 31, 1999

Prepared by PMG/MH and ST

WATER SKILL COURSE OR EXPERIENCE	AYMAN AFIFI (R)	ABDULLA ELIWA (R)	YASSER IBRAHIM (gone)	ALI SALAM (R)	HESHAM HARB (R)	SAIED E AHMED (R)	MOHAMED ABDEL GHANY(R)	TAMER KAMAL(R)	WAEL ABDEL FATTAH (R)	MOHAMED ABBAS (R)	SALAH SOLIMAN (S)	SAYED SALEM (S)
	NAMES OF THE RANGERS (R) and SKIPPER (S)											
PADI DIVEMASTER												
PADI ASSISTANT INSTRUCTOR												
PADI INSTRUCTOR												
OXYGEN PROVIDER SPECIALTY												
BOAT ACCIDENT INVESTIGATION	E	E	E		E	E			E			
15 DIVES	Y	Y	Y	A	Y	Y	A	A	A	A	A	
20 DIVES	Y	Y	Y	A	Y	Y	A	A	A	A	A	
40 DIVES	Y	Y	Y	A	Y	Y	A	A	A	A	A	
60 DIVES	Y	Y	Y	A	Y	Y		A		A		
100 DIVES	Y	Y	Y		A	A						
150 DIVES	A	A	A		A	A						
200 DIVES	A	A	A									
SAFARI BOAT DIVING	A	A	A	A	A	A	A	A		A	A	
IN WATER COASTAL INSPECTIONS												
SMALL BOAT HANDLING COURSE											E	E
COTS TEAM LEADER	Y	Y	Y		Y	Y						
U/W CORAL REEF MONITORING	C	EC	E	E	E	E			E	E		

A = AFTER OCT 98, Y = PRIOR TO OCT 98 E = EXPERIENCE C = COURSE BOLD = EST TRAINING, NON BOLD = OTHER SOURCE OF TRAINING

ANNEX 3A TRAINING STATUS OF RED SEA RANGERS in WATER SKILLS and SCUBA as of Aug 31, 1999

Prepared by PMG/MH and ST

NAMES OF THE RANGERS (R) and SKIPPER (S)												
WATER SKILL COURSE OR EXPERIENCE	AYMAN AFIFI (R)	ABDULLA ELIWA (R)	YASSER IBRAHIM (gone)	ALI SALAM (R)	HESHAM HARB (R)	SAIED E AHMED (R)	MOHAMED ABDEL GHANY(R)	TAMER KAMAL(R)	WAEL ABDEL FATTAH (R)	MOHAMED ABBAS (R)	SALAH SOLIMAN (S)	SAYED SALEM (S)
10 MINUTE TREADING WATER	Nov 98	Y	Y	Oct 98	Y	Y	Apr 99	Nov 98	Nov 98	Oct 98	Oct 98	Y
200 METER SWIM		Oct 98	Y	Oct 98	Y	Y	Apr 99	Nov 98	Nov 98	Oct 98	Oct 98	
400 METER SWIM		Apr 99	Apr 99		Apr 99	Apr 99		Nov 98	Nov 98			
PADI OPEN WATER SCUBA COURSE	Y	Y	Y	Nov 98	Y	Y	Jun 99	Y	Y	Nov 98	Nov 98	
PADI ADVANCED OPEN WATER COURSE	Y	Y	Y	Feb 99	Y	Y	InProg	Jan 99	Feb 99	Feb 99	Feb 99	
PADI MEDIC FIRST AID	Apr 99	Apr 99	Apr 99	Apr 99	Apr 99	Apr 99	Apr 99	Apr 99	Apr 99	Apr 99	Apr 99	Apr 99
PADI DIVING RESCUE COURSE		Apr 99	Apr 99		Apr 99	Apr 99						
PADI NIGHT DIVE SPECIALTY												
PADI EQUIPMENT SPECIALTY	Feb 99	Mar 99	Feb 99	Mar 99	Mar 99	Mar 99		Mar 99	Feb 99	Feb 99	Mar 99	
PADI DEEP DIVE SPECIALTY	Aug 99	Mar 99		Aug 99	Aug 99	Mar 99		Aug 99	Aug 99		Aug 99	
PADI DRIFT DIVE SPECIALTY												
PADI WRECK DIVE SPECIALTY												
PADI U/W NAVIGATION SPECIALTY												
PADI PEAK PERFORMANCE AND BUOYANCY	Dec 98	Mar 99	Dec 98	Mar 99	Dec 98	Mar 99		Dec 98	Dec 98	Dec 98	Mar 99	
PADI U/W PHOTOGRAPHY SPECIALTY	Sep 98	Sep 98	Sep 98		Feb 99	Sep 98		Feb 99	Apr 99	Apr 99		
PADI U/W VIDEO SPECIALTY												
PADI DIVE MASTER ORIENTATION				Aug 99		Aug 99	Aug 99					
PADI NITROX SPECIALTY												

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A = AFTER OCT 98 Y = PRIOR TO OCT 98 E = EXPERIENCE C = COURSE BOLD = EST TRAINING NON BOLD = OTHER SOURCE OF TRAINING

ANNEX 3:

EEAA Red Sea Ranger Training Report

14 Pages of Tables

This Annex consists of two parts that summarize the status of the rangers' water skills, training and experience during and at the close of the PMG Project in August 1999. Other that overseas study-tours for three Egyptian counterparts (2 Senior Rangers and the HEPCA Executive Manager) no other formal training of project counterparts occurred under the interim project. Additional training was designed (with the USAID Development Training 2 Project) but began implementation only during the last month of the PMG program.

a) ***ANNEX 3A: Training Status of Red Sea Rangers.*** This list the completed skills and training courses for each of the 10 EEAA Protectorates staff members located in Hurghada.

> *2-Page Table*

b) ***ANNEX 3B: Monthly Training Reports for September 1998-August 1999.*** This lists the individual training activities completed on a month-by-month basis, including any other major events that added to the Rangers' experience, or limited the training during that month.

> *12-Pages of Tables*

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ANNEX 2C HEPCA INVENTORY From USAID/PMG and EST Projects
(Sorted by Category, Item, Location)

Qty	Item	PROJECT	CATEGORY	S/N	Status	Location	Person Responsible
1	Television	EST	Office Equip	See M Habib	?	HEPCA Office	H Tomoum
1	VCR	EST	Office Equip	See M Habib	?	HEPCA Office	H Tomoum
1	Camera, Sea & Sea U/W	EST	Photography	See M Habib	Lost	Gone	H Tomoum
1	Flash for Sea & Sea U/W Camera	EST	Photography	See M Habib	Lost	Gone	H Tomoum
1	Spare Tire for Trailer	EST	Vehicle	N/A	?	?	H Tomoum
1	Vehicle Trailer	EST	Vehicle	N/A	?	?	H Tomoum

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ANNEX 2C HEPCA INVENTORY From USAID/PMG and EST Projects
(Sorted by Category, Item, Location)

Qty	Item	PROJECT	CATEGORY	S/N	Status	Location	Person Responsible
1	Portable generator (2 4KW)	EST	Mooring Equip	See M Habib	?	?	H Tomoum
1	Punch (Handheld)	EST	Mooring Equip	N/A	OK	HEPCA Shop	H Tomoum
1	Rivet Gun (Replaces Orig)	EST	Mooring Equip	N/A	OK	HEPCA Shop	H Tomoum
2	Screw Drivers (Set of 8 pieces)	EST	Mooring Equip	N/A	OK	HEPCA Shop	H Tomoum
1	Sockets (52 Pieces Set)	EST	Mooring Equip	N/A	Lost	HEPCA Shop	H Tomoum
1	Soldering Iron	EST	Mooring Equip	See M Habib	OK	HEPCA Shop	H Tomoum
2	Spanners (12 pieces Set)	EST	Mooring Equip	N/A	OK	HEPCA Shop	H Tomoum
1	Spirit Level	EST	Mooring Equip	N/A	OK	HEPCA Shop	H Tomoum
3	Stainless Steel Wire (30m)	EST	Mooring Equip	N/A	?	?	H Tomoum
1	Tape Measure Spool (30 or m?)	EST	Mooring Equip	N/A	OK	HEPCA Shop	H Tomoum
3	Tape Measures 5m 25' x 1"w	EST	Mooring Equip	N/A	2 Left	HEPCA Shop	H Tomoum
5	Tool Box	EST	Mooring Equip	N/A	OK	HEPCA Shop	H Tomoum
2	Torch /Flashlight	EST	Mooring Equip	N/A	OK	HEPCA Shop	H Tomoum
1	VHF Radio	EST	Mooring Equip	See M Habib	?	?	H Tomoum
1	Video Camera (Sony 8mm)	EST	Mooring Equip	See M Habib	?	?	H Tomoum
1	Video U/W Housing and Access	EST	Mooring Equip	See M Habib	?	?	H Tomoum
3	Vise Grips (10)	EST	Mooring Equip	N/A	OK	HEPCA Boat	H Tomoum
2	Vise Grips (10)	EST	Mooring Equip	N/A	OK	HEPCA Shop	H Tomoum
Misc	Welding Electrodes (4mm) Box	EST	Mooring Equip	N/A	OK	HEPCA Shop	H Tomoum
1	Welding machine 160 Amp	EST	Mooring Equip	See M Habib	OK	HEPCA Shop	H Tomoum
1	Wire Brush	EST	Mooring Equip	N/A	OK	HEPCA Shop	H Tomoum
2	Wire Cutter 6	EST	Mooring Equip	N/A	1 Left	HEPCA Shop	H Tomoum
1	Wood Clamps (set of 4 pieces)	EST	Mooring Equip	N/A	OK	HEPCA Shop	H Tomoum
2	Air Conditioner	EST	Office Equip	See M Habib	?	HEPCA Office	H Tomoum
10	Chairs	EST	Office Equip	N/A	OK	HEPCA Office	H Tomoum
2	Computer	EST	Office Equip	See M Habib	?	HEPCA Office	H Tomoum
1	Copy Machine Sharp	EST	Office Equip	See M Habib	OK?	HEPCA Office	H Tomoum
3	Desk	EST	Office Equip	N/A	OK	HEPCA Office	H Tomoum
1	FAX Machine Sharp	EST	Office Equip	See M Habib	?	HEPCA Office	H Tomoum
3	File Cabinet	EST	Office Equip	N/A	?	HEPCA Office	H Tomoum
1	Overhead Projector	EST	Office Equip	See M Habib	OK	HEPCA Office	H Tomoum
1	Printer	EST	Office Equip	See M Habib	?	HEPCA Office	H Tomoum
1	Printer HP690	EST	Office Equip	See M Habib	?	HEPCA Office	H Tomoum
1	Projection Screen	EST	Office Equip	N/A	?	HEPCA Office	H Tomoum
1	Refrigerator	EST	Office Equip	See M Habib	?	HEPCA Office	H Tomoum
1	Slide Projector	EST	Office Equip	See M Habib	OK	HEPCA Office	H Tomoum
3	Storage Cabinet	EST	Office Equip	N/A	?	HEPCA Office	H Tomoum
1	Stove	EST	Office Equip	See M Habib	?	HEPCA Office	H Tomoum
1	Telephone Reception Set	EST	Office Equip	See M Habib	?	HEPCA Office	H Tomoum

ANNEX 2C HEPCA INVENTORY From USAID/PMG and EST Projects
(Sorted by Category, Item, Location)

Qty	Item	PROJECT	CATEGORY	S/N	Status	Location	Person Responsible
1	Drive Gad Shank 1 1/8' SG 18 EMI	PMG	Mooring Equip	N/A	OK	HEPCA Boat	H Tomoum
1	Drive Gad Tip SG 3 EMI	PMG	Mooring Equip	N/A	OK	HEPCA Boat	H Tomoum
1	Electric Angle Grinder	EST	Mooring Equip	See M Habib	OK	HEPCA Boat	H Tomoum
1	Electric Angle Grinder 4 5' Bosch	EST	Mooring Equip	See M Habib	OK	HEPCA Shop	H Tomoum
1	Electric Angle Grinder 9 Bosch	EST	Mooring Equip	See M Habib	OK	HEPCA Shop	H Tomoum
1	Electric Bench Grinder 9	EST	Mooring Equip	See M Habib	OK	HEPCA Shop	H Tomoum
1	Electric Hand Drill 13mm, Bosch 500W Green	EST	Mooring Equip	See M Habib	?	?	H Tomoum
1	Electric Hand Drill Bosch 750W, Blue	EST	Mooring Equip	See M Habib	OK	HEPCA Shop	H Tomoum
1	Electric Jig Saw Bosch 50pst	EST	Mooring Equip	See M Habib	OK	HEPCA Shop	H Tomoum
1	Electric Outlet Tester	EST	Mooring Equip	N/A	OK	HEPCA Shop	H Tomoum
1	Electric Suitcase (?)	EST	Mooring Equip	NA	?	?	H Tomoum
2	Eye Glasses for Welding	EST	Mooring Equip	N/A			H Tomoum
2	Eye Shields for Normal Use	EST	Mooring Equip	N/A	OK	HEPCA Shop	H Tomoum
2	Eye Shields for Welding	EST	Mooring Equip	N/A	OK	HEPCA Shop	H Tomoum
1	First Aid Kit	EST	Mooring Equip	N/A	?	?	H Tomoum
1	GPS (Differential Boat mountable)	EST	Mooring Equip	See M Habib	OK	HEPCA Office	H Tomoum
25	Grinding Disks 9	EST	Mooring Equip	N/A	14 Left	HEPCA Shop	H Tomoum
25	Grinding Disks (4')	EST	Mooring Equip	N/A	18 Left	HEPCA Shop	H Tomoum
40	Hacksaw Blades	EST	Mooring Equip	N/A	some	HEPCA Shop	H Tomoum
2	Hacksaw, Stainless	EST	Mooring Equip	N/A	1 Bad	HEPCA Shop	H Tomoum
6	Hammers	EST	Mooring Equip	N/A	Gone	Lost	H Tomoum
2	Lamp and Cable	EST	Mooring Equip	N/A	OK	HEPCA Shop	H Tomoum
25	Lubricating Oil Spray Can (WD40)	EST	Mooring Equip	N/A	Consumed	Gone	H Tomoum
2	Measuring Meter Stick Wood Collapsible	EST	Mooring Equip	N/A	OK	HEPCA Shop	H Tomoum
2	Metal Angle Guides	EST	Mooring Equip	N/A	OK	HEPCA Shop	H Tomoum
1	Metal Bolt Cutter 42	EST	Mooring Equip	N/A	OK	HEPCA Shop	H Tomoum
5	Metal Tool Boxes	EST	Mooring Equip	N/A	OK	HEPCA Shop	H Tomoum
1	Meter Stick (Metal)	EST	Mooring Equip	N/A	OK	HEPCA Shop	H Tomoum
1	Oxygen Regulator	EST	Mooring Equip	See M Habib	OK	HEPCA Shop	H Tomoum
2	Oxygen Tanks (for welding)	EST	Mooring Equip	See M Habib	OK	HEPCA Shop	H Tomoum
1	Pipe Wrench 10'	EST	Mooring Equip	N/A	OK	HEPCA Boat	H Tomoum
1	Pipe Wrench 10	EST	Mooring Equip	N/A	OK	HEPCA Shop	H Tomoum
2	Pipe Wrench 12	EST	Mooring Equip	N/A	OK	HEPCA Boat	H Tomoum
2	Pipe Wrench 12	EST	Mooring Equip	N/A	OK	HEPCA Shop	H Tomoum
2	Pipe Wrench 14	EST	Mooring Equip	N/A	?	?	H Tomoum
2	Pliers 8	EST	Mooring Equip	N/A	OK	HEPCA Shop	H Tomoum

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ANNEX 2C HEPCA INVENTORY From USAID/PMG and EST Projects
(Sorted by Category, Item, Location)

Qty	Item	PROJECT	CATEGORY	S/N	Status	Location	Person Responsible
1	Buoy and Reel	EST	Diving Equip	N/A	?	Not Received	H Tomoum
4	Dive Computer (Aladin Pro)	EST	Diving Equip	See M Habib	OK	HEPCA Boat	H Tomoum
5	Diver alarm (Rattles)	EST	Diving Equip	N/A	?	Not Received	H Tomoum
5	Diving Mask	EST	Diving Equip	N/A	Dead	Gone	H Tomoum
4	Diving Mesh Bag (small)	EST	Diving Equip	N/A	?	?	H Tomoum
5	Diving Wetsuit Boots	EST	Diving Equip	N/A	Dead	Gone	H Tomoum
5	Slates, U/W	EST	Diving Equip	N/A	OK	HEPCA Shop	H Tomoum
3	Weight Belt	EST	Diving Equip	N/A	Consumed	Gone	H Tomoum
1	Weight Belt	EST	Diving Equip	N/A	OK	HEPCA Boat	H Tomoum
1	Wetsuit 2 Piece Scubapro	EST	Diving Equip	N/A	OK	HEPCA Boat	H Tomoum
3	Wetsuit 2 Piece, Scubapro	EST	Diving Equip	N/A	OK	HEPCA Shop	H Tomoum
2	5 gal gas canister	EST	Mooring Equip	N/A	1 Left	HEPCA Boat	H Tomoum
1	Adjustable Spanner 6'	EST	Mooring Equip	N/A	OK	HEPCA Shop	H Tomoum
2	Adjustable Spanner 8'	EST	Mooring Equip	N/A	OK	HEPCA Shop	H Tomoum
2	Adjustable Spanner 10	EST	Mooring Equip	N/A	?	?	H Tomoum
2	Adjustable Spanner 12'	EST	Mooring Equip	N/A	?	?	H Tomoum
1	Adjustable Spanner 12"	EST	Mooring Equip	N/A	OK	HEPCA Shop	H Tomoum
2	Adjustable Spanner 15'	EST	Mooring Equip	N/A	?	?	H Tomoum
1	Adjustable Spanner 15"	EST	Mooring Equip	N/A	OK	HEPCA Boat	H Tomoum
2	Adjustable Spanner 18"	EST	Mooring Equip	N/A	OK	HEPCA Shop	H Tomoum
1	Air Gun / Drill (short mouth)	EST	Mooring Equip	N/A	OK	HEPCA Shop	H Tomoum
1	Air Pipe w/ 15m Hose for Air Gun	EST	Mooring Equip	N/A	OK	HEPCA Shop	H Tomoum
1	Alan Keys Stanley Set	EST	Mooring Equip	N/A	OK	HEPCA Shop	H Tomoum
2	Alan Keys Stainless Set	EST	Mooring Equip	N/A	OK	HEPCA Boat	H Tomoum
1	Battery Charger (12 V)	EST	Mooring Equip	See M Habib	OK	HEPCA Shop	H Tomoum
1	Bench Vice 6 (blue)	EST	Mooring Equip	N/A	OK	HEPCA Shop	H Tomoum
1	Bench Vise (4)	EST	Mooring Equip	N/A	OK	HEPCA Cont	H Tomoum
2	Blades for Steel (Set)	EST	Mooring Equip	N/A	OK	HEPCA Shop	H Tomoum
2	Blades for Wood (Set)	EST	Mooring Equip	N/A	OK	HEPCA Shop	H Tomoum
1	Box of Damper Stamps (0 9)	EST	Mooring Equip	N/A	OK	HEPCA Shop	H Tomoum
1	Box of Damper Stamps (A Z)	EST	Mooring Equip	N/A	OK	HEPCA Shop	H Tomoum
1	Caliper	EST	Mooring Equip	N/A	OK	HEPCA Shop	H Tomoum
2	Cutting Knife - Stanley	EST	Mooring Equip	N/A	OK	HEPCA Boat	H Tomoum
3	Cutting Knife Stanley	EST	Mooring Equip	N/A	OK	HEPCA Shop	H Tomoum
5	Diving Knives	EST	Mooring Equip	N/A	Broken	Gone	H Tomoum
1	Drive Gad Set	EST	Mooring Equip	N/A	OK	HEPCA Cont	H Tomoum
3	Drive Gad Couplers	EST	Mooring Equip	N/A	Bad	HEPCA Cont	H Tomoum
3	Drive Gad Couplers	EST	Mooring Equip	N/A	New	HEPCA Cont	H Tomoum
2	Drive Gad Extension, SG 2 EMI	PMG	Mooring Equip	N/A	OK	HEPCA Boat	H Tomoum

ANNEX 2B EEAA Inventory From USAID/PMG and EST Projects
(Sorted by Location, Category, Person)

Qty	Item	PROJECT	CATEGORY	S/N	EEAA ID #	Status	Location	Person Responsible
1	Hydraulic Drill	EST	Mooring Equip	See M Habib	TBD	OK	HEPCA Boat	H Tomoum
1	Hydraulic Hammer	EST	Mooring Equip	N/A	TBD	OK	HEPCA Boat	H Tomoum
1	Hydraulic Power Unit	EST	Mooring Equip	See M Habib	TBD	OK	HEPCA Boat	H Tomoum
1	Load Locker for Mantas	EST	Mooring Equip	N/A	TBD	OK	HEPCA Boat	H Tomoum
1	Set Hydraulic Hoses	EST	Mooring Equip	N/A	TBD	OK	HEPCA Boat	H Tomoum
63	18 Halas Polyurethene Buoy	EST	Mooring Equip	N/A	TBD	New	HEPCA Cont	H Tomoum
11	18 Halas Polyurethene Buoy	EST	Mooring Equip	N/A	TBD	Used	HEPCA Cont	H Tomoum
59	18 Halas Polyurethene Buoy	EST	Mooring Equip	N/A	TBD	Dead	HEPCA Cont	H Tomoum
6	600' Roll 7/8 Poly White Heavy Duty Line	EST	Mooring Equip	N/A	TBD	OK	HEPCA Cont	H Tomoum
134	600 Roll 7/8 Poly Yellow u/v treated Line	EST	Mooring Equip	N/A	TBD	OK	HEPCA Cont	H Tomoum
3m	Chafing Hose (Blue)	EST	Mooring Equip	N/A	TBD	OK	HEPCA Cont	H Tomoum
3	Couplers for Drive Gad	EST	Mooring Equip	N/A	TBD	Bad	HEPCA Cont	H Tomoum
3	Couplers for Drive Gad	EST	Mooring Equip	N/A	TBD	New	HEPCA Cont	H Tomoum
1	Drive Gad Set	EST	Mooring Equip	N/A	TBD	OK	HEPCA Cont	H Tomoum
60	Lead Sheets (1/4' thick)	EST	Mooring Equip	N/A	TBD	OK	HEPCA Cont	H Tomoum
112	Manta Ray MR1 Anchor	EST	Mooring Equip	N/A	TBD	OK	HEPCA Cont	H Tomoum
300	Mooring Pin USA Made (18 inches)	EST	Mooring Equip	N/A	TBD	1 Left	HEPCA Cont	H Tomoum
1	Boring Drill Bit	EST	Mooring Equip	N/A	TBD	OK	HEPCA Shop	H Tomoum
1	1997 Jeep Cherokee (JEEP 2)	EST	Vehicle	See A Kamel	TBD	OK	HEPCA/Hurg	H Tomoum

ANNEX 2B EEAA Inventory From USAID/PMG and EST Projects
(Sorted by Location, Category, Person)

Qty	Item	PROJECT	CATEGORY	S/N	EEAA ID #	Status	Location	Person Responsible
4	Chair for Desk	EST	Office Equip	N/A	TBD	OK	EST Office	S El Halawani
1	Computer Table	EST	Office Equip	N/A	TBD	OK	EST Office	S El Halawani
8	Conference Chairs	EST	Office Equip	N/A	TBD	OK	EST Office	S El Halawani
4	Desks Wooden Flat	EST	Office Equip	N/A	TBD	OK	EST Office	S El Halawani
1	Fax Machine	EST	Office Equip	5GBHB026844	TBD	OK	EST Office	S El Halawani
1	File Cabinet 4 Drawer	EST	Office Equip	N/A	TBD	OK	EST Office	S El Halawani
4	File Cabinets 2 Drawer	EST	Office Equip	N/A	TBD	OK	EST Office	S El Halawani
1	Hot Plate Olympic	PMG	Office Equip	N/A	TBD	Dead	EST Office	S El Halawani
1	HP DeskJet printer	?	Office Equip	SG63B1P0YC	TBD	OK	EST Office	S El Halawani
1	Low Storage Cabinet	EST	Office Equip	N/A	TBD	OK	EST Office	S El Halawani
4	Metal Bookcases	EST	Office Equip	N/A	TBD	OK	EST Office	S El Halawani
1	Mobica Arm Chair	PMG	Office Equip	N/A	TBD	OK	EST Office	S El Halawani
1	Round Conference Table	EST	Office Equip	N/A	TBD	OK	EST Office	S El Halawani
1	Storage Cabinet - Wooden	EST	Office Equip	N/A	TBD	OK	EST Office	S El Halawani
1	Xerox photocopier 5824	PMG	Office Equip	335570	TBD	OK	EST Office	S El Halawani
1	Buoyancy Compensator SCUBAPRO (Dr H s)	EST	Diving Equip	N/A	TBD	OK	EST/Hurg	M Habib
1	Wetsuit 2 Piece (Dr H s)	EST	Diving Equip	N/A	TBD	OK	EST/Hurg	M Habib
1	Adjusable wrench Size 10	EST	Misc Field Equip	N/A	TBD	OK	EST/Hurg	M Habib
3	Box of nails (about 500 Per each)	EST	Misc Field Equip	N/A	TBD	OK	EST/Hurg	M Habib
1	Drill Probes 6 MM 5 Pieces	EST	Misc Field Equip	N/A	TBD	OK	EST/Hurg	M Habib
1	Drill Probes 8 MM 6 Pieces	EST	Misc Field Equip	N/A	TBD	OK	EST/Hurg	M Habib
1	Hydraulic Driller	EST	Misc Field Equip	N/A	TBD	Poor	EST/Hurg	M Habib
1	Metal Wired Tape Freeman's Record	EST	Misc Field Equip	N/A	TBD	Poor	EST/Hurg	M Habib
1	Saw Plates Ultra Major 10D/24T	EST	Misc Field Equip	N/A	TBD	OK	EST/Hurg	M Habib
1	Sawing Device Sand Vik 226 (2pieces)	EST	Misc Field Equip	N/A	TBD	OK	EST/Hurg	M Habib
1	U/W Hydraulic Drill Blue point at 800	EST	Misc Field Equip	31,873,00	TBD	OK	EST/Hurg	M Habib
2	Vice Grip Locking wrench	EST	Misc Field Equip	N/A	TBD	OK	EST/Hurg	M Habib
1	1997 Jeep Cherokee (JEEP 3)	EST	Vehicle	See A Kamel	TBD	OK	EST/Hurg	A Kamel
1	Drive Gad Carry Bag, GB 1 EMI	PMG	Mooring Equip	N/A	TBD	OK	HEPCA Boat	H Tomoum
2	Drive Gad Extension, SG 2 EMI	PMG	Mooring Equip	N/A	TBD	OK	HEPCA Boat	H Tomoum
1	Drive Gad Shank 1 1/8 SG 18 EMI	PMG	Mooring Equip	N/A	TBD	OK	HEPCA Boat	H Tomoum
1	Drive Gad Tip SG 3 EMI	PMG	Mooring Equip	N/A	TBD	OK	HEPCA Boat	H Tomoum
Misc	Hydraulic Couplers	EST	Mooring Equip	N/A	TBD	OK	HEPCA Boat	H Tomoum

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ANNEX 2B EEAA Inventory From USAID/PMG and EST Projects
(Sorted by Location, Category, Person)

Qty	Item	PROJECT	CATEGORY	S/N	EEAA ID #	Status	Location	Person Responsible
1	Computer Mouse	?	Computer	40212933	TBD	OK	EEAA/Qusier	A Eliwa
2	Computer Speakers	?	Computer	80404091	TBD	OK	EEAA/Qusier	A Eliwa
1	Computer Terminal	?	Computer	280 61315436	TBD	OK	EEAA/Qusier	A Eliwa
2	Arm Chair	PMG	Office Equip	N/A	TBD	OK	EEAA/Qusier	A Eliwa
1	Desk 4 Drawer	PMG	Office Equip	N/A	TBD	OK	EEAA/Qusier	A Eliwa
1	Desk 7 Drawer	PMG	Office Equip	N/A	TBD	OK	EEAA/Qusier	A Eliwa
1	Fan (Fresh Air Fan)	PMG	Office Equip	N/A	TBD	OK	EEAA/Qusier	A Eliwa
1	Fax Machine	EST	Office Equip	6KBHA020360	TBD	OK	EEAA/Qusier	A Eliwa
2	Glass Table Small	PMG	Office Equip	N/A	TBD	OK	EEAA/Qusier	A Eliwa
1	HP DeskJet printer	?	Office Equip	SG8311XORC	TBD	OK	EEAA/Qusier	A Eliwa
2	Kitchen Cabinet	PMG	Office Equip	N/A	TBD	OK	EEAA/Qusier	A Eliwa
1	Wooden Closet	PMG	Office Equip	N/A	TBD	OK	EEAA/Qusier	A Eliwa
1	Wooden File Cabinet	PMG	Office Equip	N/A	TBD	OK	EEAA/Qusier	A Eliwa
1	Xerox photocopier 5254	EST	Office Equip	See S El Halawani	TBD	OK	EEAA/Qusier	A Eliwa
1	35 MM U/W Camera Sea & Sea Motor Marine 2	PMG	Photography	See M Habib	TBD	OK	EEAA/Qusier	A Eliwa
1	Flash Sea & Sea YS 80	PMG	Photography	See M Habib	TBD	OK	EEAA/Qusier	A Eliwa
1	1997 Jeep Cherokee (JEEP 1)	EST	Vehicle	See A Kamel	TBD	OK	EEAA/Qusier	A Eliwa
1	4 8m Zebec inflatable boat	PMG	Boat	Molly 3	TBD	OK	EEAA/Storage	S Soliman
1	Mercury Outboard Engine, 40 HP, Model 40m/alt	PMG	Boat	See M Habib	TBD	OK	EEAA/Storage	S Soliman
1	Air Compressor Bauer Utilus	PMG	Diving Equip	See M Habib	TBD	OK	EEAA/Storage	A Afifi
1	Computer CPU	?	Computer	See S El Halawani	TBD	OK	EST Office	EST Manager
1	Computer CPU	?	Computer	K7FBW	TBD	OK	EST Office	EST Manager
1	Computer keyboard	?	Computer	See S El Halawani	TBD	OK	EST Office	EST Manager
1	Computer power supply	?	Computer	PB9747215932	TBD	OK	EST Office	EST Manager
2	Computer Speakers	?	Computer	SBC BM100 PHLLIPS	TBD	OK	EST Office	EST Manager
1	Computer keyboard	?	Computer	M960244393	TBD	OK	EST Office	EST Manager
1	Computer Mouse	?	Computer	See S El Halawani	TBD	OK	EST Office	EST Manager
1	Computer Mouse	?	Computer	3585151	TBD	OK	EST Office	EST Manager
2	Computer Speakers	?	Computer	See S El Halawani	TBD	OK	EST Office	EST Manager
1	Computer Terminal	?	Computer	See S El Halawani	TBD	OK	EST Office	EST Manager
1	Computer Terminal	?	Computer	84767A1B16 97	TBD	OK	EST Office	EST Manager
1	Computer CPU	?	Computer	F825K4	TBD	OK	EST Office	S El Halawani
1	Computer Mouse	?	Computer	733DO2464	TBD	OK	EST Office	S El Halawani
2	Computer Speakers	?	Computer	80404089	TBD	OK	EST Office	S El Halawani
1	Computer keyboard	?	Computer	CMYKPQ6987	TBD	OK	EST Office	S El Halawani
1	Computer Terminal	?	Computer	280 61315566	TBD	OK	EST Office	S El Halawani
1	Laser printer	?	Office Equip	See S El Halawani	TBD	OK	EST Office	EST Manager
7	Bed Sheets	EST	Office Equip	N/A	TBD	OK	EST Office	S El Halawani

ANNEX 2B EEAA Inventory From USAID/PMG and EST Projects
(Sorted by Location, Category, Person)

Qty	Item	PROJECT	CATEGORY	S/N	EEAA ID #	Status	Location	Person Responsible
4	Sofa	EST	Office Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
1	Step Ladder (2 step)	PMG	Office Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
1	Storage Cabinet Metal, Locking	PMG	Office Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
1	Stove	EST	Office Equip	See S El Halawani	TBD	OK	EEAA/Hurg	A Afifi
3	Table	EST	Office Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
1	Table for slide projector	PMG	Office Equip	See S El Halawani	TBD	OK	EEAA/Hurg	A Afifi
1	Telephone Switchboard - Panasonic	PMG	Office Equip	See S El Halawani	TBD	OK	EEAA/Hurg	A Afifi
1	Television 21 Inch Panasonic	PMG	Office Equip	See S El Halawani	TBD	OK	EEAA/Hurg	A Afifi
1	Uno Vacuum Cleaner	PMG	Office Equip	See S El Halawani	TBD	OK	EEAA/Hurg	A Afifi
1	VCR Video Multi System Panasonic	PMG	Office Equip	See S El Halawani	TBD	OK	EEAA/Hurg	A Afifi
1	Washing Machine	EST	Office Equip	See S El Halawani	TBD	OK	EEAA/Hurg	A Afifi
1	35 MM U/W Camera Sea & Sea Motor Marine 2	EST	Photography	See M Habib	TBD	Dead Traded	EEAA/Hurg	A Afifi
1	35 MM U/W Camera Sea & Sea Motor Marine 2	PMG	Photography	940,114 630,00	TBD	OK	EEAA/Hurg	A Afifi
1	35 MM U/W Camera Sea & Sea Motor Marine 2	PMG	Photography	See M Habib	TBD	OK	EEAA/Hurg	A Afifi
1	Flash Sea & Sea YS 80	EST	Photography	See M Habib	TBD	OK	EEAA/Hurg	A Afifi
1	Flash, Sea & Sea YS 80	PMG	Photography	See M Habib	TBD	OK	EEAA/Hurg	A Afifi
1	Kodak 356 mm Pro star 333	PMG	Photography	N/A	TBD	OK	EEAA/Hurg	A Afifi
1	U/W Lense 20 MM	PMG	Photography	891,013,683,00	TBD	OK	EEAA/Hurg	A Afifi
1	View finder top mount for 20 MM lense	PMG	Photography	NVF 023186	TBD	OK	EEAA/Hurg	A Afifi
1	Yashica 35 mm 120 mm zoom	EST	Photography	11,124,00	TBD	OK	EEAA/Hurg	A Afifi
1	Yashica??	EST	Photography	See M Habib	TBD	?	EEAA/Hurg	A Afifi
1	1999 Ford Truck With King Cab	PMG	Vehicle	See A Afifi	TBD	OK	EEAA/Hurg	A Afifi
1	1999 Jeep Cherokee (JEEP 4)	PMG	Vehicle	See A Afifi	TBD	OK	EEAA/Hurg	A Afifi
1	Ford Truck drive belt	PMG	Vehicle Spares	F65Z - 8620 JB	TBD	OK	EEAA/Hurg	A Afifi
1	Ford Truck electrical trailer tow	PMG	Vehicle Spares	F150 F250	TBD	OK	EEAA/Hurg	A Afifi
5	Ford Truck oil filter	PMG	Vehicle Spares	FL - 820S	TBD	OK	EEAA/Hurg	A Afifi
1	Ford Truck bottom hose	PMG	Vehicle Spares	F85Z8286 GA	TBD	OK	EEAA/Hurg	A Afifi
2	Ford Truck cleaner blade	PMG	Vehicle Spares	F80Z - 17528 - CA	TBD	OK	EEAA/Hurg	A Afifi
8	Ford Truck conical air filter	PMG	Vehicle Spares	FA 1632	TBD	OK	EEAA/Hurg	A Afifi
5	Ford Truck fuel filter	PMG	Vehicle Spares	FG 986B	TBD	OK	EEAA/Hurg	A Afifi
1	Ford Truck metal scriber	PMG	Vehicle Spares	N/A	TBD	OK	EEAA/Hurg	A Afifi
1	Ford Truck radiator hose	PMG	Vehicle Spares	F6528260BA	TBD	OK	EEAA/Hurg	A Afifi
1	Computer CPU	?	Computer	9504260821	TBD	OK	EEAA/Qusier	A Eliwa
1	Computer keyboard	?	Computer	7011618	TBD	OK	EEAA/Qusier	A Eliwa

ANNEX 2B EEAA Inventory From USAID/PMG and EST Projects
(Sorted by Location, Category, Person)

Qty	Item	PROJECT	CATEGORY	S/N	EEAA ID #	Status	Location	Person Responsible
1	VHF Radio Fixed (25 Watt Horizon Omni)	PMG	Misc Field Equip	68U510097 or 66U540189	TBD	OK	EEAA/Hurg	A Afifi
1	GPS Fixed Garmin 120 XL	EST	Misc Field Equip	64,918 369,00	TBD	OK	EEAA/Hurg	A Afifi
1	GPS Hand Held 2000 XL Magellan	PMG	Misc Field Equip	00 62013 000	TBD	OK	EEAA/Hurg	A Afifi
1	Binoculars Olympus	EST	Misc Field Equip	285235	TBD	OK	EEAA/Hurg	A Afifi
?	SPOTGUN COTS Injection Guns	PMG	Misc Field Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
1	Tool Kit Sea Bowld Marine 57 pieces	PMG	Misc Field Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
1	VHF Hand Held Radio (ShortWave 3KM Range)	EST	Misc Field Equip	2572 2078	TBD	OK	EEAA/Hurg	A Afifi
1	VHF Hand Held Radio (ShortWave 3KM Range)	EST	Misc Field Equip	2572 2078	TBD	OK	EEAA/Hurg	A Afifi
3	Arm Chair	PMG	Office Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
8	Armchairs	EST	Office Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
4	Armless Chair	EST	Office Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
5	Beds (Junior Size)	EST	Office Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
1	Bookcase	EST	Office Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
2	Chair for Desk	EST	Office Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
2	Desk	EST	Office Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
1	Desk 7 Drawer	PMG	Office Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
6	Dining Room Chair	EST	Office Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
1	Dining Table	EST	Office Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
1	Fax Panasonic	PMG	Office Equip	See S El Halawani	TBD	OK	EEAA/Hurg	A Afifi
2	File Cabinet	EST	Office Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
2	Glass Table Big	PMG	Office Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
1	Hot Plate Olympic	PMG	Office Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
1	HP DeskJet printer	?	Office Equip	5G6CU1B1V4	TBD	OK	EEAA/Hurg	A Afifi
1	HP LaserJet printer	?	Office Equip	2t278942	TBD	OK	EEAA/Hurg	A Afifi
5	Mattress (Junior Size)	EST	Office Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
2	Metal Chandeliers	EST	Office Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
2	Night Stand	EST	Office Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
1	Nova Washing Machine	PMG	Office Equip	See S El Halawani	TBD	OK	EEAA/Hurg	A Afifi
1	Overhead Projector Kodak	PMG	Office Equip	See S El Halawani	TBD	OK	EEAA/Hurg	A Afifi
6	Pillow	EST	Office Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
1	Projection Screen Dalite	PMG	Office Equip	See S El Halawani	TBD	OK	EEAA/Hurg	A Afifi
1	Refrigerator	EST	Office Equip	See S El Halawani	TBD	OK	EEAA/Hurg	A Afifi
1	Security Safe	PMG	Office Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
1	Set of China	EST	Office Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
1	Slide Projector, Kodak Carousel	PMG	Office Equip	See S El Halawani	TBD	OK	EEAA/Hurg	A Afifi

ANNEX 2B EEAA Inventory From USAID/PMG and EST Projects
(Sorted by Location, Category, Person)

Qty	Item	PROJECT	CATEGORY	S/N	EEAA ID #	Status	Location	Person Responsible
6	Instrument Console, SCUBAPRO two pieces (Depth Air Press)	EST	Diving Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
4	Instrument Console Sherwood, Three pieces (Depth, Air Press Compass)	PMG	Diving Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
10	Jumbo kit bag	EST & PMG	Diving Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
4	Lithium batteries	EST	Diving Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
6	Mask	EST	Diving Equip	N/A	TBD	4 Broken	EEAA/Hurg	A Afifi
5	Mask (2 with Optical Lenses)	PMG	Diving Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
12	Mouth piece	EST & PMG	Diving Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
10	Neoprene hoods	EST & PMG	Diving Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
5	NI CD Charger	EST & PMG	Diving Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
30	O ring	EST & PMG	Diving Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
6	Octopus SCUBAPRO R 190	EST	Diving Equip	See M Habib	TBD	OK	EEAA/Hurg	A Afifi
4	Octopus SCUBAPRO R 190	PMG	Diving Equip	See M Habib	TBD	OK	EEAA/Hurg	A Afifi
10	Pairs neoprene (pads)	EST & PMG	Diving Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
10	Pairs of Neoprene Boots	EST & PMG	Diving Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
4	Regulator SCUBAPRO MK2	PMG	Diving Equip	See M Habib	TBD	OK	EEAA/Hurg	A Afifi
6	Regulator SCUBAPRO R 190	EST	Diving Equip	See M Habib	TBD	OK	EEAA/Hurg	A Afifi
12	Snorkel	EST & PMG	Diving Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
10	Spare batteries pack (Torch)	EST & PMG	Diving Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
6	Tank boots	EST	Diving Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
4	Tank boots	PMG	Diving Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
10	Tube Silicon grease	EST & PMG	Diving Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
10	Weight belt	EST & PMG	Diving Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
100	Weights one kg	EST	Diving Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
6	Wet suit two pieces	EST	Diving Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi, A Eliwa, Y Said, T Kamel, W Fattah, Spare
1	Wet suit - One Piece, 5mm	PMG	Diving Equip	N/A	TBD	OK	EEAA/Hurg	H Harp
4	Wet suit two pieces	PMG	Diving Equip	N/A	TBD	OK	EEAA/Hurg	M Abass, A Salem,
~500 m	Chains Heavy Duty	EU	EU/Sinai	N/A	TBD	OK	EEAA/Hurg	A Afifi
13	Sea Anchors	EU	EU/Sinai	N/A	TBD	OK	EEAA/Hurg	A Afifi
misc	4 rulers and 3 clipboard	PMG	Misc Field Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
1	Binocular Olympus	EST	Misc Field Equip	2,855,235,00	TBD	OK	EEAA/Hurg	A Afifi
1	Binocular Olympus?	EST	Misc Field Equip	?See M Habib	TBD	?	EEAA/Hurg	A Afifi
2	Cooler Chests	PMG	Misc Field Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
1	VHF Radio Fixed (25 Watt Horizon Omni)	PMG	Misc Field Equip	62U510097	TBD	OK	EEAA/Hurg	A Afifi

ANNEX 2B EEAA Inventory From USAID/PMG and EST Projects
(Sorted by Location, Category, Person)

Qty	Item	PROJECT	CATEGORY	S/N	EEAA ID #	Status	Location	Person Responsible
1	6 8m RHIBoat with 220 HP Cummins Engine	EST	Boat	Molly 1	TBD	OK	EEAA/Hilton Marina	S Soliman
1	6 8m RHIBoat with 220 HP Cummins Engine	EST	Boat	Molly 2	TBD	OK	EEAA/Hilton Marina	S Soliman
2	Boat Trailers for Molly 1 and 2	EST	Boat	N/A	TBD	OK	EEAA/Hilton Marina	S Soliman
2	Foot Pump for Willard Inflatables (Mollys)	PMG	Boat	N/A	TBD	OK	EEAA/Hilton Marina	S Soliman
6	Cummins (Molly) oil filter	PMG	Boat	3932217 LF 3349	TBD	OK	EEAA/Hurg	S Soliman
1	GPS on Molly	EST	Boat	See M Habib	TBD	OK	EEAA/Hurg	S Soliman
1	VHF Radio on Molly	EST	Boat	See M Habib	TBD	OK	EEAA/Hurg	S Soliman
1	Computer CPU	?	Computer	950426085T	TBD	OK	EEAA/Hurg	A Afifi
1	Computer CPU	?	Computer	950426098t	TBD	OK	EEAA/Hurg	A Afifi
1	Computer keyboard	?	Computer	K620902557	TBD	OK	EEAA/Hurg	A Afifi
1	Computer keyboard	?	Computer	CMYKPQ6987	TBD	OK	EEAA/Hurg	A Afifi
1	Computer Mouse	?	Computer	3449744	TBD	OK	EEAA/Hurg	A Afifi
1	Computer Mouse	?	Computer	3449773	TBD	OK	EEAA/Hurg	A Afifi
2	Computer Speakers	?	Computer	80404093	TBD	OK	EEAA/Hurg	A Afifi
1	Computer Terminal	?	Computer	280 61315574	TBD	OK	EEAA/Hurg	A Afifi
1	Computer Terminal	?	Computer	280 61309690	TBD	OK	EEAA/Hurg	A Afifi
6	Aluminum 12 liter SCUBA Cylinder w/Mesh Cover	EST	Diving Equip	See M Habib	TBD	OK	EEAA/Hurg	A Afifi
4	Aluminum 12 liter SCUBA Cylinder w/Mesh Cover	PMG	Diving Equip	See M Habib	TBD	OK	EEAA/Hurg	A Afifi
6	Buoyancy Compensator SCUBAPRO	EST	Diving Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
4	Buoyancy Compensator SCUBAPRO	PMG	Diving Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
8	Diving computer Alladin Pro	PMG	Diving Equip	See M Habib	TBD	OK	EEAA/Hurg	A Afifi
2	Diving computer Alladin Pro	EST	Diving Equip	See M Habib	TBD	OK	EEAA/Hurg	A Afifi
6	Diving knife	EST	Diving Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
4	Diving knife (Wenoka)	PMG	Diving Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
10	Diving torch SCUBAPRO Rechargeable	EST & PMG	Diving Equip	N/A	TBD	1 Broken	EEAA/Hurg	A Afifi
6	Fins	EST	Diving Equip	N/A	TBD	3 Gone	EEAA/Hurg	A Afifi
4	Fins	PMG	Diving Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
6	Fins buckles	EST	Diving Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
12	Fins strap	EST & PMG	Diving Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
10	Halogen bulb	EST & PMG	Diving Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi
6	Head strap	EST & PMG	Diving Equip	N/A	TBD	OK	EEAA/Hurg	A Afifi

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ANNEX 2A PROCUREMENT AND OPERATIONS BUDGET

AMENDED WORKPLAN BUDGET FOR PMG MAY 1999 EXTENSION

ITEM #	Procurement items	Red Sea Marine Park 1998	Purchased as of 28 Feb '99	Spent as of 28 Feb '99	Cost Estimate to complete
1	Jeep Cherokee & Extended Cab Truck	$64,000 00	2 Vehicles	$64,000 00	$6 000 00
2	U/W Camera	$1,200 00	1 Kit, 1 replacment	$1,100 00	$375 00
3	TV and VCR (Hurgada only)	$1,200 00		$0 00	$1,200 00
4	- Overhead and Slide Projector	$3 000 00		$0 00	$2,000 00
5	- Scuba Gear (4 Full Sets)	$15,000 00	W suits, masks, fins,Misc	$2,800 00	$7 000 00
6	- Small Inflatable with Engine	$8,000 00	Boat & Engine	$8005 00	$0 00
7	Portable Air Compressor	$8,000 00		$0 00	$7,000 00
8	Tools for the Boat	$1,200 00	Small Kit Misc Tools	$100 00	$200 00
9	VHF Radios (1Base, 2 Mobile)	$5 500 00		$0 00	$3,000 00
10	GPS Portable Receivers (2 Small)	$900 00	1 Magellen	$400 00	$500 00
11	Office Equipment (Computers, Fax Etc)	$25 000 00	2 Upgrades, 1 Computer	$5 000 00	$5,000 00
12	Misc Field Equipment	$6,300 00		$5 000 00	$1,300 00
	Totals	**$139,300 00**		**$86,405 00**	**$32,800 00**
				New total =	**$119,205 00**

Item #	Operations	1998		28 Feb '99	To complete
	Ranger operations				
13	Ranger operations misc	$17,650 00		$47,765 00	$6,764 00
14	Ranger office furnishings and phone	$8,825 00		$7,277 00	$370 00
15	Ranger Boat lease	$6,000 00		$4,555 00	$1,445 00
16	Ranger and EST Hurghada office lease	$39,200 00		$51,977 00	$3,529 00
17	Ranger Quesir office lease	$4,800 00		$5 290 00	$1 176 00
	Total	**$76,475 00**		**$116,864**	**$13,284 00**
				New total=	**$138,727 00**
	HEPCA support				
	Divers salaries	$5,900 00		$41,502 00	$9,100 00
	Boat lease	$45,600 00		$68,359 00	$14,500 00
	Office support	$50,400 00		$65,662 00	$9,500 00
	Totals	**$101,900 00**		**$175,523**	**$33,100 00**
				New total =	**$208,623 00**

ANNEX 2:

Procurement and Inventory

12 Pages of Tables

This Annex consists of three elements:

a) ***Annex 2A: Amended PMG Procurement and Operations Budget*** This summarizes the last PMG procurement plan approved by EEAA-NCS. ***1-Page Table***

b) ***Annex 2B: PMG Inventory of Major EEAA-Owned Equipment.*** This lists the major items that were purchased with USAID funds and that have already been, or will eventually be turned over to the EEAA Protectorates. The list includes the name of the organization (EEAA Rangers, PMG/Hurghada Office, or the HEPCA Technical Team) that presently has possession of the item(s) as of the end of the PMG Project. ***7-Page Table***

c) ***Annex 2C: EST/PMG Inventory of HEPCA-Owned Equipment*** This lists the major equipment and items that were purchased under the EST and PMG projects for HEPCA other than those items that will be passed over to EEAA Protectorates under the mooring contract. ***4-Page Table***

BEST AVAILABLE COPY

ANNEX 1. RED SEA RANGERS/HURGHADA PATROL SUMMARY
Jan-Aug 1999

MONTH	DAY	PATROL				NO PATROL DUE TO						
		With Molly I	With Molly 2	With Other Boat		BAD WEATHER	NO BOAT	NO STAFF	NO REASON GIVEN		*EST NOTES*	*EEAA NOTES*
Aug	3	1										
Aug	4	1										
Aug	5	1										
Aug	6	1										
Aug	7	1										
Aug	8	1										
Aug	9	1										
Aug	10	1										
Aug	11	1										
Aug	12	1										
Aug	13								1			Conference
Aug	14								1			Conference
Aug	15	1										
Aug	16	1										
Aug	17	1										
Aug	18	1										
Aug	19								1			Dive Course
Aug	20							1				
Aug	21							1				
Aug	22						1					
Aug	23						1					
Aug	24						1					
Aug	25						1					
Aug	26						1					
Aug	27						1					
Aug	28						1					
Aug	29						1					
Aug	30						1					
Aug	31			1								
SUB-TOTALS		**138**	**25**	**1**		**13**	**20**	**30**	**17**		**244**	
		84%	**15%**	**1%**		**16%**	**25%**	**38%**	**21%**			
TOTALS		**164**				**80**						**244**

ANNEX 1 RED SEA RANGERS/HURGHADA PATROL SUMMARY

Jan-Aug 1999

MONTH	DAY	PATROL				NO PATROL DUE TO						
		With Molly I	With Molly 2	With Other Boat		BAD WEATHER	NO BOAT	NO STAFF	NO REASON GIVEN		*EST NOTES*	*EEAA NOTES*
Jul	2		1								Patrol w/ Molly 2	
Jul	3		1									
Jul	4								1			Conference
Jul	5		1								Patrol w/ Molly 2	
Jul	6	1									Patrol w/ Molly 2	
Jul	7	1									Patrol w/ Molly 2	
Jul	8	1									Patrol w/ Molly 2	
Jul	9	1										
Jul	10	1									COTS Safari	
Jul	11	1									COTS Safari	
Jul	12	1									COTS Safari/Patrol	
Jul	13	1									COTS Safari	
Jul	14	1									COTS Safari	
Jul	15	1									COTS Safari	
Jul	16	1									COTS Safari	
Jul	17	1										
Jul	18	1										
Jul	19	1									COTS Safari	
Jul	20	1									COTS Safari	
Jul	21	1									COTS Safari	
Jul	22	1									COTS Safari	
Jul	23							1			COTS Safari	
Jul	24							1			COTS Safari	
Jul	25							1				
Jul	26							1			Molly 1 Down, M2 Needs Patch	
Jul	27							1				
Jul	28	1										
Jul	29	1										
Jul	30	1										
Jul	31	1										
Aug	**1**	1									Patrol Went	
Aug	2	1										

ANNEX 1 RED SEA RANGERS/HURGHADA PATROL SUMMARY
Jan-Aug 1999

MONTH	DAY	PATROL				NO PATROL DUE TO					EST NOTES	EEAA NOTES
		With Molly I	With Molly 2	With Other Boat		BAD WEATHER	NO BOAT	NO STAFF	NO REASON GIVEN			
May	31							1				
Jun	1							1				
Jun	2							1			Patrol Went	
Jun	3	1									Patrol Went	
Jun	4	1										
Jun	5	1										
Jun	6	1										
Jun	7	1										
Jun	8	1										
Jun	9	1										
Jun	10	1										
Jun	11	1										
Jun	12	1										
Jun	13	1										
Jun	14	1										
Jun	15	1										
Jun	16							1				
Jun	17							1			Molly 1 Damaged	
Jun	18							1			Molly 2 Out of Water	
Jun	19							1			M1 &2 Out of Water	
Jun	20							1			Molly 2 in Water	
Jun	21	1										
Jun	22						1				Patrol w/ Molly 2	S Safari
Jun	23						1					S Safari
Jun	24						1				Patrol w/ Molly 2	S Safari
Jun	25						1					S Safari
Jun	26						1					S Safari
Jun	27						1					S Safari
Jun	28						1				Patrol w/ Molly 2	S Safari
Jun	29						1				Patrol w/ Molly 2	S Safari
Jun	30		1									
Jul	1		1								Patrol w/ Molly 2	

HEPCA is a recognized NGO Non Governmental Non profit making Organization registered with the Red Sea Governorate and established by Members of the Hurghada Diving society

HEPCA s mission statement is the protection and conservation of the land and marine ecology and the underwater environment of the coral reef of the Red Sea and its coastline

NEWS

olume 1° December 1998-January 99

STRUCTURE

General Assembly
Members

↓

Board of Directors

President
Samih Sawiris
Vice president
Johan Vifian
Treasurer
Karim Helal
Secretary
Ayman Taher
Board Members
Peter Dielessen
Nigel Gawis

↓

Support Office

↓

Executive Director
Hesham Tomoum
Technical Manager
Robert Cozens
Technical Teem
Mohamed Desouki
Omar Okasha
Ekrami Hanna
Ahmed Abu Raia
Membership Coordinator
Osama Harb
Financial Controller
Mohamed Amin
Driver-Logistics
Mohamed Kassem

1998 was a very active year for HEPCA we are able to report many environmental happy stories alongside the sad ones Our member and non members are discovering that they can defend their own resources and bring the reefs back to a productive life The community is realizing the important role they could play in preserving the natural resources of the Red Sea This has been very clear in the decreased number of violations which are reported to HEPCA and the EEAA during 1998 It is also clear through the active participation in the meetings and workshops called upon by the Governorate and the concerned agencies Several committees have been formed by the stakeholders and though more results could have been accomplished yet we believe that bringing the different to sit together and discuss various issues related to the Red Sea is a success by itself

1999 will also carry various changes related to the environment The private sector will be requested to actively participate in policy and decision making This is the only proven method of ensuring a sustainable development Community leaders individuals groups and organizations need to know about and participate in making decisions in those which can affect their community and their business This strong emphasis on citizens is not a local trend it is an international strategy which has proven to be successful in many examples all around the world in both developed and under developed countries

HEPCA with the support of its members will play an active role in promoting Citizen s participation and supporting the various efforts of all concerned parties to participate effectively in environmental decision-making and help government institutions to manage and use Citizen s input

Inside this edition

- HEPCA Quiz
- HEPCA s Constitution
- Members 1999
- Newsletter
- Training quarters
- 2nd official trip to the far Islands
- Board of directors news
- HEPCA products
- Membership status update
- New member
- Forget the environment
- Mooring buoy status update

HEPCA P O Box 144 Hurghada Red Sea Egypt Tel--2 065 446674 Fax --2 065 445035 E mail hepca@hepca.org

Forget the Environment

Imagine gray skies filled with smoke bellowing from sulfur factories
Imagine oil tankers docking at the marina instead of beautiful dive boats
Imagine all the expensive luxurious hotels filed with refinery workers instead of money spending tourists
Imagine all the bazaars closed
Imagine all the tour guides and tour companies out of business
Imagine oil spills and pollution
This is only part of the ugly picture we are trying to paint for people that don t care to help Not being part of the solution is becoming part of the problem HEPCA supportive members are the driving gears of the association The lack of results that you notice in the community is directly related to the lack of participation in decision making by other non-members community leaders and without them our hands are tied behind our back

Just a thought by ENVIROMAN

Mooring Buoy Status Update 1st, December 1998

Hurghada

Total installations 252

Safaga

Total installations 60

Southern Coast

Total installations 37

Far Islands

Total installations 37

Total Moorings 386

New Member

We would like to welcome *Iberotel Palm Beach* as they have joined HEPCA as exclusive members

Membership Status Update December 1998

Individual Members	[illegible]
Exclusive & Charter Members	[illegible]
Basic Members	[illegible]
Associate Members	[illegible]
Sponsors	[illegible]
Friend of HEPCA	[illegible]
Total number of members	[illegible]

HEPCA Board of Directors update

We would like to inform all that Mr Mohamed Seofi has resigned from the HEPCA board of Directors due to personal reasons Mr Seofi has assisted and supported the Association since its establishment and will still support the Association as an active member We thank him for his continuos efforts and wish him the best of luck in his future endeavored

The board of directors have invited Mr Nigel Jarvis to occupy the vacant place and Mr Jarvis accepted the position This is to remind all that Mr Nigel has nominated himself in the last board of directors meeting and therefore he is allowed from the legal point of view to join the board with no delay We are positive that Mr Jarvis will be a great asset to the Association and its members and we wish him the best of luck in his new post

HEPCA PRODUCTS

Available at member dive centers, HEPCA office, Easy Divers Dive Store at the Empire Hotel and Focus photo shop

HEPCA Maps

Please be informed that we are currently preparing and we will soon upload the HEPCA maps for all the sites we have installed moorings in You will be able to visit our web site and print all the maps you want directly from the site We hope you will like this new feature

Quiz answers

1 6 or multiples of 6 2 8 3 Carapace 4 30-40 years 5 26 6 Web site 7 20-20 minutes

HEPCA P O Box 144 Hurghada Red Sea Egypt Tel—2 06 5 44 0 74 Fax —2 06 5 4450 Email hepca@hepca.org

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HEPCA s mandate is the protection and conservation of the land and marine ecology and the underwater environment of the coral reef of the Red Sea and its coastline

NEWS IN BRIEF

Happy 1999 to all our members of

Al Alia for Tourism & Dev
Aqua naut
Aquarius Diving Club
Barakuda Diving Center
Blue brothers Diving Center
Blue Water Dive Resort
Conrad Hotel
Dive Point
Divers International
Divers Lodge
Diving Worls
Ducks Dive Center
Easy Divers
El Samaka Diving Center
Emperor Divers
Hilton Resort
Holiday Inn
Iberotel Arabella
James & Mac Dive Center
Jasmine Diving Center
Mirette Hotel
Ocean Red Diving Center
Orascom Enterprise
Orca Diving Center
Peak Marine House
Red Sea for Tourism and Diving
Red Sea images
Roland Schum Diving Center
Sea Horse Diving Center
Seaworld Diving Center
Shams Safaga
Sinai Divers
Sofitel Hotel and Resort
Star Fleet Charters
Storm Diving Center
Sub Aqua
Subex Hurghada
Volkert Sagtaga Diving Center

Sponsors

PADI
Marriott Hotel
Hurghada Bulletin

HEPCA Board of Directors update

We would like to inform all that Mr Mohamed Seofi has resigned from the HEPCA board of Directors due to personal reasons Mr Seofi has assisted and supported the Association since its establishment and will still support the Association as an active member We thank him for his continuos efforts and wish him the best of luck in his future endeavors

The board of directors have invited Mr Nigel Garvis to occupy the vacant place and Mr Jarvis accepted the position This is to remind all that Mr Nigel has nominated himself in the last board of directors meeting and therefore he is allowed from the legal point of view to join the board with no delay We are positive that Mr Jarvis will be a great asset to the Association and its members and we wish him the best of luck in his new post

Second "official trip" to the Far Islands

On Saturday the 5th. December M/Y Oyster started the second official trip to the Far Islands The Managing Director of the Yacht offered HEPCA two spaces on board the vessel This was a great opportunity for HEPCA to maintain the installation at the Brothers HEPCA team has allocated all the installations and replaced the top reef lines as they were all lost The deep moorings which were installed to support the vessels from the aft side were lost completely and the team could not find any trace for them

We would like to thank Mr Khalid Samy for giving us this opportunity and we wish him the best of luck in his future safaris

New Member

We would like to welcome ***Iberotel Palm Beach*** as they have joined HEPCA as exclusive members

Mooring Buoy Status Update 1st, December 1998

Hurghada
Total installations 252
Safaga
Total installations 60
Southern Coast
Total installations 37
Far Islands
Total installations 37

Total Moorings 386

HEPCA Maps

Please be informed that we are currently preparing and we will soon upload the HEPCA maps for all the sites we have installed moorings in You will be able to visit our web site and print all the maps you want directly from the site We hope you will like this new feature

HEPCA's Newsletter

We hope you appreciate the new format of the Members newsletter We currently issue three different format of the newsletter

The first format is the detailed newsletter to our members and it is now printed in two colors The second is the format available at our web site and the third is the news in brief which is published at the Hurghada bulletin

According to your feed back which was collected in the August survey- we are now including information related to various issues of importance and we hope it is what you expect

Please feel free to contact us if there are any additional news you think relevant and should be included in the newsletter

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HEPCA NEWS

Volume 2 February March 1999

STRUCTURE

General Assembly
Members

Board of Directors

President
Samih Sawiris
Vice president
Johan Vifian
Treasurer
Karim Helal
Secretary
Ayman Taher
Board Members
Peter Dielessen
Nigel Garvis

Support Office

Executive Director
Hesham Tomoum

Technical Team
Mohamed Desouki
Omar Okasha
Ekramy Hanna
Ahmed Abu Raia
Technical Consultant
Robert Corens

Membership Coordinator
Osama Harb
Financial Controller
Mohamed Amin
Driver-Logistics
Mohamed Kassem

Schools awareness program

On the 9th February HEPCA presented an environmental awareness seminar for an intermediate public school El Mina school The objective of the program is to highlight environmental issues to the school children

The seminar was presented under the guidance and supervision of the -Red Sea Educational Directorate. If the materials and the contents of the presentation are accepted by the Directorate, HEPCA could then maximize the programs exposure to include other schools in the Red Sea Governorate

New moorings

New moorings have been installed in the following sites

Reef name	# of mooring
• Abu Glawa	3
• Gota Abu Glawa	4
• Abu Sonbok	2
• Sevoul Saghira	4
• Sakhwa Abu Galawa	2
• Seoul Kabira	4
• Shabha	2
• Marsa Gota Abu Galawa	2
• Shabrur Seoul	4
• Manta Point	2
• Light House	2
• Poseidon Garden	2
Total new moorings	33

10% Discount on all HEPCA products
if purchased from the newly opened HEPCA store at Andreas Hotel
This offer is only valid through cash purchases
done from the store till the end of March 1999

Inside this edition

- HEPCA Quiz
- 2nd official trip to the far Islands
- Red Sea Reef Monitoring Program 1998
- Non HEPCA Members
- HEPCA garden 2
- HEPCA outlet
- Zoning workshop
- Whose fault is it ?
- Incident report forms
- Good bye Bob
- HEPCA products
- HEPCA maps
- Membership status update
- Mooring buoy status update
- Private sector & moorings

HEPCA P.O. Box 144 Hurghada Red Sea Egypt Tel—2 065 446074 Fax —2 065 445035 E mail hepca@hep.com

Incident Report Forms

We haven't been receiving violation reports lately We would like to think that there are no violations anymore We know there are still violators and there is still violations which are done against the reef and the environment Please help yourself and the environment by reporting these violations to HEPCA

GOOD BYE BOB

Robert Cozens known to all as Bob has worked for HEPCA as the technical manager since February 1998 His work and input in the mooring project has been appreciated and recognized Bob will be doing consultant work to HEPCA in areas related to the moorings

We wish to thank him on behalf of HEPCA members and on behalf of the environment for his efforts and we wish him luck in his future assignments !

Private Sector & Mooring

Orascom Divers Lodge Blue Brother, TGI-MSG diving Sun Surf, CBS Charter have joined their efforts and contracted HEPCA to install moorings at the northern diving sites of Hurghada
We will be updating all with the site names and the installation type in our next newsletter and on our web site Perhaps this is the largest contribution to the Environmental efforts by the private sector in the Red Sea

Most probable everybody knows that the mooring project initially was aiming to install 250 moorings in the Red Sea With the installation of more than 50 moorings in the northern sites, the total number of installation will exceed 450 moorings

Mooring Buoy Status Update 1st, February 1999

Hurghada
Total installations 252

El Gouna
Total installations 33

Safaga
Total installations 60

Southern Coast
Total installations 37

Far Islands
Total installations 37

Total Moorings 419

Membership Status Update January 1999

Individual Members	5
Exclusive & Charter Members	33
Basic Members	3
Associate Members	1
Sponsors	3
Honor	2
Total number of members	**47**

HEPCA PRODUCTS

Available at member dive centers HEPCA office, Easy Divers Dive Store at the Empire Hotel and Focus photo shop

HEPCA Maps

Please be informed that we have uploaded the mooring maps for most of the moored sites You will be able to visit our web site at http // www hepca org and print all the maps you want for free We hope you like this new feature

Quiz answers
1 All the above 2 22 countries 3 Eighteen temperature 4 2 boats(Orchid & Oyster) 5 10 % discount 6 Liver is full with oil

The PCA P O Box 144 Hurghada Red Sea Egypt Tel—2 06 5 44667 Fax —2 06 5 4 5 5 E mail hepca@hepca org

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NEWS

Volume 19 November 1998

STRUCTURE

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Technical Teem

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Omar Okasha
Ekramy Hanna
Ahmed Abu Raia

Membership coordinator
Osama Harb
Financial Controller
Mohamed Amin
Driver-Logistics
Mohamed Kassem

Minister of the Environment Visit to Hurghada

HEPCA had the honor of inviting H E, Madam Minister of the Environment to a sea tour on Friday the 23rd October 1998
The Red Sea Governor accompanied H E and a group of environmental specialists and directors headed by Ambassador Sally Shelton from the Agency for International Development

The visit was very successful and H E Dr Nadia Makram Ebied expressed her utmost support to the -EEAA Red Sea Rangers- and the environmental bodies and entities in
Hurghada including HEPCA and praised their efforts
H E expressed her wishes that HEPCA would develop and have more office branches within the Red Sea Governorate

Clean up activity Giftun Island-2nd trip

On Friday October 30th, HEPCA staff, with the help of 1 volunteer from Sub Aqua 3 laborers and 2 Rangers removed the man made structure located on the island including the steel and the brick The total weight of steel structure was 1420 Kg and the remaining garbage weight was 400 + Kg We were anticipating that the Giftun's clean up would be accomplished over one day Due to the few number of participants as this was a busy month for most of the members
Magawish Island On Friday October 13th HEPCA staff - only was able to finish the clean up job of the island of Small Magawish in a record time of less than 3 hours We managed to remove all the garbage steel bars and all the material resulting from previously burned garbage
Our future clean up efforts includes Tawila and we'll inform you of the date as soon as we feel it would be convenient for everybody to participate Please contact Divers International Hilton Plaza-to list your name for our next cleanup

Inside this issue

- HEPCA quiz
- Attention dive guides & boat captains
- Welcome Osama
- HEPCA on the web
- No Photograph is worth destroying the Underwater Environment?
- Quote of the month
- Moorings workshop
- Membership status
- Mooring status
- Membership and Service agreement
- Quiz answers
- HEPCA products
- Red Sea Hotel Association

HEPCA P O Box 144 Hurghada Red Sea Egypt Tel--2 06 4466-4 Fax --2 065 445035 E mail hepca@hepca or

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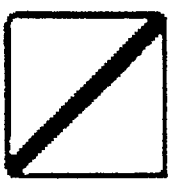

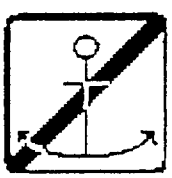

Membership & Service Agreement

HEPCA board of directors has just approved the implementation of the **"Membership and Service Agreement"** which will be implemented in January 1999 The new agreement has many benefits both for the Association and its members It will set new guidelines of cooperation and support

The most apparent objective of introducing this agreement is the need to establish a clear understanding of the relationship between our respective members and their Association The board of directors is also aiming to increase the Member s participation in environmental efforts

At the end of March 1999 after successful completion of the "Mooring Project" in Hurghada **and** Safaga, HEPCA will be entering a new era, as it will be involved in many other activities HEPCA will be targeting towards improving the conditions within the diving industry, marine activities and environmental awareness through various programs and products Members will be requested to support the Association while it is moving between one project and another

HEPCA has the structure to become a and could become a strong umbrella of Members This umbrella would have a voice, which could be heard on the local National and International level Such an umbrella needs mutual grounds of co-operation and this has been expressed in the new **'Membership and Service Agreement"**which will be presented soon and we hope will meet your approval and understanding

Mooring Buoy Status Update 1st, November 1998

Hurghada

Total installations 252

Safaga

Total installations 60

Southern Coast

Total installations 37

Far Islands

Total installations 37

Total Moorings 386

Membership Status Update November 1998

Individual Members	4
Exclusive & Charter Members	41
Basic Members	8
Associate Members	3
Sponsors	1
Friend of HEPCA	2
Total number of members	59

HEPCA PRODUCTS

Available at member dive centers, HEPCA office, Easy Divers Dive Store at the Empire Hotel and Focus photo shop.

QUIZ -How did you do?
I km around the islands 25, EEAA, Molly, 7 (mugs T shirt pens posters post cards key rings dive guides), Echinoderm, 7, Two hours Damsel

HEPCA P O Box 144 Hurghada Red Sea Egypt Tel—2 06 446674 Fax —2 06 44 03 E mail hepca @hepca org

HEPCA Membership Status Update
September 1998

Individual Members	4
Exclusive & Charter Members	41
Basic Members	8
Associate Members	3
Sponsors	1
Friend of HEPCA	2
Total number of members	59

A very big thank you to all those who have paid their membership dues for this year

The outstanding balance for 1998 dues is
21 703 L E

PASS THE WORD

Rose our volunteer has distributed a further 12000 environmental awareness leaflets to hotels and tour operators to the south of Segala This together with the 3900 distributed by our previous volunteer Heather makes a grand total of 15900 The leaflets in English German Italian French and Arabic have been placed in front office reception public areas and guest rooms We are currently working on a Russian version and a project to increase the environmental awareness information given by tour operators and ground handling agents

Open Meeting

We often get a number of similar questions being asked by different people We would like to know if you would like us to have an open meeting hosted by HEPCA staff and possibly the EEAA The meeting would allow you to get all the latest information discuss relevant issues and get to know what we do We would like the meeting to be open to all members and non-members alike If you would like to take part please contact us giving the most suitable time for you to attend It is important that if we proceed with this that we do have a good attendance

QUIZ How did you do?
Ham around the islands 25 EEAA Molly 7 (mugs t shirt pens posters post cards key rings dive guides) Echinodorm 7 Two hours Dunsel

Mooring Buoy Status Update
1st, September 1998

Hurghada

Total installations	253
New installation	1
Maintenance	699
Recorded cost to date	357,519 LE

Safaga

Total installations	62
New installation	0
Maintenance	20
Recorded cost to date	48,607 LE

Southern Coast

Total installations	37
New installation	0
Maintenance	0
Recorded cost to date	47,253 LE

Far Islands

Brothers Island	12
Abu El Kizan	08
Zabargad	11
Rocky Islands	06
Recorded cost to date	52 532 LE

Total Moorings	352
Total cost to date	505,911 LE

HEPCA ON THE WEB

We have now updated or internet domain to include Links to members domain and e-mail on-line bulletin board mooring and membership status newsletters and much more It will be updated regularly direct from the HEPCA office View us in www/hepca com We look forward to your comments and suggestions

HEPCA P O Box 144 Hurghada Red Sea Egypt Tel 2 065 460711 Fax 442 0 584 50 5 1 E-mail [illegible]

[illegible] the Red Sea [illegible] and established by Members of the Hurghada Diving [illegible]

[illegible] Mission statement is the protection and conservation of the land and marine ecology and the underwater environment of the coral reef of the Red Sea and its coastline

HEPCA
RED - SEA

OCT 98

NEWS IN BRIEF

Crown Of Thorns Collection
September Statistics

Total number of volunteers	46
Total number of COTS collected	1826
Total number of COTS measured	691

Violations reported to HEPCA & FFAA
September 1998

Dump of food waste garbage	1
Breaking corals	1
Disturbance of marine life	2
Marine life in captivity	1
Anchoring on reef	2

HEPCA ON THE WEB

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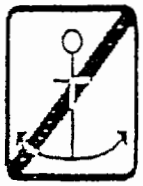
www hepca com

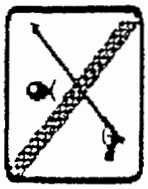
HEPCA TRADING

[illegible] the HEPCA [illegible] Diver Store at [illegible]

Mooring Buoy Status Update 1st October 1998

Hurghada	
Total installations	283
Installation replacement	0
Maintenance	734
Safaga	
Total installations	60
Installation replacement	0
Maintenance	0
Southern Coast	
Total installations	[illegible]
Installation replacement	0
Maintenance	0
Far Islands	
Brother Island	12
Abu El Kizan	08
Zabargad	11
Rocky Islands	06
Total Moorings	**387**





Islands Clean up activity

HEPCA has co ordinate with the FFAA and the Red Sea Governorate and agreed to proceed with a clean up campaign for the Islands Most of our readers know that some of the Islands like Giftun Magawish and Tawila are packed with garbage This garbage is dumped on the Islands either by daily snorkeling boats or Safari boats

The clean up activity is organized in a way to enable as many people as possible to participate in the clean up If you miss God Forbid one of these days you can always join us on other days Please find here under the clean up schedule

Task 1 Giftun Island Accomplished
Friday 16th October a group of volunteers 4 from Easy Divers 1 Magawish 1 Subaquatic 1 El Sawaker 1 Red Sea tourists 1 Private 1 Aquarium 7 HEPCA staff 2 FFAA rangers collected 1515 Kg of garbage from the Island and installed garbage bins

Task 2 Magawish Island
Saturday the 7th November we will be organizing with the support of our members a beach clean up for Magawish Island
Start point Parties Club Hotel Reception 09 00 am

Task 3 Tawila Island
Saturday 14 November we will visit Tawila Island to remove the garbage dumped on the Islands which has been accumulating for long time
Start point International Diving Center Hilton Plaza 09 00 am

JOB OPENING

HEPCA will soon initiate an environmental & educational campaign The campaign includes activities such as Environmental awareness programs MFA Oxygen provider training Lifeguard training and Tug Master programs The beneficiaries of this activity will be individuals working in the diving industry

If you are a qualified trainer have previous experience in organizing training activities and would be interested in participating in this project on a limited contract basis or you can volunteer some of your time please send your resume to HEPCA

[illegible] Hurghada Red Sea Egypt Tel 2 [illegible] Fax 2 [illegible] Hepca@[illegible]

BEST AVAILABLE COPY

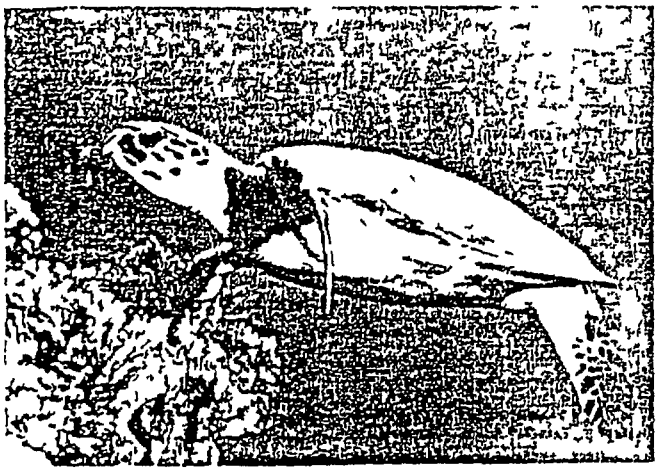
problem In order to decrease outgoings cheaper equipment is purchased less or cheaper maintenance is carried out and staff are hired for less Lower wages attracts those less qualified to handle equipment sometimes requiring very technical knowledge It also attracts those looking for nothing more than a job to fund their lifestyle not those with a passion for the sport Additional services are also reduced Meals aboard the boat and transfers utilize cheapest options available All of these problems are increasing the risk of diving sadly resulting in the accidents that have been seen lately

The only way to stop this continual spiral downwards is to oversee the services offered Due to the tightening of the rules prices may have to rise The consumer may initially see this as negative but those understanding the business will know it can only be a positive thing Healthy competition will mean those centers who follow the rules who use quality equipment who employ highly qualified staff will be able to continue doing so Those centers selling cheap but unsafe services will either have to increase standards necessitating rising their costs or get out of the business

The grading system and the overseeing of centers will mean tourists can be sure the service they see advertised will be safely and honestly offered This can only be good for the industry ensuring tourists return year after year and that they spread the good word about Egypt

On behalf of future divers coming to this country and in memory of those whose lives have been affected by recent accidents I would like to thank the new committee These people who are giving their own time and energy to ensure diving continues to be a safe and fascinating sport

The Rescue of a TURTLE



What would you do if you were shown a turtle in a small zoo, fenced into a concrete enclosure, with no water? Scream abuse at the owner? Pick up the turtle and run off with it? Feel sorry for the turtle, but go home and forget about it?

Or would you do as a HEPCA member did when he found such a turtle in a Cairo snake farm? He showed no immediate reaction but called the owner of the farm the following day saying he was interested in buying the turtle Initially the bidding began at 1 500 LE but negotiations over the following days got the price down to 600 LE Deal secured our Hero had helped Miss Turtle take her first step back to freedom

The next step was to get her health checked and then return her to the sea as soon as possible This is where the Heroin of the story enters Chris a vet operating here in Hurghada was contacted HEPCA asked her if she would be willing to check the turtle over and supervise the return her-to-the-sea mission Chris happily agreed and arrived back from dinner the following evening to find a turtle swimming around the small pool by her laboratory

A few injections for vitamins and infections and Miss Turtle was ready to return to the Big Blue At this point Chris offered me some very interesting information that may well be useful for anyone who wishes to examine a turtle (I m sure this will cover a large percentage of our readers) if you wish a turtle to relax just turn them on their back They will just lie there and you can complete the examination with no problems Don t ever say you don t learn anything from this magazine!

Wrapped in a sheet Miss Turtle was carried to the boat Boy was she heavy Chris comments The smell of the salt air must have told Miss Turtle that she was going back to the place she once knew Though it is not too sure where she came from it is possible she was found out by an oil platform in the Suez area Though she wasn t exactly going home Chris is sure that Miss Turtle will be more than pleased with her new location This area is Turtle-Heaven Chris assures me

Once the boat was anchored the process of lowering Miss Turtle into the water began Chris and a guest waited in the water as she was lowered down to them Sensing what was happening Miss Turtle began frantically flapping her flippers even before she reached the water The boat was anchored in a way that meant when she entered the water her back was to the coral Chris was amazed that as soon as she was in the water she turned and swum directly to the coral

water she turned and swum directly to the coral

Someone was in the water taking photos of this historic event and as soon as she entered the water they took a photo The photo shows a turtle way in the distance speeding towards something she had probably thought she would never see again As she swam I am sure she was saying Thank you to HEPCA thank you to Chris and thank you to everyone else who helped her escape the concrete prison and return her to Turtles paradise!

No Photograph is worth destroying the Underwater Environment?

Simple question – Simple answer – NO!

So why do underwater photographers have such a bad reputation? In my view the answer is made up of two groups of people -

Firstly professional photographers (so called because they get paid to take photos) and secondly the diver who buys or rents a camera and receives no training in how to use it although does not necessarily intend to do damage

Some (and I do stress some!) professionals have a great awareness of the delicate reef structure and do respect it Others do not – these are the 'lost cause people and do not give a damn This latter group we (the diving community in general) need to educate in whatever way we can to stop them destroying our livelihood I have some personal feelings about these people but I fear they could not be printed here - so ' dive guides and instructors' talk to these people politely, counsel them on the damage they may inflict and if necessary report them! The dive center managers and owners can help by having the courage of conviction to back your dive guides in these cases

Now lets take a look at the second group – by far the majority of offenders As I said earlier, these people don't necessarily intend to do damage but I am sure we have all seen it – give a person a camera to hold underwater and three things occur -

A) Their buoyancy control goes out of the window
B) They forget completely about their buddy – a safety issue
C) They forget about the 60cm extension to their feet – Fins!

Is this a familiar story to you? If so then what do we need to prevent it? – Education No I am not asking you all to suddenly become experts in underwater photography because the three main problems encountered by people with a camera are nothing to do with taking photos

- A little extra comment in your dive site briefing with respect to buddy procedures and using cameras underwater (especially for people with rental cameras) helps prevent separations
- Suggest that the buddy may wish to be the model for the photos
- Caution camera users about the position of their fins when taking photos
- Suggest that first time rentals take a couple of minutes at the beginning of a dive to practice a fin pivot whilst holding a camera with two hands – you ll be amazed!
- Keep photographers in mind when conducting a long guided tour underwater – they would like to stop and take photos occasionally
- Take an interest in your client s photos and, for those who have bad results, offer them a photo course

Taking photos underwater should be a positive, enjoyable experience and with a little guidance it is – having taught numerous photo courses in Hurghada over the last five years my clients do come back for more isn t that what we all want?

If the above has helped you in any way then it has been worth the time to write this article and if you have any comments or further suggestions I would like to hear them Thank you for taking the time to read this and supporting HEPCA by doing so

Kevin G Haigh, Red Sea Images
rsimages@red-sea com

Maintenance in Safaga

The divers and the boat are expected to be working in the Safaga reefs at the start of October All members have been contacted in Safaga asking for the priority areas for additional moorings It is important that we know the locations as soon as possible so that we can apply to the EEAA for permission to install We have already applied for additional moorings at Shaab Shear Please contact the office as soon as possible with your requests as we would not like to delay the maintenance work in the area

EEAA CORNER

Ayman and his team have been fully occupied with Crown of Thorns collection and have had to put their articles on hold We expect to have the articles again for the next issue

Quote of the month

There is no point in running if you are on the wrong road

Proverb

THE HEPCA QUIZ

Test your knowledge Answers on the back page

What is the area that has been designated as a National Park?

- ☐ All the Red Sea
- ☐ 5 km around the islands
- ☐ 1 km around the islands
- ☐ All the coast

How many moorings are at Small Giftun?

- ☐ 10
- ☐ 25
- ☐ 15
- ☐ 30

Who owns the moorings?

- ☐ Dive Centers
- ☐ EEAA
- ☐ HEPCA
- ☐ USAID

What is the name of the EEAA Rangers boat?

- ☐ Molly
- ☐ Fred
- ☐ Abdul
- ☐ Doesn t have a name

How many products does HEPCA sell to raise money?

- ☐ 1
- ☐ 10
- ☐ 4
- ☐ 7

What is a Crown of Thorns?

- ☐ Echinoderm
- ☐ Cnidarian
- ☐ Mollusc
- ☐ Mammal

How many Directors are on the board of HEPCA?

- ☐ 7
- ☐ 10
- ☐ 4
- ☐ 12

What is the average time needed to install a mooring buoy?

- ☐ One hour
- ☐ Two hours
- ☐ Three hours
- ☐ Four hours

What family of fish is the clown fish?

- ☐ Damsel
- ☐ Wrasse
- ☐ Gobie
- ☐ Blenny

ATTENTION DIVE GUIDES & BOAT CAPTAINS

We have had a number of mooring buoys that have been badly damaged or pulled out by over stressing by the boat To prevent further damage we would ask you to follow these recommendations

Single mooring	Two boats can use a single mooring provided that they tie with the bow of the second boat tied to the stern of the first
Double mooring	A maximum of three boats can use two moorings at the same time The boats may be moored with either the bow or the beam to the mooring Depending on site conditions this should be reduced to only two boats in windy or rough sea and may be increased to four boats in calm sea
Rough sea	The scope must be increased by at least half the length of the boat if the sea conditions are rough Any moorings too close to the reef to allow this should not be used in such conditions
Calm sea	Very little stress is placed on the moorings so any number of boats may use the moorings with in reason
Pick up line	On no account should the pick up line be attached directly to the boat
Manoeuvring	Use minimum engine power when maneuvering the boat on the mooring

Move to a resting place when possible and allow others to use the dive mooring Please use the moorings wisely and advise, in a pleasant way, those who don't, to do so Advise us of any broken or damaged moorings It is in all our interests to prolong the life of our moorings and reduce the maintenance costs It may be inconvenient to have to move but it is far more inconvenient if the mooring is lost Your help and co-operation will be most welcome

Wrecks, reef or both?

HEPCA has had a some enquires about the use of artificial wrecks to reduce pressure on dive sites and to create new and interesting reefs It has been a common practice to do this in a number of popular dive destinations around the world We would like to know if you have any opinions on this subject and if so please pass them on to our office

Welcome Rose

Rose Winer has joined the HEPCA team for a few months as a volunteer She will be working on public relations with hotels tour operators and dive centers She will be visiting members shortly so please make her welcome

HEPCA survey results, what next?

Just in case you are wondering what will happen following or recent survey on how can serve you The results of the survey are on the agenda for the next Board of Directors meeting in September We hope that their comments and any subsequent action will be outlined in the next newsletter

HEPCA P O Box 144 Hurghada Red Sea Egypt Tel++2 065 446674 Fax ++2 065 445035 E mail hepca@intouch com

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environmental protection and conservation association
HEPCA
RED - SEA
Hurghada

MEMBER NEWS

Volume 17 September 1998

Inside this issue

- Crown of thorns collection
- Thank you
- Translation
- Try the softly softly approach
- Essential environmental briefings
- The HEPCA quiz
- Attention dive guides & boat captains
- Wrecks reef or both?
- Welcome Rose
- Survey results what next?
- No Photograph is worth de stroying the Underwater En vironment?
- Maintenance in Safaga
- EEAA Corner
- Quote of the month
- Membership status
- Pass the word
- Open meeting
- Mooring status
- HEPCA on the web
- Quiz answers

Crown Of Thorns Collection

The latest figures released by the EEAA indicate that over 4000 animals have now been collected Main concentration is Umm Gamar, Shaabruhr and Carless with some collected from southern sites There are still more out there so please continue your support

THANK YOU

HEPCA staff would like to offer a special thank the following for their recent help and support
Tony Jeanes (Fish Eye Productions) Ayman Baksoom Heather Fowle Easy Divers Barakuda Dive Center (Marriott) El Samaka Dive Center Tiran Diving and Safaris Star Fleet Charters all those involved in Crown of Thorns collection

TRANSLATION PLEASE

We would love to hear from any person who would be prepared to translate some of our more important newsletter articles into other languages PLEASE CALL THE OFFICE IF YOU CAN HELP

Try the softly softly approach

On many of the submitted incident report forms we have noted that the violator has given the reporter some sort of rude gesture or uses abusive language Also we have noted that some o the reporters Divemasters and Instructors tend to be rather violent to express their point Sure we are all very angry when someone is destroying the reef for no apparent reason but maybe they are not so environmentally aware as you or I Many Instructors working in tropical locations emphasize the damage that can be done to the reef by poor diving practices but not all Divers trained in cooler climates do not have fragile corals to worry about If they do not receive an environmental briefing at the start of their holiday then they may not know any different Certainly there are always those who know and just don t care and also those that know more than we do Underwater we all know that we have to be very positive with our instructions but do we always have to be physical? What we are suggesting is that it may be more beneficial and you may get a mUCH better response if you point out their mistakes to them before taking action You will have a better chance of getting them to see your point of view if you can tell or show them what is correct

Essential Environmental Briefings!

Do you and your dive guides give an environmental briefing to each new guest? Quite often our diving guests are not aware of the damage that they can inflict on a fragile coral reef only of what the reef can do to them A good well balanced environmental briefing at the very start of the holiday can only be beneficial to both the diver and the reef So what should be included in the briefing? Three basic elements should be used WHAT WHY HOW What should or should not be done (including what is against the law) Why you should not do it Don t limit this to because the law says you can t tell them why it is bad for the reef How to avoid damaging the reef For example touching any living organism in the sea with hands gloves boots fins or anything else for that matter can damage and/or cause infection to that organism or colony of organisms Feeding of fish and flushing the WC while at the reef upsets the ecosystem by changing feeding habits and altering the chemical (pH) balance of the water Show them that you care because if you don t care why should they? In addition demonstrating a good understanding of the environment in which you are diving is the essence of a true professional The divers that respond well to this are the divers we all want to return again and again If you require any help or further information regarding environmental awareness please give us a ring at the office and we will be only too pleased to help

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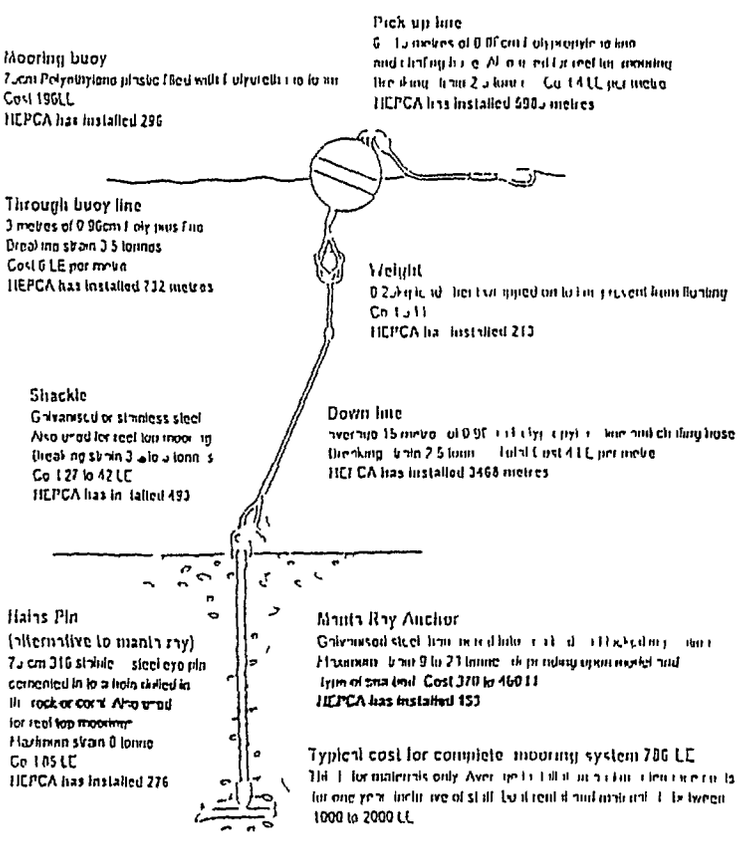
85

WHAT'S IN A MOORING?



CROWN OF THORNS STARFISH

We would like to inform all those who were concerned about the Crown Of Thorns Breakout that HEPCA received only 6 surveys from El Sunah Diving Center, hence we were not able to produce the data reports required by the ELAA. As previously explained these reports were essential before proceeding with collecting the Crown Of Thorns.
In order to overcome the current situation the rangers started to survey and collect the COTS on the 12th July 1998 with the support of some volunteers. In a couple of days they collected more than 1000 COTS from Shabrour Umm Gumman in addition to the scientific data.
If any of our dear readers would like to volunteer a part of some of his/her time please call Ayman Faber at the diving center located at the Hilton Plaza.

Quote of the Month

Waiting until everything is perfect before making a move is like waiting to start a trip untill all the traffic light are green

Karin Ireland

HEPCA MEMBERSHIP UPDATE

Individual members	5
Charter & Exclusive members	40
Basic members	3
Associate members	5
Sponsors	6
Total number of members 1998	59

Outstanding membership & donation dues for 1998
L.E 43 776.00

THANK YOU

We would like to thank all of you who offered help and assistance in responce to our HOW CAN YOU HELP article in our previous newsletter. We would like to thank in particular El Sunah diving center, Emperor Diver, Oriscom Divers lodge, Easy divers, M/Y Endonice Divers, International Aquarium.

We will be contacting you in the first week of July to allocate the days we will be sending our divers onboard your vessels.

Thank you

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GENERAL ANNUAL MEETING FAQ

Q *What was the purpose of the meeting?*
A To fill the three places on the board of directors left vacant by resignations
Q *Who had resigned and why?*
A Jim Yanny (Treasurer) left Egypt to pursue an opportunity abroad
Moustafa Tahir (Chairman) and Shafik Walidan resigned due to pressure of work commitments outside of Hurghada Both remain members of HEPCA
Q *Was there a good turnout for this meeting?*
A This was an extremely important meeting to attend as this was the opportunity for members to stand for the board or vote for those they thought would best represent their interests
Of the 58 members who were entitled to vote only 11 attended and 1 sent his apologies which was very disappointing
Q *How were the specific roles allocated to the board of directors?*
A The new board held their first meeting on July 1 1998 and allocated the vacant positions as follows Samih Sawaris – Chairman Karim Helal – Treasurer - Johan Vilian – Secretary
Q *Do you envisage the new board will introduce any changes?*
A The board is very enthusiastic and has many innovative ideas for HEPCA We are also fortunate to be receiving excellent support from the Red Sea Governor
Q *What would you identify as the number one priority for the next six months?*
A HEPCA as an NGO needs to develop HEPCA is more than mooring buoys Between now and the end of the year the board will formulate a plan for 1999 They will actively canvass the members to ascertain how we can better serve them and will modify the mission statement to more accurately reflect the needs of the members
Q *What can we as members do to help?*
A *HEPCA* was formed by the diving community of Hurghada in an attempt to protect its business HEPCA is its voice and acts on its behalf but we can only be of help if the members cooperate with us If we do not receive their cooperation we cannot function effectively The cooperation of the members is the single most important factor effecting our ability to achieve the desired results

Mooring Buoy Status Update 1st, July 1998

Hurghada

Total installations	237
New installation	0
Maintenance	11
Buoy replaced	1
Lines replaced	3

Safaga

Total installations	62
New installation	10
Maintenance	88
Buoy replaced	16
Lines replaced	43

Southern Coast	25
Brothers Island	12
Abu El Kizan	08
Zabargad	11
Rocky Islands	06

BOAT SKIPPERS TRAINING REPORT

As you know HEPCA has organized a training workshop for boat skippers on the 30th June 1998
Organizing this training workshop included the following
Hiring professional trainers from the marine academy Alex
Providing transportation for trainers from & to Alex
Providing accomodation for 2 trainers for 4 days
Renting a venue for the training for 3 days
The man hour required to prepare the work shop

Unfortunately after this preparation 1 Captain showed up for the training and we were obliged to cancel the training

EEAA CORNER

What's New with USAID's EST Project?

By Dr Stacey Tighe

As many of you know the United States Agency for International Development (USAID) was supporting the Environmentally Sustainable Tourism (EST) project in Egypt during 1995 1997 That project included among other things a regional office here in Hurghada that provided technical assistance and logistical support to EEAA the Red Sea Rangers and to HEPCA So what is the status of the EST Project?

The original project was completed in December 1997 Its successes included helping EEAA to establish the first rangers s headquarters in the Red Sea providing the red MOLLY I and MOLLY II ribs for the rangers to patrol the reefs and providing the moorings installed by HEPCA for the Marine Park and EEAA. *Other partners in the project included the Egyptian Tourist Development Authority (TDA) and most of the activities took place here in the Red Sea governorate* The project s staff well-known by many of you included Mr David Smith Dr Hesham Moustafa Ms Salwa El Halawani and Ahmed Kamel as well as other visiting specialists and the office was located in the Marriott Hotel EST was a pilot or demonstration project and there was hope by many that it would continue or expand as a much larger project

With great thanks to the USAID the EST project activities are continuing through this year until December 1998 but some things have changed First the project was expanded a little so the work for TDA and for the Marine Park was divided into 2 jobs and Mr Smith stayed in Cairo to work with the TDA *He recently accepted another position in the Middle East and has left the project in the capable hands of Mr Nicholas Winer formerly the project manager for a large national park program in Botswana* I was lucky enough to inherit the marine protectorate activities and the office in Hurghada to manage My job is to continue the operational support for the EEAA rangers and HEPCA including purchasing equipment coordinating training and managing the technical specialists who come to Hurghada *to assist the EEAA and others* I also serve as a technical advisor to the EEAA Protectorates Department on issues relating to the Red Sea Marine Park Dr Hesham Ms Salwa and Ahmed Kamel remain on the project and we have added Samir to help us in the office We also relocated the project s office to share the building being used by the EEAA Rangers as their new Hurghada headquarters *(it is on the corniche in Dahar just next to Sinbad Seaview hotel) Although we miss the Marriott and its wonderful staff we are happy to be closer to our partners the Rangers*

The expansion of the EEAA Ranger program and the EEAA/HEPCA program to install moorings for the offshore islands and southern coast will keep us quite busy We are hoping to run a couple of workshops and some outreach activities as well However if you have any ideas or suggestions about things which USAID or the EST project could do please stop by or let us know We are always looking for better and new ways to do our jobs here and to support conservation and sustainable tourism in the Red Sea

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Members Newsletter

Volume 15 JULY 1

Inside this issue

* Thank you
* COTS
* What s in a mooring?
* EEAA Corner
* Mooring Buoy status
* Mooring Buoy status update
* General Annual Meeting FAQ
* Boat Skippers training report
* What's new with EST
* Membership update

NEW VISION

The month of July 1998 marks a new start for HEPCA

New board members have been nominated to represent the members in the General Meeting on June 30th 1998 On the following day, the board conducted their first official meeting Mr Samih Sawiris, the chief executive officer- CEO- of Orascom has been appointed by the board members as the chairman of the board

The new board members are currently in the process of identifying the possible strategies to follow in order to reach the target plans of HEPCA and its environmental mission

Any future plans for HEPCA will only be realized through the involvement and the appropriate help and support of the members

Congratulations to the new board of directors and we wish them the best of luck in their mission

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Vhat's happening in HEPCA?

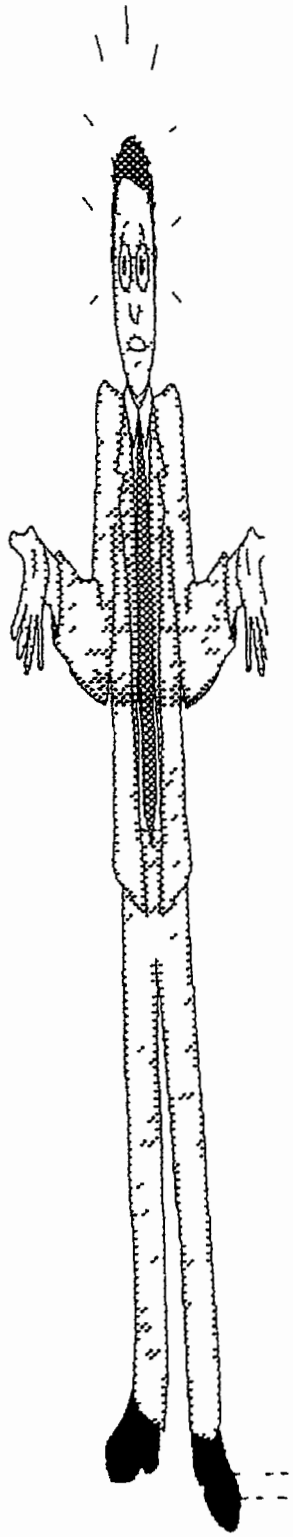
Some people have been asking this question and we would like to assure all of them hat HEPCA is in fact more active now than ever before This may not be so apparent on a local scale because many of you are used to seeing the boat and reading the newsletter in local publications We can assure you that the newsletter still exists but ' is difficult to keep all the information we need to share with you to the old single page form The first of the new format, last month, was a four pages spread together with a supplement of 2 pages on the current status regarding diving the far islands of he Red Sea and the Crown Of Thorns Survey As always, the newsletter is delivered o our members every month, so for those of you who are paying for the privilege of nembership will certainly receive your copies If not, then please tell us and we will be only too happy to put this right

As regards to the mooring buoys, we currently have installed and maintain 350 noorings ranging from Gota Dir in the north to Rocky Island in the south An ddditional 100+ are planned from Safaga to Ras Banas and plans being made to nstall moorings to the northern sites While it is easy to see new moorings dotted around the reefs, it is not so clear to see the maintenance that goes on afterwards, broken lines, damaged buoys and inspections of anchors, shackles etc All have to ake place to ensure the mooring remains in place for the benefit of all At the time of vriting this article, we have been in Safaga for the last 10 days for installation & naintenance This is the main reason why the sites with no buoys, you have been eporting to us, is still not attended to We thank all those who informed us of the lost buoys in Gotta, Abu Ramada North and Shabrour Um Gammar. We will maintain nese sites after the safaga mission is accomplished

Vhen we do loose one or if you find any unusable, we would be very grateful if you vould report it to us and we will endeavour to replace or repair it as soon as we can Ve do, however, ask you to bear with us and not expect this to happen overnight As ou can see we have a large area to cover and an ever increasing number of nstallations to deal with so, we may have to give priority to other locations from time o time We do have plans to spread our team more widely so that routine naintenance can be carried out on a more widespread basis Please see our HOW 'OU CAN HELP section

HEPCA is also in the unique position to represent the community on environmental ssues and although initiated by the local dive industry it has now grown to ncompass many more areas We are constantly monitoring activities and epresenting those of you that care about the environment We have a good working elationship with the EEAA (Egyptian Environmental Affairs Agency) and the Red overnorate and hope that we can strengthen these further The EEAA Protectorates Division has the overall control of the installation, use and maintenance of the noorings as well as the responsibility of dealing with those who damage the nvironment. While HEPCA represents its members on these and other issues we do ot represent the law or enforce policy What we can do is to be a voice and act on behalf of those who care, continue the protection by raising awareness and utilise the xpertise we have gained to continue our role

inally the message we give to you all is please do continue to call and do not be put ff by our strange telephone system which we have applied to change Our main umber, 445035 has a call hold feature that continues to give a ringing tone even hen busy However, the office is manned seven days a week and you can also elephone us on 446674 and we will always welcome your call



HOW CAN YOU HELP

In order to satisfy our plan to provide better maintenance coverage particularly in the northern areas we need space on your boats We would like you to offer space for two HEPCA divers for 5 or 6 days in a three month period The divers would travel to your chosen destinations and carry out maintenance work on the moorings This work would be the replacement of lines and/or buoys The divers would provide their own equipment, be presentable at all times keep well clear of the dive deck entry and exit areas while your guests are using them and also keep all materials below deck until guests are clear They would adhere fully to the instructions given by the dive centre staff This would assist us in that we could cover more sites in the same day and would be good publicity for your diving centre in showing your commitment to environmental protection We already have a number of centres more than willing to offer time and would like more to join in Please call Bob Cozens on 446647 for more details or you offer to help

We are still in need of safari boats to assist with mooring installations on the south coast Please call us if you have a boat available We are prepared to pay all costs for the trip so you stand to lose nothing but will be helping to protect your investment in the Red Sea

Dear member
Offer your divers the HEPCA official dive guide
help us to reproduce other materialls for the Red Sea divers

FAREWELL

Emad Sadaawy and Ahmed Tawfik from the technical installation team has left HEPCA on the 1st of May We wish to thank for their efforts and we wish them the best of luck in their new assignment

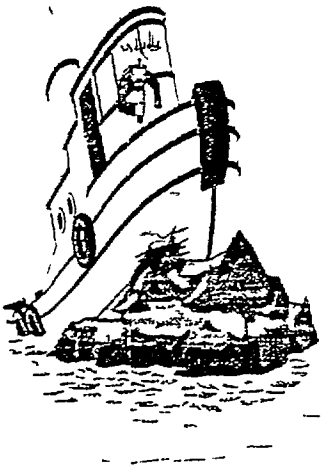
BOAT SKIPPERS TRAINING

Environmental & Seamanship 4 days training workshop in Arabic will be conducted soon for boat skippers All those interested in attending this free training workshop please submit your names to your diving centre or directly to HEPCA Training will also enclude the guidelines of working in protected areas

Crown Of Thorns Starfish Survey

We would like to inform all those who were concerned about the Crown Of Thorns Breakout that HEPCA did not receive one single survey back, hence we were not able to generate the data required by the EEAA before we could organise a collecting campaign similar to what happened in Sharm El Sheikh
We are afraid that there is nothing we can do at HEPCA without your support on this issue It was suggested that HEPCA divers could survey the Hurghada sites and get the required data!
This would be impossible for more than one reason
Our divers would need a minimum of 22 days to cover Hurghada only It could take less than 5 days if all Instructors and dive guides would survey the sites which they visit anyway during their daily diving
We can not afford to stop the installation in Safaga and the maintenance program for 22 days and involve them in the survey I am sure you can imagine how would this affect the mooring systems

We ask again for your help to preserve and protect our reefs and eventually your business
Please read The article Sharm El Sheikh co operation and solidarity
example



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EEAA

The Government of Egypt has established a branch office of the EEAA-Egyptian Environmental Affairs Agency- Natural conservation Sector-in Hurghada This is the home office of the Red Sea Rangers of the Red Sea protectorate, consisting of 22 off shore Islands

The rangers duties include patrolling the dive sites and reefs located in Hurghada and Safaga They have established an additional base office in the South of the Red Sea (Couseir) on the 4th, June 98 This enables the rangers to monitor and preserve the dive sites and the coastline along the southern coast of the Red Sea

As a sign of appreciation for these efforts, we have decided to allocate a space in our Newsletter for the EEAA and the Rangers In this corner you will find important and interesting information they wish to share with the community, related to the marine protectorate and its human activities HEPCA Editor

تعتبر المحميات الطبيعية مناطق جذب سياحي بما تحتويه من انظمة بيئية نادرة ، و بفضل وهبنا الله عز وجل بثروات طبيعية عديدة في هذه المحميات يجب الحفاظ عليها وقد اعتبت محميات جزر البحر الأحمر سنة ١٩٨٦ كجزء من محميات عندما تم اعتماد اعلانها مرة اخرى سنة ١٩٩٥ لما لها من اهمية قصوى وتتمتع هذه المحميات بالعديد من الثروات الطبيعية منها الشعاب المرجانية والمالجروف والحشائش البحرية وكلها انظمة بيئية هامة جدا لحياة الأسماك والكائنات البحرية الأخرى ، ومن هذا المنطلق وجب حمايتها وهذه المحميات تخضع للقانون ٢ ١ لسنة ١٩٨٣ بشأن المحميات الطبيعية ، كما انها كمناطق بيئية تخضع ايضا لقانون ٤ لسنة ١٩٩٤ بشأن حماية البيئة ولعلى اشهر هذه الفرصة واعرف بالمخالفات لهذين القانونين والعقوبات التي توقع على المخالف

اهم المخالفات هي -

١- يحظر بأي طريقة صيد او نقل او امساك او جمع الكائنات البحرية (اسماك - شعاب مرجانية - اصداف قواقع -) الطيور - الحيوانات البرية كذلك يحظر حيازتها او نقلها او التحول بها او بيعها او عرضها للبيع حية او ميتة

٢- ممنوع استخدام المخطاف منعا باتا على مناطق الشعاب المرجانية وممنوع الوقوف على الشعاب

٣- ممنوع اطعام الأسماك والطيور حيث ان ذلك يؤدي الى الإخلال بالتوازن الطبيعي

٤- ممنوع استخدام القفازات اثناء الغطس

٥- ممنوع الصيد بالنسفة ، والشارة ، ويسمح فقط بالصيد بالشارة بعيدا عن اماكن الغوص واماكن الشعاب في مياه مفتوحة لا يقل عمقها عن ٥ متر

٦- يحظر القاء اي مخلفات او قمامة او زيوت او شحومات في البحر او على الشواطئ او اي مواد اخرى تؤدي الى تلوث البحر والقضاء على الحياة البحرية او تلوث التربة

يتعرض المخالف للعقوبة طبقا لاحكام القانون ٢ ١ لسنة ١٩٨٣ والقانون ٤ لسنة ١٩٩٤

العقوبات

١- تصل العقوبة للمخالف في الحالة من ١-٥ الى غرامة تصل الى ١ جنيه وبالحبس مدة لا تقل عن سنة مع تحميل المخالف القيمة التعويضية للأضرار البيئية الناجمة

(المادة السابعة من القانون ٢ ١ لسنة ١٩٨٣)

٢- تصل العقوبة في الحالة ٦ الى غرامة تصل الى ٢ جنيه

(المادة ٨٧ من الباب الرابع - العقوبات - الفصل الرابع - القانون ٤ لسنة ١٩٩٤)

ملاحظة هامة طبقا لأحكام المادة ٧٢ - الفصل الثاني - الباب الثالث من القانون ٤ لسنة ١٩٩٤ يكون للشخص الاعتباري او المعهود اليه ادارة المنشأة مسئولا عما يقع من العاملين بالمخالفة لأحكام مواد القانون

لمزيد من المعلومات يرجى الاتصال بادارة محميات جزر البحر الاحمر

تليفون وفاكس ٥٤٩٦٣٢ - ٥٤٤٨٢ -٦٨ ٥٤٤

الغردقة

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ANNEX 5:

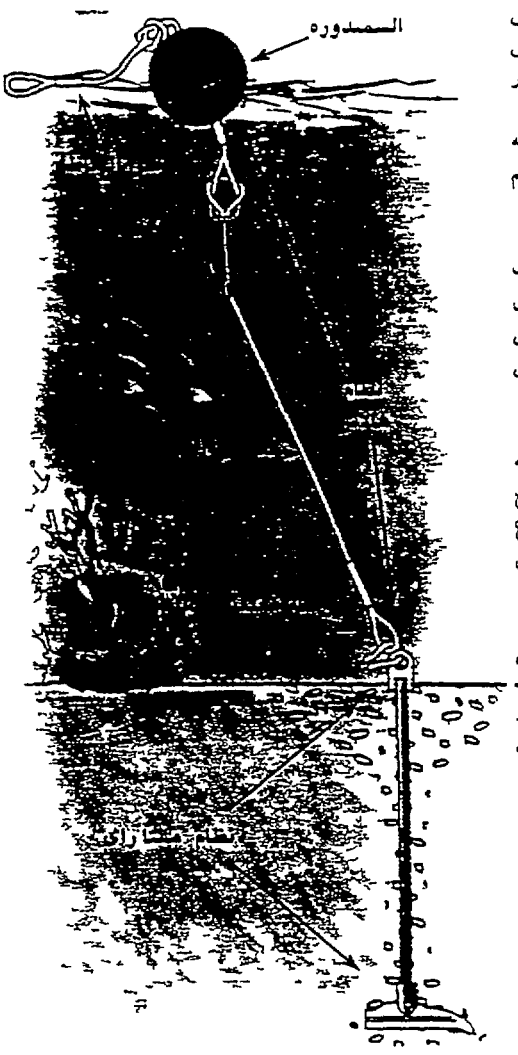
HEPCA Member Newsletters and News Briefs

31 Pages of Newsletters

ANNEX 5 PUBLISHED MEMBER NEWSLETTERS AND NEWS BRIEFS FROM HEPCA

ITEM	TYPE	DATE	DESCRIPTION
1	Flyer	1997	Mooring Buoy Information
2	Member Newsletter	Sep-Oct 1997	Issue No 7
3	Member Newsletter	Jan-98	Issue No 10
4	Member Newsletter	Feb-98	Issue No 11
5	Member Newsletter	Mar-98	Issue No 12
6	Member Newsletter	Spring 1998	Issue No 13?
7	Member Newsletter	Jun-98	Volume 14
8	Member Newsletter	Jul-98	Volume 15
Missing	Member Newsletter	Aug-98	Volume 16
9	Member Newsletter	Sep-98	Volume 17
10	News in Brief	Oct-98	Hurghada Bulletin
Missing	Member Newsletter	Oct-98	Volume 18
11	Member Newsletter	Nov-98	Volume 19
12	Member Newsletter	Dec98-Jan99	Volume 19 (Should be #20?)
13	News in Brief	Jan-Feb99	Hurghada Bulletin
14	Member Newsletter	Feb-Mar99	Volume 21
15	News in Brief	Mar-99	Hurghada Bulletin
16	News in Brief	Jul-99	Hurghada Bulletin

السمدورات



تواصل عدد الزوارق الخاصة البحارية تموه بالبحر الاحمر ومن ثم تزايد ايضا الضرر الملحق الى تجمع حمايه ما تبقى من الموارد الحساسه الموجوده تحت سطح البحر فالضرر المادى الذى يلحقه المراسى بالشعب المرجانيه مشكله كبيره يصعب حولها دراسات وفيره وهذا الضرر يمكن تلافيه الى حد كبير بواسطه السمدورات التى تلغى الحاجه الى الرسو مباشره على الشعب فانه منطقه تسمل الزوارق باستطاعتها ان تستفيد بوجود سمدورات وفصلاً عن تقليل الاضرار التى تلحق بالشعب المرجانيه تتيحه للرسو تتيح السمدورات ايضا اصحاب الزوارق اذ تكفل الامان لزوارقهم اثناء استماعهم بالشعب المرجانيه

وقد تمكنت جمعيه المحافظه على البيئه بالغردقه «هيكا» عن طريق التمويل الخاص بالمبادرات الخاصه من توفير عدد من السمدورات وتركيبها فى العديد من مواقع الغوص لتفادى رسو الزوارق على الشعب كذلك اعدت الوكاله الامريكيه للتنميه الدوليه «هيكا» بالاموال اللازمة لتركيب ماتتى وخمسين سمدوره جديده فى الغردقه وسفاجا والقصير فضلا عن اموال اضافيه لتدريب ملاحى الزوارق واقتصرت على استخدام تلك السمدورات

وتتكون جميع انظمه السمدورات من ثلاثه عناصر هى تركيبه مثبته فى قاع البحر وسمدوره طافيه على سطح البحر وصله تربط بين العنصرين وعادة ما تحدد الخصائص المميزه لقاع البحر انسب نوع من انواع تلك الانظمه وهكذا فان نظام «هالاس» هو انجح نظام فى المناطق التى تكون فيها قاع البحر صخرى على حين يوصى بنظام «ماتا - راى» للمناطق التى تكون فيها القاع رملى مغطى بقطع المرجان او مزيجا من النوعين السابقين

تتيح حاليا تتيح البيئه تشكيل دوريات منتظمه مكونه من ثلاث مراقبين لكى تجوب المناطق التى توجد بها سمدورات للتأكد من استخدامها على النحو الصحيح هذا بجانب تنفيذ لوائح الحظر كجزء من استراتيجيه الاداريه الشامله لحماية البيئه ان السمدورات تكفل الحماية للشعاب المرجانيه بشرط استخدامها استخداما سليما هذا الامر يقتضى تعريف الزائرين المستخدمين المحليين للسمدورات باصول استخدامها

عند استخدام السمدورة

١ - اقترب من السمدوره على الجانب الذى يهب منه الريح ضد التيار
٢ - راعى ان يكون الحبل الذى يصل بين قاربك والحبل المخصص للرباط المتصل بالسمدوره مرخيا
٣ - يتعين على الزوارق الاكبر حجما ارخاء حبل الرباط اكثر من الزوارق الصغيره
٤ - يمكن ربط الزوارق الاصغر حجما الى بعضها البعض فى الايام الهادئه
٥ - استخدام السمدورات متاح للجميع على اساس اسبقيه القدوم
٦ - السمدورات معده بغرض استخدامها لنصف اليوم فقط
٧ - تحرك بحذر فى منطقه السمدورات مع مراعاه السابحين والغواصين
٨ - عاين السمدوره التى تربط زورقك بها وتأكد من ان وصولك اليها مأمون
٩ - تكرم بالابلاغ عن اى سمدوره تلاحظ ان ضررا قد لحق بها او انها احتجت من مكانها

لا تصل حبل الرباط الى السمدوره مباشره

الطريقة الصحيحه للرباط على السمدوره

لا تلتى المخلفات

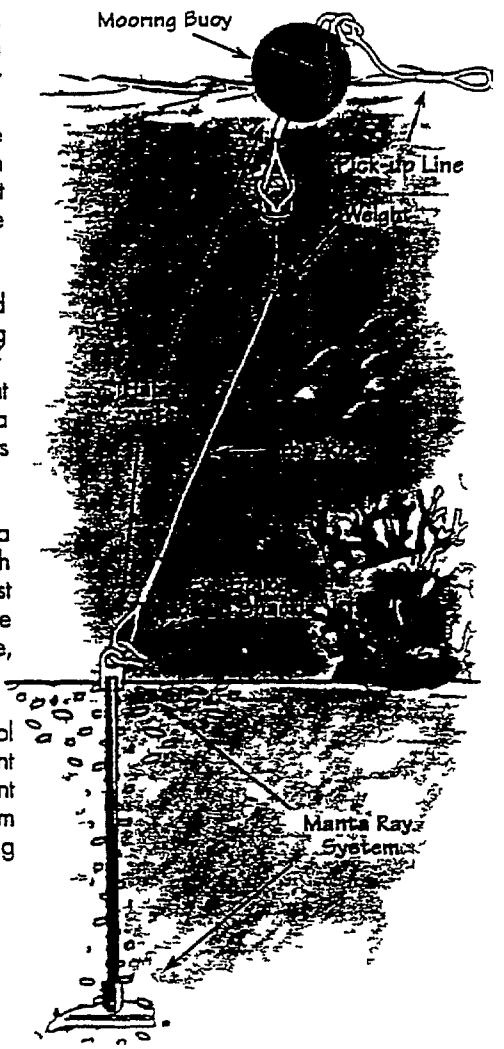
HEPCA RED - SEA
Hurghada environmental protection and conservation association

USAID
تم التمويل بواسطه الوكاله الامريكيه للتنميه الدوليه

ص ب ١٤٤ الغردقه البحر الاحمر جمهوريه مصر العربيه
تليفون و فاكس ٣٥ ٤٤٥ (٦٥)

MOORING BUOY INFORMATION

As the number of private and commercial boats in Hurghada continues to grow so does the urgency for protecting what remains of the fragile and sensitive resources below the sea surface Physical damage to coral reefs from anchors is a well documented marine resource protection problem Such damage can be significantly reduced by mooring buoys which eliminate the need for anchoring on the reef Any area that receives boat traffic can benefit from mooring buoys which can be integrated into any comprehensive resource protection management strategy In addition to reducing anchor damage to living corals buoys can act as an important management tool and can also serve as a convenient way for boaters to secure their vessels while enjoying the unique coral reef communities



Through private funding and initiatives the Hurghada Environmental Protection and Conservation Association (HEPCA) has been able to provide and install mooring buoys in a number of dive-sites, to prevent boats from anchoring on the reef HEPCA also approached The United States Agency for International Development (USAID) which provided funds to install 250 more buoys in Hurghada Safaga and El Quseir, with additional funds to provide training to boat captains and crews on the use of these buoys

All mooring buoy systems consist of three elements a permanent fixture on the sea bottom a floating buoy on the water surface and something in between to attach the two Sea bottom characteristics usually dictate what type of system is most suitable The Halas system is most successful in areas with flat solid bedrock The Manta-Ray on the other hand is recommended for areas of sand coral rubble, or a combination of bottom types

The Egyptian Environmental Affairs Agency (EEAA) will locate six Rangers to patrol mooring areas in fast boats to ensure correct use of the buoys and to implement EEAA regulations as part of a comprehensive resource protection management strategy Mooring buoys protect reefs but only if we use them, and use them correctly Visitors and local users must be properly educated regarding mooring buoy use

USING THE BUOY

1 Approach upwind of the buoy, against the current
2 Add rope to create slack with the mooring buoy
3 Larger boats must give out extra scope to create a horizontal pull on the buoy
4 Smaller boats are encouraged to tie off to one another on calm days
5 Buoys are available on a first come first serve basis for everyone
6 Buoys are intended only for half day usage
7 Maneuver slowly in the area of buoys and watch carefully for snorkelers, swimmers and divers
8 Inspect the mooring buoy you are tied to and make sure the system is secure
9 Please report any damaged or missing buoys

Never tie pick up line directly to boat

By increasing the length of line on windy days the boat has a better ride

Anchoring is not permitted

Hurghada environmental protection and conservation association
HEPCA
RED - SEA

PO Box 144 Hurghada Red Sea Egypt
Phone & Fax (065) 445-035

USAID
Funded by USAID

HEPCA
RED - SEA
Hurghada environmental protection and conservation association

CROWN OF THORNS–SURVEY

WARNING

The spines of the crown-of-thorns starfish are toxic and may produce painful injuries Always keep at a safe distance

Simply complete this survey for each reef you visit During your visit, note the condition of the coral and the presence or absence of crown-of-thorns starfish Count all the crown-of-thorns starfish seen on each dive The information you provide will help us to keep a check on the starfish at the Red Sea Reefs

Zero sightings Please note that it is equally important to complete reports for reef visits during which no starfish were sighted

1 Name of reef(s) _____ _____

Date of visit. _____

2 Which sight of the reef did you examine? _____

3 How did you examine the reef? ☐ Scuba diving ☐ Snorkelling

4 Please describe the location of each site For example GPS position, NW of reef

Site 1 _____ Site 2 _____

5 For about how long did you examine each site?

Site 1 __hours __ minutes Site 2 __ hours __ minutes

6 What proportion of the corals appeared to be dead?

A- Recently dead (i e corals white or covered by fuzzy, green algae)

Site 1 _____ Site 2 _____

B- Long dead (i e corals entirely covered by brown algae)

Site 1 _____ Site 2 _____

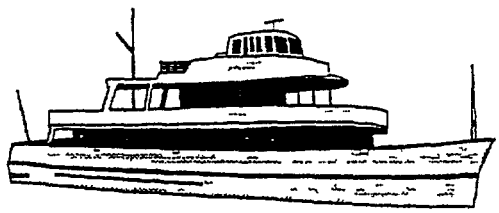
7 Did you see any crown-of-thorns starfish? ☐Yes ☐No

If NO, please go to question 13 If YES, please continue

NEWS LETTER

Southern Islands & Safari Supplement

Hold on to your horses, or boats in this case We understand that the government have declared the southern islands open for water sport activities However, we urge you not to start taking bookings until all the information and regulations have been issued HEPCA in association with the Egyptian Environmental Affairs Agency (EEAA) have been in the process of installing moorings on the islands and coastal routes and are now receiving numerous calls from our members and non-members alike wanting to know what the position is HEPCA, like many of you are waiting for the official information to be released by the EEAA and therefore cannot give you any specific information What we can tell you is that it will not be the same unregulated way as it used to be As we understand several processes will need to take place before any trips can be planned Boats will have to conform to the specifications, be licensed and inspected before being issued with a permit Captains and dive guides will have to conform to certain standards as regards safety and conservation Routes will be restricted and boats will be travelling in convoy for both safety and the assurance that regulations will be enforced An EEAA ranger will be assigned to each convoy Full details of the regulations and allocations of permits etc , will be issued by EEAA in due course and as soon as they are confirmed we will pass the information on to you



St John's Some safari boats have been confronted by the Navy when diving in this area We cannot get any conformation as to any restrictions on diving in this area What our advice to you is that you should state that you intend to travel as far as St Johns when applying to the Coast Guard for permits If there are restrictions in place at the time then should inform you

Coastal safari routes There is no restriction to these at present but HEPCA has well over 100 buoys and associated equipment, courtesy of USAID, to complete moorings to the south of Safaga We ask for your support in protecting in what you are selling as some of the best diving in the Red Sea What we need is the use of safari boats for any length of time possible to complete these installations USAID and the EU have funded the mooring of the islands, USAID has funded the moorings along the coast Please make your contribution by offering us a boat at cost price or less If you have any available time, no matter how short it may be, please make the offer It is in your interest to protect these reefs Call 446674

e-mail us
hepca@intouch com
to get your
d Sea Reef Database Form

التمندورات

الغردقة

تم تركيب 237

حارى تركيب 17

جنوب ابوسوما

تم تركيب 25

حارى تركيب 95

الاخوين

تم تركيب 12

الزبرجد

تم تركيب 12

ابو الكيزان

تم تركيب 8

اي تركيبات احري فـــي
الحرر تبعـــا لتعليمـــات
حهار شئون البيئة

Special Thanks to our sponsors : It would have been difficult to reach our current strength without your support and help , Thank you

BUOY'S STATISTICS

Hurghada

Installed 237
To be installed 17

South of Abu Kiffan

Installed 25
To be installed 95

Brothers Islands

Installed 12

Zabargad Island

Installed 12

Dedalus Reef(Abu Kizzan)

Installed 08

* Future Islands Installations are decided by EEAA

IN THIS ISSUE

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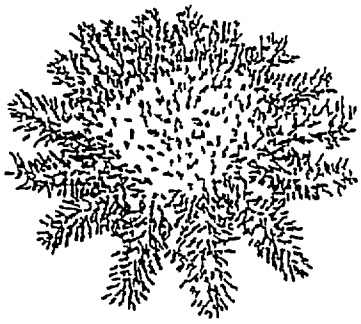
Assistance required for Buoys maint
Collecting bags soon available
The Only Enemy
Buoys Statistics
COTS Survey

P O BOx 144 Hurghada, Red Sea, Egypt Tel/FAX ++ 065 445035 Email hepca@intouch com



Crown of Thorns star fish

حالص الشكر والتحية لريسة اليحوت والمراكب على تعاونهم مع فريق هيكا الفني للتركيبات
ان محهودكم وتعاونكم اما بالابلاغ عن العوامات المفقودة أو الملاحظات التي تبلغونا بها بصفة مستمرة سواء بالابلاغ المباشر أو أثناء اللقاءات المختلفة هو من أهم أسباب نجاح جميع المشروعات البيئية المختلفة التي سوف تجعل من محافظة البحر الأحمر مكانا جميلا لنا ولابنائنا للعيش به

SOUTH WIND

Mooring buoys

At the request of the boat skippers we have initiated the installation of Southern wind mooring buoys at the locations suggested by the skippers We will be using the SCUBAPRO Buoys Our plan installing between 17 - 20 mooring, for use during the Southern wind "AZIZB"

MEMBERS 1998

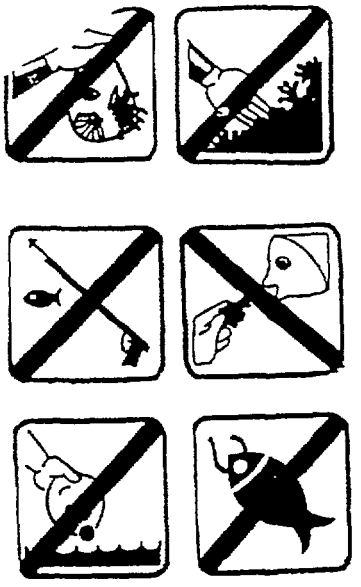
Aquanaut
Barakuda Luis Bay
Barakuda Marriott
Barakuda Monaville
Beriut Diving Centre
Blue Brothers Diving Centre
Blue Water Dive Resort
Conrad International
Dawar El Omda
Dive Point Red Sea
Divers' Lodge
Diving world
Ducks Dive Centre
Dyria Sub
Easy divers
El Samaka Beach
Emperor Divers (Hilton)
Emperor Divers (Princess Hotel)
EQI
Fish Eye Production
Golden Turtle
Hilton Resort Hurghada
Holiday Inn Resort Hurghada
Holiday Inn Safaga
Hurghada Marriott Beach Resort
Hurghda Bulletin
Iberotel Arabella
Intercontinental Resort & Casino
International Dive Master
James & Mac
Lazy Divers
Maged Abd El Aziz
Marriott Beach Resort
Mirette Hotel
Monika /Jasmin diving Centre
Moustafa Taher
Nautico Egypt
Ocean Red
Orca
Orso Diving Club
PADI
Peak Marine
Pirates Club
Red Sea For Tourism & diving
Red Sea Images
Roland Schumm Diving Centre
Royal Palace Hotel
Sea Horse
Sea World Diving Centre
Seafari
Seaworld Diving Centre
Sefpa Safaga
Sepia Hurghada
Sepia Nabaa
Shafick Wahdan
Shams Safaga
Sinai Divers
Sofitel Hurghada
Star fleet Charters
Sub Aqua Conrad Int.
Sub Aqua Sofitel
Subex Hurghada
TGI Sahara Diving Centre
Three Corners Hotel
VIP Diving Centre
Volkert Safaga Paradise

HELP US TO HELP YOU

We would appreciateif you would inform us of any lost or unusable mooring
Maintenance of these systems is expensive and may take time to repair Each mooring buoy installation costs between 500 - 1000 LE to put in place Lack of care and consideration for the moorings will result damage or lost systems Please use it wisely and do not overload with boats or allow the boat to pull on the mooring while the propeller engaged Your assistance will be welcome by all.

دعونا نساعد بعضنا البعض

نشكر لكم تعاونكم معنا في الإبلاغ عن الشمندورات المفقوده أو التي تلاحظون أن ضررا قد لحق بها أن صيانة الشمندورات اجراء يحتاج الى الوقت والى الأموال حيث أن تركيب الشمندورة الواحده يتكلف بين 500 الى 1000 جنية ان طريق التعامل مع الشمندورات واسلوب الرباط قد يكون له تأثير سئ على الشمندورات اذا تم تصوره خاطئة نرجوا منكم عدم تحميل الشمندورات باكثر من طاقتها من حيث عدد الزوارق وكذلك عدم جذب الشمندورات والتحميل عليها اثناء دوران المحرك إن مساعدتكم لنا لها عظيم الأثر



HEPCA PRODUCTS

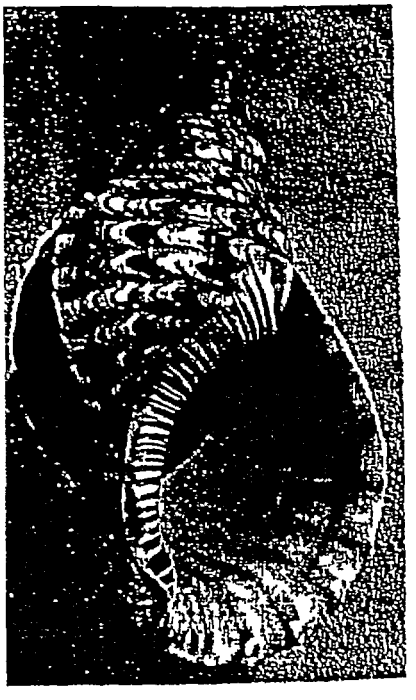
T-SHIRT
MUG
WALL POSTER
PEN
Key Chain

AVAILABLE AT YOUR DIVING CENTER

HOW TO USE THE COTSS

Crown Of Thorns Starfish Survey

All instructors and Dive guides are requested to personally fill in the survey- enclosed in this bulletin- after each dive or they may, at their discretion, involve other divers under their supervision as a thrilling activity Simply complete this survey for each reef you visit During the visit, note the condition of the coral and the presence or absence of the COTS Count all the COTS seen on each dive The information you provide will be entered into the **RSRDAT (Red Sea Reef Database)** Please note that it is equally important to complete reports for reef visits during which no starfish were sighted After completing the survey either fax it to HEPCA or wait till the end of the week when you have compiled more surveys and contact us at 445035 and we will arrange collecting it



The Only Enemy

Basically the only natural enemy of the Crown of Thorns Starfish is the Trumpet Triton- see fig- The Triton has a popularity among shell collectors The Triton may measure 40 CM across and is sold for a high price But the real price is paid in dead corals

Collecting Bags

HEPCA is in the process of obtaining Special Collecting Bags to be used in Boats, Diving centers, beach cleanups ,etc We will be distributing them to our members for evaluation If they are proven efficient we can then start delivering them at their cost price Each bag is designed to contain around 20 KG of garbage with the characteristic of draining water and a tight closing feature

WHY MONITOR CORAL REEFS

Coral reefs are important underwater habitats Millions of coastal and island inhabitants around the world depend on coral reefs for food and livelihood Increasingly, reefs have become popular tourist sites as SCUBA and snorkeling became more widely affordable Many human activities are threatening the survival of coral reefs

We need your help for the vital task of assessing the present status of the reefs and monitoring changes over time

HEPCA is a recognized NGO-Non Governmental Organization –Registered with the Red Sea Governorate under Law 32/1964 AND established by members of the Hurghada Diving Society
HEPCA's mandate is the protection of the land, marine ecology and the underwater environment of the coral reef of the Red Sea and its cost line

SPRING 1998 (MAY?)

MEMBERS NEWS LETTER

Crown Of Thorns Starfish

The Giant Crown Of Thorns Starfish (Acanthaster Planci), which has been notoriously responsible for the destruction of large area of coral reef, spends its life browsing on coral polyps It can grow up to 1 metre across and is capable of demolishing 4 metre of reef surface a month
The thousands of suckers on the underside of its 16 arms are used to extract the minute, plankton – eating polyp's essential in reef build up
Lately, the COTS have caused major reef destruction, which have taken hundreds of years to build up, in different parts of the world
What we will be working at in HEPCA with the co operation of the EEAA Egyptian Environmental Affairs Agency with the assistance of our members is entering the data of this outbreak in a Reef Database Information System This information will be available to our Members and all concerned parties in this issue By following an action plan in dealing with this outbreak, we will be confident that any interaction with the COTS is calculated, measured and dealt with in a scientific manner

Good Bye

We at HEPCA would like to give a big thank you and say goodbye to four members of the Board and two of our staff Captain Mustafa Taher, Captain Shafik Wahdan, Jim Yanny retired from the board I am sure that many of you will know some of these names as being HEPCA founder members
We would like to extend your thanks for their devotion and hard work over the last three years Secondly, we wish Cary Yanny and Jane Ossman from the office of HEPCA We know that you may not know the faces but we are sure you know the voices Cary was the Executive Director and has now moved to Bermuda with her husband Jane was our Training Manager and also doubled up as Public Relations as well as editor of the Newsletter Jane has moved back to the UK for an indefinite period but like Cary she has many connections here in Egypt and I am sure they will both be back to see us again In the mean time there will be new faces appearing in their places and new ideas to continue to strive to improve HEPCA for all its members

P O Box 144 Hurghada Red Sea-Egypt Tel/Fax ++2 065 445035 e-mail hepca@intouch com

APR 1998

HEPCA Member Newsletter

Issue no 12 - March 1998

HEPCA DIVERS HEAD SOUTH!!

THE SOUTH To straighten the record as rumours are abounding regarding the Brothers we can confirm that HEPCA/EEAA have sent a boat to the south to moor the islands We stress that at this time the islands remain closed Any information regarding the opening of the islands will come to the dive centres directly from the Government

SAFAGA The two remaining HEPCA divers have taken the HEPCA boat to Safaga to install mooring buoys in that area They will be spending the next two weeks in Safaga We would appreciate that in their absence any reporting missing or broken mooring buoys in HURGHADA should be reported directly to the HEPCA office on Channel 68 or by phone/fax

CROWN OF THORNS ALERT!

The Crown of Thorns Starfish is a large spiky starfish which feeds on live coral In small numbers it presents no threat to corals but in large numbers it is capable of devastating large tracts of reef as it has done in the Barrier Reef and areas in the Pacific

A group of around 100 Crown of Thorns Starfish was sighted in Shaprunr Umm Gamar in the last two weeks We have also received reports of large numbers present on certain reefs in the south This has been reported to the EEAA who is responsible for this issue

Please keep your eyes open and help us by reporting any more sightings of large numbers of these creatures There is a picture of a crown of thorns on the back of this Newsletter Be aware that these creatures are venomous to humans and have a nasty sting No divers should be handling site their disposal unless official notification is received

FISHING

We were very distressed to get two calls this month regarding fishing Firstly a dive guide called to report that the very large grouper which had become quite a regular at East Toria Tanous had been sighted with a spear sticking out of its head just behind its gills The fish appeared to have been speared a day or so earlier and was by then near to death and could barely swim The selfish and cruel acts of one person has now deprived many divers of the chance to see this very large grouper

Secondly a hotel owner reported a man sprinkling powder on the surface of the water at Disha El Daba He informed me (as did a number of other guides) that there were many dead fish on the sea bed at this site Unfortunately the man and his truck were too far away to be identified

Both cyanide or dynamite fishing and spear fishing are outlawed by Law 102 Please report incidents to the Rangers or to HEPCA Your help is needed and much appreciated

EEAA RANGERS

Congratulations to the Rangers on their new speed boat Molly 1 which is now operational Molly 1 can be contacted on Channel 11 (call sign Molly)

There appears to be much confusion about the relationship between HEPCA and the Rangers The Rangers are not employed by HEPCA and as such do not report to HEPCA although we have a good working relationship and cooperate day to day on a number of issues The Rangers are in fact part of the Government EEAA (Egyptian Environmental Affairs Agency)

Any inquiries regarding the activities of the Rangers or questions on the law affecting the protection of the reefs should be directed to the Rangers on tel 446040

TRANSLATING THE HEPCA NEWSLETTER

IF ANYONE WHO HAS ACCESS TO MICROSOFT PUBLISHER IS WILLING TO HELP TRANSLATE THE HEPCA NEWSLETTER EACH MONTH INTO EITHER GERMAN, ITALIAN OR FRENCH WE WOULD LOVE TO HEAR FROM YOU CERTAIN MEMBERS HAVE REQUESTED THIS AND WE WOULD LOVE TO OBLIGE

DANKE, GRAZIE, MERCI

HEPCA OFFICE

VHF Radio Channel 68

Phone and Fax 065 115 03..

email hepca@intouch ...

Visit us in Sahl H...

HEPCA RED - SEA environmental protection and conservation association

HEPCA Member Newsletter

Issue No 11 - February 1998

WELCOME TO NEW HEPCA STAFF

We are very happy to welcome two new members of staff to the HEPCA team!

Mohamed Amin Farag has joined as our new Financial Manager Prior to joining HEPCA Mohamed was the Chief Accountant with Gharib Oil Services in Ras Gharib

Bob Cozens is our new Logistics Manager Bob is from the UK and has been working in Hurghada for two years, managing Ocean Red Diving Centre Bob will be responsible for the installation and maintenance of the mooring buoys

MEMBERSHIP REMINDER

THE MEMBERSHIP RENEWALS ARE NOW DUE JANE IS CURRENTLY DOING THE ROUNDS OF THE MEMBERS TO COLLECT THE MEMBERSHIP FEES AND UPDATE MEMBERS ON OUR ACTIVITIES

HEPCA OFFICE

Phone and Fax 065-445 035

email hepca@intouch com

Visit us in Sakala

HEPCA NOW HAS A VHF RADIO - CHANNEL 68, CALL SIGN 'HEPCA' - CALL US!!

New Buoys on Trial

We are currently testing the efficiency of a new style of mooring buoy on a number of the reefs in the Hurghada area You may have the opportunity to use them, they are somewhat smaller than the current buoys

The existing buoys we are using have a 8 10% failure rate for reasons which are not entirely clear but tend to include the damage to the buoy caused by excessive force on the through line of the buoy The new system includes the use of a buoy which is used as a marker but does not carry a through line, hence reducing the strain placed on the buoy in high seas We would be grateful if you would pass any comments you may have on to Bob who will be monitoring the trial

Please help us with the policing of the existing mooring buoys by reporting missing or damaged moorings to Bob Your help is vital to the success of our maintenance programme and is much appreciated

TRAINING UPDATE

CONSERVATION WORSHOPS

We have now held two HEPCA Conservation Workshops for dive guides and instructors in late January and early February which proved to be very successful From March we will be running these on a fortnightly basis and look forward to meeting more guides and instructors throughout the year Please call the office to reserve your place

TOURIST EDUCATION

The Tourist Education Presentations will commence in March in sha Allah. The presentation will be an enjoyable and informative talk on the aquatic ecosystems in the Red Sea and how to preserve them and will include a slide show The talk is aimed principally at snorkellers and divers but will also be of interest to other tourists It would be very helpful for us if you could make your guests aware of these talks They are free of charge Full details will be sent to dive centres when they are finalised

It is hoped that we will later be doing these presentations in all the main languages We are looking for volunteers to help with this Also we would be delighted to hear from any hotels who are willing to offer a room in which we can hold these talks If you can help in any way please call Jane at the HEPCA office

THE OFFICIAL HEPCA DIVE GUIDE - HURGHADA/SAFAGA IS ARRIVING FROM THE PRINTERS NEXT WEEK. MORE DETAILS TO FOLLOW

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environmental protection and conservation association
HEPCA RED - SEA
Hurghada

HEPCA Member Newsletter

Issue No 10 - January 1998

HAPPY NEW YEAR

HEPCA WOULD LIKE TO WISH OUR MEMBERS A PROSPEROUS NEW YEAR AND WOULD LIKE TO REMIND YOU THAT YOUR 1998 MEMBERSHIP FEE IS NOW DUE WE WOULD LIKE TO THANK YOU FOR YOUR SUPPORT THROUGH 1997 AND HOPE FOR YOUR CONTINUED SUPPORT DURING 1998

VISIT FROM DIVER MAGAZINE

Steve Lee,a writer and photographer on assignment from Diver Magazine spent a week with HEPCA in early January Steve was writing about HEPCA activities in Hurghada/Safaga including the mooring buoy project and the training and public awareness programmes He went out on the HEPCA boat with our Technical Team and photographed our divers in action Steve interviewed many people including a dive guide a boat captain a national park ranger etc to discuss their views on the conservation of the reefs and related ecosystems and what they thought of HEPCA s efforts in this field We hope that this article will bring Hurghada to the attention of the diving public in the UK and will reflect positively on the efforts of everyone in Hurghada.

HEPCA OFFICE

Phone and Fax 065-445 035
email hepca@intouch com
Visit us in Sakala

HEPCA MEMBERSHIP LIST 1997

Aquanaut
Barakuda Lotus Bay/Marriott/Menaville
Beirut Dive Centre
Blue Brothers Diving
Blue Water Dive Resort
Conrad International
Dive In
Dive Point Red Sea
Divers Lodge
Diving World
Doarelamoeda
Ducks Diving Centre
Dyria Sub
Easy Divers
El Samaka Beach
Emperor Divers
Fish Eye Productions
Golden Turtle
Hilton Resort, Hurghada
Holiday Inn Resort Hurghada
Holiday Inn Resort Safaga
Sea Horse Diving Centre
Sofitel
Iberotel Arabella
Intercontinental Resort and Casino
International Divemaster
James and Mac
Lazy Divers
Marriott Beach Resort
Mirette Hotel
Monika/Jasmin Diving Centre
Nautico Egypt
Ocean Red Albatross
Orca, Safaga
Orso Diving Club
PADI International
Pirates Club
Red Sea for Tourism and Diving
Red Sea Images
Red Sea Rambler
Roland Schumm Dive Centre
Seafari
Seaworld Diving Centre
Sepia Hurghada, Safaga, Nabaa
Shams Safaga
Sinai Divers Sharm el Sheikh
Sonesta Beach Resort
South Red Sea Enterprise
Star Fleet Charters
Storm
Sub Aqua Sofitel/Conrad
Subex
TGI Sahara Diving Centre
Three Corners Hotel
VIP Diving Centre
Volkert Safaga Paradise

TRAINING UPDATE

HEPCA will be commencing its series of Conservation Workshops for Dive Guides and Instructors on 26 January The workshops are free of charge open to members and non members alike and is a good chance to get together with people from other centres to see how we can work together to help protect and the conserve the coral reefs The first workshop is already fully subscribed Please call Jane at HEPCA for more information or to sign up for one of the future workshops which will be held on a weekly basis in the HEPCA office

EMPLOYMENT REGISTER

Any guide or instructor who has attended one of the above conservation workshops will be eligible to put his name down on the HEPCA Employment Register We will be maintaining a database where we will store details of those people who are in search of either freelance or permanent employment Dive centres looking to hire will then be able to call us up to get names of guides and instructors We hope this will help facilitate communications between dive centres and those looking for work

RED SEA CALENDAR

WE HAVE BEAUTIFUL A3 SIZE FULL COLOUR 1998 CALENDARS FEATURING FABULOUS PHOTOGRAPHS OF THE MARINE LIFE IN THE RED SEA FOR SALE AT THE HEPCA OFFICE A WONDERFUL NEW YEARS PRESENT AT LE 70 (LE10 OF WHICH GOES TO HEPCA) HURRY WHILE STOCKS LAST!!

HEPCA RED - SEA Hurghada environmental protection and conservation association

HEPCA Member Newsletter

Issue No 7 - September-October 1997

250 BUOYS CELEBRATION

On Thursday 25th September the members of HEPCA had a party to celebrate the installation of over 250 mooring points in the Hurghada and Safaga area A great time was had by all It was wonderful to see so many of you there, members from dive centres, hotels and local businesses as well as indivdual members such as dive guides and instructors In total over 100 people showed up!! The people from Shelgada were fantastic in their organisation and I have heard many positive comments about the excellent food A big thank you to Farida Sidhom, a "Friend of HEPCA" and Rodina, the HEPCA secretary for their hard work on the door The main reason for the evening was to give us at HEPCA the chance to thank our members for all their support, without which HEPCA would not have been able to achieve as much as we have this year We look forward to your continued support and would like to hear any ideas or comments you may have Finally I would just like to thank Jane from Divers Lodge who brought along her wonderful puppy who managed to lighten up the speech!

NEW TRAINING MANAGER

Jane Ossman is our new Training Manager She has worked in Egypt for several years most recently as a Diving Instructor with the Red Sea Diving College in Sharm el-Sheikh Jane is from the UK and is fluent in Arabic French and Spanish Her role within HEPCA will be to co-ordinate the boat captain and crew training in addition to providing environmental training for dive guides tourist seminars targeting the divers and snorkelers and an Egyptian schools education programme We will be happy to discuss any other training ideas that you might have

We are starting with Boat Captain Training shortly - if you have a skipper who you wish to enroll please give Jane a call at HEPCA

Incident Report Forms

If anyone needs a copy of these forms please let us know and we will fax one to you When you file these reports please try to have your guests sign them and whenever possible attach a photograph of the incident When these forms come to us we log them on our computer system We call the dive centre manager to ask for his view and to ask him to confirm in writing what action has been taken in the light of the report This letter is then forwarded to the Rangers at the EEAA There has been some very positive action from some dive centres who had been unaware that these violations were taking place Thank you to them

HEPCA T-SHIRTS

THE HEPCA T SHIRTS HAVE ARRIVED!! THEY ARE AVAILABLE IN MEDIUM LARGE AND EXTRA LARGE PLEASE CALL US TO PLACE YOUR ORDER WE ARE ABLE TO ARRANGE DELIVERY FOR LARGE ORDERS

PLEASE WELCOME OUR NEWEST MEMBERS

Dyria Sub
El Samaka Beach
GoldenTurtle
Sefpa Hurghada
Sefpa Nabaa
Sefpa Safaga
Star Fleet
TGI Sahara Diving Centre

HOW CAN YOU HELP

In order to satisfy our plan to provide better maintenance coverage particularly in the northern areas we need space on your boats We would like you to offer space for two HEPCA divers for 5 or 6 days in a three month period The divers would travel to your chosen destinations and carry out maintenance work on the moorings This work would be the replacement of lines and/or buoys The divers would provide their own equipment be presentable at all times keep well clear of the dive deck entry and exit areas while your guests are using them and also keep all materials below deck until guests are clear They would adhere fully to the instructions given by the dive centre staff This would assist us in that we could cover more sites in the same day and would be good publicity for your diving centre in showing your commitment to environmental protection We already have a number of centres more than willing to offer time and would like more to join in Please call Bob Cozens on 446647 for more details or you offer to help

We are still in need of safari boats to assist with mooring installations on the south coast Please call us if you have a boat available We are prepared to pay all costs for the trip so you stand to lose nothing but will be helping to protect your investment in the Red Sea

Dear member
Offer your divers the HEPCA official dive guide
help us to reproduce other materialls for the Red Sea divers

FAREWELL

Emad Sadaawy and Ahmed Tawfik from the technical installation team has left HEPCA on the 1st of May We wish to thank for their efforts and we wish them the best of luck in their new assignment

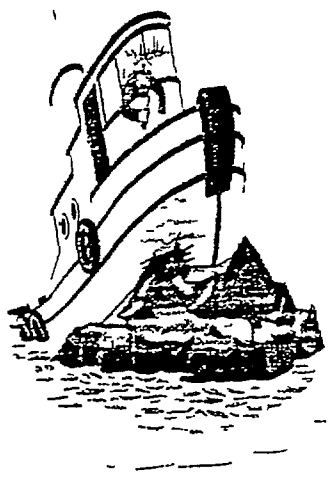
BOAT SKIPPERS TRAINING

Environmental & Seamanship 4 days training workshop in Arabic will be conducted soon for boat skippers All those interested in attending this free training workshop please submit your names to your diving centre or directly to HEPCA Training will also enclude the guidelines of working in protected areas

Crown Of Thorns Starfish Survey

We would like to inform all those who were concerned about the Crown Of Thorns Breakout that HEPCA did not receive one single survey back hence we were not able to generate the data required by the EEAA before we could organise a collecting campaign similar to what happened in Sharm El Sheikh
We are afraid that there is nothing we can do at HEPCA without your support on this issue It was suggested that HEPCA divers could survey the Hurghada sites and get the required data'
This would be impossible for more than one reason
Our divers would need a minimum of 22 days to cover Hurghada only It could take less than 5 days if all Instructors and dive guides would survey the sites which they visit anyway during their daily diving
We can not afford to stop the installation in Safaga and the maintenance program for 22 days and involve them in the survey I am sure you can imagine how would this affect the mooring systems

We ask again for your help to preserve and protect our reefs and eventually your business
Please read The article Sharm El Sheikh co operation and solidarity
example



HEPCA P O Box 144 Hurghada Red Sea-Egypt Tel—2 065 446674 Fax +—2 065 4-5035 E mail hepca@intouch com

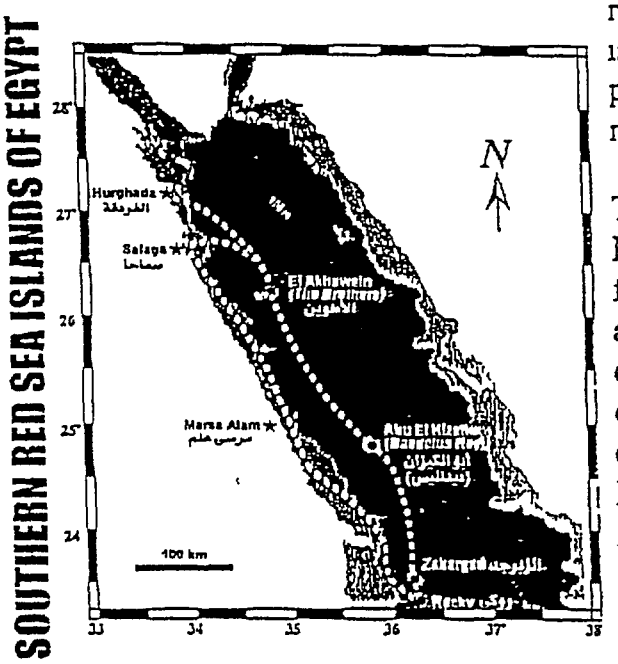
HEPCA is a recognised NGO Non Governmental Organisation registered with the Red Sea Governorate and established by the Members of the Hurghada Diving society
HEPCA's mandate is the protection and Conservation of the land and marine ecology and the Underwater environment of the coral reef of the Red Sea coast of Egypt

Members Newsletter

Volume 14 June 1998

In this issue

* Islands are open
* How Can you help
* Farewell
* Boats Skippers training
* Crown of thorns starfish survey !
* EEAA Corner
* Solidarity & Cupertino , an example
* Irregular general meeting
* Mooring buoys installation update
* Give them some scope
* Welcome to new HEPCA diver
* What is happening in HEPCA supplement



ISLANDS ARE OPEN

On the 29th, May 1998 the Red Sea governor announced in an International press conference, the opening of the offshore islands of the Red Sea for diving activities

The instructions and the guidelines, which have been announced in the conference, regulate the diving activities in the far islands These guidlineswill help in protecting and managing the natural resources of the Red Sea

The hard efforts of the EEAA, TDA, Ministry of tourism, the Egyptian Navy forces, Coast Guard Forces EU, USAID and HEPCA along with the support of diving centres safari organisers, boat captains and divers will guarantee the conservation of the natural beauties of the Red Sea This was not the first step and many steps are yet to come till all the coast of the Red Sea becomes a PROTECTORATE

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NEWS IN BRIEF

Non HEPCA Members

The following facilities wish not to join the Association for the year 1999
They are currently non HEPCA members and should not claim themselves as part of the Association

Golden Turtle Diving @ Safir Hotel

International Divemaster@Safaga

Pirates club @ Helnan Regina

SEFPA @ Hurghada, Safag & Nabaa

V I P Dive Center @ Sekkala

We would like to thank them for their previous participation, cooperation and the spirit of solidarity they have shown to HEPCA We will be looking forward to welcome them again in the future as active members of the Association

Membership Status Update

Individual Members	7
Exclusive & Charter Members	34
Basic Members	3
Associate Members	1
Sponsors	3
Honor	2
Total number of members	**50**

Incident Report Forms

We haven t been receiving violation reports lately We would like to think that there are no violations anymore We know there are still violators and there are still violations which are done against the reef and the environment Please help yourself and the environment by reporting these violations to HEPCA & EEAA

HEPCA Maps

Please be informed that we have uploaded the mooring maps for most of the moored sites You will be able to visit our web site at http //www hepca org and print all the maps you want for free We hope like this new feature

Mooring Buoy Message

We would appreciate if you would contact us @ 445035 or 446674 and inform us if you find any missing or removed buoy Lately we have found by a mere chance buoys dumped at Marinas and next to floating jetties Please call us and we will collect the buoy ASAP

PRIVATE SECTOR'S PARTICIPATION IN THE MOORING PROJECT

On the 9th February HEPCA presented an environmental awareness seminar for an intermediate public school El Mina school The objective of the program is to highlight environmental issues to the school children
The seminar was presented under the guidance and supervision of the -Red Sea Educational Directorate If the materials and the contents of the presentation are accepted by the Directorate, HEPCA could then maximize the programs exposure to include other schools in the Red Sea Governorate

HEPCA PRODUCTS

Available at member dive centers, HEPCA office HEPCA store (at 10% discount) Easy Divers Dive Store at the Empire Hotel and Focus photo shop

Schools awareness program

On the 9th, February HEPCA presented an environmental awareness seminar for an intermediate public school El Mina school The objective of the program is to highlight environmental issues to the school children

HEPCA P O Box 144 Hurghada, Red Sea-Egypt Tel++2 065 446674 Fax ++2 065 445035 E-mail hepca@hepca org

Hurghada Environmental Protection and Conservation Association
HEPCA
RED SEA

HEPCA is a recognized NGO - Non Governmental -Non profit making- Organization- registered with the Red Sea Governorate and established by Members of the Hurghada Diving society
HEPCA's mandate is the protection and conservation of the land and marine ecology and the underwater environment of the coral reef of the Red Sea and its coastline

JULY 1999

NEWS IN BRIEF

MARKETING

HEPCA is now undergoing a marketing campaign to promote its members. This is a list of our 35 members (facilities only) who will be included in the campaign

AQUANAUT
BLUE WATER
CONRAD HOTEL
D E.C.O
DIVE INN
DIVE POINT
DIVERS INTERNATIONAL
DIVERS'LODGE
DIVING WORLD
DUNE DIVING
EASY DIVERS
EL SAMAKA DIVING
EMPEROR DIVERS
HOLIDAYY INN
HIGHLIGHTS M/Y
IBEROTEL ARABELLA
IBEROTEL MAKADI
IBEROTEL-PALM BEACH
JAMES & MAC
JASMIN DIVING
MARRIOTT HOTEL
ORASCOM
ORCA DIVING
RED SEA FOR TOURISM
SCUBADOO
SEA DIVERS
SEA HORSE
SEA WORLD DIVING
SHAMS SAFAGA
SINAI DIVERS
SOMA BAY DIVING
STAR FLEET
STORM DIVING
SUB AQUA
SUBEX

COMMON GOALS

Effective management of diving growth requires more than legislation and enforcement to ensure that both the natural resources and the business structure are sustained. It requires that all users participate in decision making.
Perhaps management companies and dive operators should investigate the possibility of coming together since they have common goals and objectives.
Working together under an umbrella of any type or shape is of critical importance to all of us. Establishing criteria for managing the Red Sea resources is a must. Weather we like to be part of this change or not, this is the question. Let us all unite and assist in making sound decisions for our business and the environment.

SKIPPERS TRAINING

100 Skippers have received their Medic First Aid training courses.
Soon, we will recall those who are interested in continuing education to register for the Oxygen provider courses. Please pass the message to your skippers.

Welcome New Members

We wish to welcome our new members of *Storm Diving, Shams Safaga, James & Mac, Soma Bay Diving, Star Fleet, M/Y Highlights, D.E.C.O and Iberotel Makadi Beach.*
Thank you for the trust and we look forward serving you as members of HEPCA s General Assembly

PADI HEPCA s Board of Directors would like to thank Mr Douglas Nash, Mrs. Suzan Pleydell and Mr Simon Chance from Padi International Ltd. for their support and quick response in supporting the Educational campaign which HEPCA is undergoing at the moment. PADI s contribution enabled the project management to increase the number of beneficiaries of the MFA training.

CROWN OF THORNS AT MINISTERIAL LEVEL

It is our obligation to inform all that the efforts which have been extended by every body in fighting the COTS since early 1998 were not very promising. If we compare the numbers of the COTS which have been collected in the Red Sea and South Sinai, we would realize that we could have done a better job at the end we all share the responsibility
On Sunday the 4th, The Governor of the Red Sea hosted H E Dr Nadia Ebied Minister of State to the Environment, Dr Ebrahim Abdul Gelil, Dr Moustafa Fouda whom we wish good luck in his new post and Gen. Ahmed Shehata from the EEAA.
In a Seminar which lasted till after 18 00pm, representatives of various groups gave briefings, recommendations and their vision towards a better Red Sea.The topics addressed promoting the Red Sea as a destination, Safety and health standards of the dive operation and the action plan for fighting the break out of the COTS Initially the Governorate will launch five safari trips for COTS collection in the South. Additional two trips are organized by the military forces. We are looking forward to see the official recommendations of H E the Governor of the Red Sea, which are expected to be published soon.

SUMMARY REPORT

Due to the delay in conducting the annual General Meeting of the Association is delayed we think it is our duty to inform members of the General Assembly and the community of the important accomplishment of HEPCA during the last 12 months.

HEPCA SHOW ROOM

The objective of the HEPCA show room is to provide environmental information to the members, non members and the visitors of the Red Sea. We also aim to increase the sales of the HEPCA products through an accessible location.

ACCOUNTS 1996-1997-1998

A free lancer accountant was hired to work on the accounts of 1996-1997 His job included filing and creating a ledger books for all income and expenses during these two years This was essential from the legal and financial point of view The Association s external auditor has prepared a report of findings for 1998 which will be distributed in the next AGM.

MSA- Ministry of Social Affairs

We are currently working very closely with the Ministry of Social Affairs. In April 1998 HEPCA received a report from the MSA containing 28 audit points against the administrative and financial procedures In June 1999 this audit report was limited to three audit points. The Association is now ready to apply for re- registration when the new law of NG O s is put into effect.

ADMINISTRATION & OFFICE IMPROVEMENT

- Creating an Archive for the Association as of 1992
- Establish a permanent classroom for all future training done by HEPCA.
- Obtained a permission and installed a VHF unit at the Association.
- Upgraded the HEPCA newsletter and news in brief, which is currently published at Hurghada and Red Sea Bulletins.
- Upgraded HEPCA web site to include various important information.

ASSOCIATION UPGRADE

HEPCA has been upgraded to a higher level amongst NGOs With this upgrade, HEPCA meets the minimum requirement of international funding agencies. KPMG Hazem Hassan prepared the Associations audit report which we will receive shortly A " report of findings will be distributed to members.

NCNW PROJECT

HEPCA applied and successfully secured funding for the "Environmental Awareness and Educational Activity' through the National Council Of Negro Women Umbrella Management Institute.

ISLANDS CLEAN UP ACTIVITY

HEPCA is undergoing Islands clean ups for Giftun and Magawish islands Our partners are the community of Hurghada and the school children. We managed to remove nearly 10 tons of man made garbage from the Islands in 6 visits.We will continue our efforts through the reminder of 1999

MEMBERSHIP FOLLOW UP

We have launched an informative campaign to inform our members of our activities and also to attract new members to join the Association.

MOORING PROJECT

We have installed and currently maintaining more than 500 moorings in the Red Sea. The mooring project has ended successfully At the moment we are waiting for new instructions from the EEAA and the Park Management Group regarding their future plans for new installation and for maintenance.

HEPCA's PUBLIC GARDEN AND CHILDREN'S PARK

The objective is to create an environmental public park for adults and children. HEPCA has donated L.E 25000 from its own resources and the Red Sea Governorate has donated L.E 25000 in addition to 30 palm trees.

RELATIONSHIP WITH GOVERNMENTAL AGENCIES

HEPCA maintains a good relationship with the EEAA and the Red Sea Governorate. HEPCA is member in a governmental committee and various civil society groups

Hurghada Naval Hyperbaric & Emergency Medical Center

Started operation on the 27/10/1998 The center is built on 28000 Square meteres It is equipped with 12 twin bed rooms. It is furnished with modern operating room, rescicator labaratory and X ray rooms. There are twin chambers at the facility which could operate on 6 cases at the same time The center has received 13 diving accidents and 300 mild cases since it s opening. The center is capable of doing periodical medical checks for dive instructors and Dive masters and regular medical examinations.

We are all involved because environment matters

Hurghada Environmental Protection & Conservation Association -HEPCA
P O Box 144 Hurghada Egypt Tel (002) 065 - 446 674 Fax (002) 065 - 445 035 - VHF Channel 16 -Email hepca@hepca.org

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ANNEX 6:

Mooring Reports

6 Tables totalling 54 pages

This Annex consists of 6 pieces that summarize the state of the Red Sea EEAA, USAID-supported and HEPCA-implemented mooring program as of the end of the PMG Project

a) **ANNEX 6A: Summary of the Number of EEAA Red Sea Mooring Installations from Jan 98-Aug 99.** This Table lists the number of new installations and new dive sites moored by year (for 1997 and 1998) and by month (for 1999). The number of new moorings and sites are presented by major geographical sub-region within the Red Sea (El Gouna, Hurghada, Safaga, the Southern Coast and the Far Islands). *1-Page Table (Incomplete)*

b) **ANNEX 6B: Mooring Status for Red Sea Installations by Mooring**
- Hurghada – *11-Page Table*
- Safaga – *3-Page Table*
- South and Islands – *4-Page Table*

c) **ANNEX 6C: Mooring Costs Summary For Hurghada, Safaga and South.** This includes the easily identifiable costs tracked by the Mooring ACCESS Information Program, such as divers, pro-rated time, an average of raw materials used per installation, boat time, etc. It does not include overhead, consumables (duct tape, tar, etc), the purchase or repair costs of major equipment, etc
- *1-Page Table*

d) **ANNEX 6D: Installations Details by Dive Site for Hurghada, Safaga and the South.** This list the date of installation and hardware details of each of the ~500 moorings in the EEAA system.
- Hurghada *16-Page Table*
- Safaga *4-Page Table*
- South and Islands *6-Page Table*

e) **ANNEX 6E: Installation Summary by Reef Location for Hurghada, Safaga and the South & Islands.** This list summarizes the number of mooring installations (i.e. mooring points) at each of the dive sites in the EEAA Red Sea Mooring Program.
- Hurghada *2-Page Table*
- Safaga *1-Page Table*
- South and Islands *1-Page Table*

f) **ANNEX 6F: Reef and GPS Locations for Moorings in Hurghada, Safaga and the South.** This lists the as-yet-unedited name of each of the Mooring Sites with their GPS-determined positions, and the number of moorings at the site. This Table is a work-in-progress for eventual use in creating a final Mooring Map and for distribution.
- Hurghada *2-Page Table*
- Safaga *1-Page Table*
- South and Islands *1-Page Table*

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ANNEX 6A SUMMARY OF EEAA RED SEA MOORING INSTALLATIONS
Supported by USAID, Implemented by HEPCA
(1996 - AUG 1999)

	El Gouna		Hurghada		Safaga		Southern Coast		Far Islands		Sub-Totals For Each Work Period			
New Installations As Of End of	# New Dive Sites	# New Mooring Points	# New Dive Sites	# New Mooring Points	# New Dive Sites	# New Mooring Points	# New Dive Sites	# New Mooring Points	# New Dive Sites	# New Mooring Points	Sub-Total # of New Dive Sites Moored	Sub-Total # of New Mooring Points	Sub-Total # of New Maintenance Visits	Sub-Total of New Direct Costs (LE)
Dec 1997 (End of EST Pilot)	3	22	34	197	12	34	0	0	0	0	49	253	unknown	
August-98	0	0	2	17	2	29	18	37	5	37	22	120	included below	
December-98	0	0	0	5	0	0	0	0	0	0	0	5	5814	
January-99	10	33	0	0	0	0	0	0	0	0	10	33	359	
February-99	3	7	0	0	0	0	6	13	0	0	9	20	413	
March-99	0	0	1	14	0	0	0	0	0	0	1	14	289	
April-99	0	0	0	1	0	0	9	24	0	0	9	25		
May-99	0	0	0	0	0	0	0	0	0	0	0	0		
June-99	1	2	0	0	0	6	5	22	0	0	6	30		
July-99														
August-99														
TOTAL # OF NEW DIVE SITES MOORED	17		37		14		33		5		106		6875	
TOTAL # OF NEW MOORING POINTS		64		234		69		96		37		500		

HURGHADA Mooring Status Report 1 Jan 97 to 30 Apr 99

Installation Reference	Reef Name	Summary of Diver Hours	Summary of Staff Costs	Summary of Material Costs (LE)	Maintenance Costs	Date of Last Maintence or Visit	Last Work Done	Total # of Maintenance Visits over Period
50 01	Abu Galawa	3 95	181 40	128 08	309 48	2/7/99	Snorkel check	4
50 02	Abu Galawa	3 95	181 40	128 08	309 48	2/7/99	Snorkel check	4
50 03	Abu Galawa	5 35	177 09	286 60	463 69	2/7/99	Dive check	4
30 06	Abu Hashish	4 06	1250 14	1196 18	2446 32	4/5/99	Remove test FG buoy and replace	14
30 01	Abu Hashish	2 03	688 71	683 34	1372 05	4/5/99	Free dive check and clean	15
30 02	Abu Hashish	5 61	1415 25	1150 18	2565 43	4/5/99	Snorkel check and clean	16
30 03	Abu Hashish	4 99	1023 77	1631 08	2654 85	4/5/99	Snorkel check and clean	15
30 05	Abu Hashish	8 28	1696 21	1228 73	2924 94	4/5/99	Snorkel check and clean	17
30 07	Abu Hashish	2 89	1042 41	177 78	1220 19	4/5/99	Snorkel check and clean	13
30 04	Abu Hashish	2 86	762 49	1054 05	1816 54	4/5/99	Snorkel check and clean	15
31 04	Abu Machadig	1 53	467 74	126 33	594 07	4/5/99	Snorkel check and clean	6
31 03	Abu Machadig	1 53	379 79	126 33	506 12	4/5/99	Snorkel check and clean	6
31 02	Abu Machadig	3 95	673 18	602 22	1275 40	4/5/99	Snorkel check and clean	9
31 01	Abu Machadig	3 55	670 90	950 32	1621 22	4/5/99	Snorkel check and clean	10
31 05	Abu Machadig	2 55	340 24	460 19	800 43	4/5/99	Snorkel check and clean	5
23 01	Abu Nugar	3 49	860 24	718 57	1578 81	2/14/99	Dive check and clean	10
23 08	Abu Nugar	4 26	561 02	503 73	1064 75	2/14/99	Free dive check and clean	9
23 07	Abu Nugar	2 30	579 66	556 29	1135 95	2/14/99	Free dive check and clean	9
23 06	Abu Nugar	1 84	909 46	785 04	1694 50	2/14/99	Free dive check replace lost buoys and lines Line cut	8
23 05	Abu Nugar	1 75	904 29	796 38	1700 67	2/14/99	Free dive check replace lost buoys and lines Line cut	7
23 04	Abu Nugar	6 38	894 52	815 12	1709 64	2/14/99	Free dive check and clean	10
23 03	Abu Nugar	4 91	721 57	837 80	1559 37	2/14/99	Free dive check and clean	10
23 02	Abu Nugar	10 16	1758 04	2029 48	3787 52	2/14/99	Dive check and clean down line replace missing buoy a	12
63 01	Abu Nuhas	9 17	982 76	701 16	1683 92	2/13/99	Survey for drilling Install manta	2
09 05	Abu Ramada	6 33	742 85	453 00	1195 85	4/17/99	Snorkel check and fit chafing loop	36
07 03	Abu Ramada	10 98	1287 19	1036 83	2324 02	2/23/99	Boat check	29
09 01	Abu Ramada	7 74	820 36	462 79	1283 15	4/17/99	Snorkel check and fit chafing loop	38
09 02	Abu Ramada	7 16	926 65	474 62	1401 27	4/17/99	Snorkel check an fit chafing loop	40
05 21	Abu Ramada	3 60	222 38	107 18	329 56	2/27/99	Dive check pin	5
09 03	Abu Ramada	6 61	1068 25	409 02	1477 27	4/17/99	Snorkel check	36

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Installation Reference	Reef Name	Summary of Diver Hours	Summary of Staff Costs	Summary of Material Costs (LE)	Maintenance Costs	Date of Last Maintence or Visit	Last Work Done	Total # of Maintenance Visits over Period
09 04	Abu Ramada	5 75	669 93	271 40	941 33	4/17/99	Snorkel check	35
10 09	Abu Ramada	4 74	521 59	417 34	938 93	4/17/99	Snorkel check	40
09 06	Abu Ramada	5 15	582 61	327 78	910 39	4/17/99	Snorkel check	37
09 07	Abu Ramada	5 56	865 49	474 12	1339 61	4/17/99	Snorkel check	38
09 08	Abu Ramada	7 58	868 12	251 99	1120 11	4/17/99	Snorkel check and fit chefing loop	36
09 09	Abu Ramada	7 43	857 53	271 40	1128 93	4/17/99	Snorkel check	36
10 01	Abu Ramada	7 16	773 75	530 95	1304 70	4/17/99	Snorkel check	43
10 02	Abu Ramada	6 76	769 74	507 48	1277 22	4/17/99	Snorkel check	43
10 03	Abu Ramada	9 81	1287 51	814 60	2102 11	4/17/99	Snorkel check	46
10 05	Abu Ramada	8 57	977 08	858 80	1835 88	4/17/99	Snorkel check	45
10 06	Abu Ramada	3 77	201 45	84 50	285 95	3/4/99	Snorkel check	5
10 07	Abu Ramada	8 78	1393 04	1039 97	2433 01	4/17/99	Snorkel check	44
10 08	Abu Ramada	7 64	1053 96	684 12	1738 08	4/17/99	Snorkel check	45
10 11	Abu Ramada	10 51	1119 12	549 61	1668 73	4/17/99	Snorkel check change top line	23
10 10	Abu Ramada	11 06	1356 32	899 20	2255 52	4/17/99	Snorkel check and fit chafing loop	43
54 02	Abu Sombok	9 33	207 05	112 44	319 49	1/26/99	Probe and install manta	1
54 01	Abu Sombok	4 75	152 43	129 08	281 51	1/26/99	Attach top line	2
35 02	Ben El Gebal 1	11 13	1610 45	1628 80	3239 25	2/28/99	Boat check	42
35 03	Ben El Gebal 1	16 05	2903 41	1446 42	4349 83	2/28/99	Boat check	44
35 01	Ben El Gebal 1	16 28	2052 61	1641 26	3693 87	2/28/99	Boat check	41
36 02	Ben El Gebal 2	17 74	3342 85	1723 92	5066 77	2/28/99	Boat check	48
36 01	Ben El Gebal 2	16 51	3142 41	1373 03	4515 44	2/28/99	Boat check	46
37 02	Ben El Gebal 3	8 36	1137 51	813 07	1950 58	2/28/99	Boat check	42
37 01	Ben El Gebal 3	10 85	1503 04	1288 39	2791 43	2/28/99	Boat check	43
38 01	Ben El Gebal 4	5 69	1315 12	452 26	1767 38	2/28/99	Boat check	44
38 02	Ben El Gebal 4	8 59	1322 36	535 88	1858 24	2/28/99	Boat check	43
21 03	Big Gifton	5 34	506 74	510 07	1016 81	3/16/99	Snorkel check	26
21 10	Big Gifton	4 00	339 12	474 56	813 68	3/22/99	Install manta buoy and lines	1
21 05	Big Gifton	10 81	926 30	1416 46	2342 76	4/13/99	Snorkel check	27
21 09	Big Gifton	3 75	317 92	474 56	792 48	3/22/99	Install manta buoy and lines	1

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Installation Reference	Reef Name	Summary of Diver Hours	Summary of Staff Costs	Summary of Material Costs (LE)	Maintenance Costs	Date of Last Maintence or Visit	Last Work Done	Total # of Maintenance Visits over Period
21 07	Big Gifton	56 01	3158 86	1871 03	5029 89	2/25/99	Boat check	25
21 04	Big Gifton	6 72	673 86	567 71	1241 57	3/16/99	Search for missing installation probe for manta not goc	27
21 08	Big Gifton	8 50	714 74	260 50	975 24	3/11/99	Drill and cement 3 pins	1
21 01	Big Gifton	4 46	433 94	264 99	698 93	3/16/99	Snorkel check	27
21 02	Big Gifton	5 14	506 90	214 81	721 71	3/16/99	Snorkel check	27
21 06	Big Gifton	3 41	348 33	590 39	938 72	3/16/99	Snorkel check	23
42 01	Big Magawish	4 05	359 36	198 42	557 78	3/31/99	Attach buoy and lines	2
42 02	Big Magawish	4 05	359 36	198 42	557 78	3/31/99	Attach buoy and lines	2
42 03	Big Magawish	4 50	453 18	194 64	647 82	3/31/99	Attach buoy and lines	2
42 04	Big Magawish	8 50	657 04	88 50	745 54	4/1/99	Probe for manta drill and cement pin	1
04 05	Carless Reef	9 05	838 17	871 55	1709 72	3/18/99	Free dive check	17
04 02	Carless Reef	7 23	759 42	1105 35	1864 77	3/18/99	Free dive check	15
04 04	Carless Reef	10 20	998 26	764 25	1762 51	3/18/99	Search for missing installation Buoy lost manta needs	17
04 03	Carless Reef	8 40	788 80	910 55	1699 35	3/18/99	Free dive check	17
04 06	Carless Reef	9 42	869 02	740 59	1609 61	3/18/99	Free dive check	17
04 01	Carless Reef	7 50	740 95	582 83	1323 78	3/18/99	Free dive check	17
59 02	Dolphin Circus	5 50	452 61	253 20	705 81	2/11/99	Attach buoy and lines	2
59 01	Dolphin Circus	3 25	266 60	253 20	519 80	2/11/99	Attach buoy and lines	2
12 07	El Aruk	3 91	589 65	559 17	1148 82	4/6/99	Snorkel check and clean	32
12 06	El Aruk	6 07	652 68	477 27	1129 95	4/6/99	Snorkel check and clean	34
12 04	El Aruk	6 16	609 13	456 97	1066 10	4/6/99	Snorkel check and clean	29
12 16	El Aruk	1 89	223 30	191 27	414 57	11/9/98	Attach new buoy down line and top line Down line cut	3
12 03	El Aruk	4 90	717 09	521 09	1238 18	4/6/99	Snorkel check and clean	29
12 02	El Aruk	6 96	825 20	598 78	1423 98	4/6/99	Snorkel check and clean	30
12 01	El Aruk	6 01	604 40	449 41	1053 81	4/6/99	Snorkel check and clean	30
12 05	El Aruk	6 02	667 06	602 67	1269 73	4/6/99	Snorkel check and clean	33
12 09	El Aruk	4 99	658 69	536 84	1195 53	4/6/99	Snorkel check and clean	32
12 11	El Aruk	3 53	461 49	438 07	899 56	4/6/99	Snorkel check and clean	32
12 12	El Aruk	3 80	612 48	517 93	1130 41	4/6/99	Snorkel check and clean	32
12 13	El Aruk	3 18	541 21	464 89	1006 10	4/6/99	Free dive check	31

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Installation Reference	Reef Name	Summary of Diver Hours	Summary of Staff Costs	Summary of Material Costs (LE)	Maintenance Costs	Date of Last Maintence or Visit	Last Work Done	Total # of Maintenance Visits over Period
12 14	El Aruk	7 58	961 30	504 03	1465 33	4/6/99	Snorkel check and clean	31
12 08	El Aruk	6 21	885 53	904 69	1790 22	4/6/99	Snorkel check and clean	33
12 15	El Aruk	8 14	797 50	583 58	1381 08	4/6/99	Snorkel check and clean	30
12 10	El Aruk	3 66	475 15	438 43	913 58	4/6/99	Snorkel check and clean	32
08 01	Erg Abu Ramada	6 89	940 63	315 23	1255 86	4/17/99	Free dive check	32
08 02	Erg Abu Ramada	8 21	1357 43	726 11	2083 54	4/17/99	Free dive check	32
34 02	Erg Adel	18 56	2107 79	710 95	2818 74	4/29/99	Free dive check	29
34 01	Erg Adel	13 51	1928 82	772 56	2701 38	4/29/99	Free dive check	32
32 02	Erg Ali	7 92	902 90	808 22	1711 12	4/29/99	Free dive check	29
32 01	Erg Ali	8 15	847 22	653 37	1500 59	4/29/99	Search for missing installation	28
27 02	Erg Bridget/Tiffany	9 06	1212 86	660 27	1873 13	4/29/99	Free dive check	26
27 01	Erg Bridget/Tiffany	10 85	1612 37	822 45	2434 82	4/29/99	Free dive check	26
14 01	Erg Sabena	7 36	1153 56	442 67	1596 23	4/7/99	Boat check	37
14 02	Erg Sabena	7 20	1157 61	124 74	1282 35	4/7/99	Boat check	35
05 01	Erg Somaya	6 51	925 04	174 02	1099 06	4/17/99	Dive check and clean	19
05 03	Erg Somaya	2 03	393 95	26 10	420 05	11/28/98	Search for new location	4
05 02	Erg Somaya	5 56	855 28	250 38	1105 66	4/17/99	Dive check and change top line	19
25 06	Fanadir	8 28	1153 51	389 54	1543 05	4/4/99	Free dive check	14
25 11	Fanadir	7 53	714 65	288 92	1003 57	3/27/99	Search for missing installation drill and cement pin	14
25 10	Fanadir	9 62	1035 58	917 09	1952 67	3/17/99	Free dive check	14
25 09	Fanadir	6 98	853 03	457 71	1310 74	4/4/99	Free dive check	15
25 07	Fanadir	18 79	2246 64	634 71	2881 35	4/4/99	Free dive check	17
25 14	Fanadir	3 83	314 66	187 08	501 74	4/4/99	Attach lines and buoy	2
25 05	Fanadir	4 75	530 16	200 98	731 14	4/4/99	Snorkel check	16
25 04	Fanadir	4 83	524 05	327 22	851 27	4/4/99	Snorkel check and change top line	16
25 03	Fanadir	4 16	461 47	284 59	746 06	4/4/99	Snorkel check and change line	16
25 02	Fanadir	3 50	387 65	158 90	546 55	4/4/99	Snorkel check	16
25 01	Fanadir	7 73	819 45	243 06	1062 51	4/4/99	Snorkel check	16
25 08	Fanadir	12 31	1534 36	679 83	2214 19	4/4/99	Free dive check	17
25 13	Fanadir	4 50	373 27	523 48	896 75	3/27/99	Install manta and lines	1

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Installation Reference	Reef Name	Summary of Diver Hours	Summary of Staff Costs	Summary of Material Costs (LE)	Maintenance Costs	Date of Last Maintence or Visit	Last Work Done	Total # of Maintenance Visits over Period
25 15	Fanadir	8 50	714 73	158 08	872 81	4/4/99	Attach line and check location	2
25 12	Fanadir	7 92	633 81	240 00	873 81	4/4/99	Attach buoy and lines	3
19 07	Fanous	4 03	1100 27	261 40	1361 67	3/27/99	Snorkel check and clean	28
19 08	Fanous	4 03	580 27	261 40	841 67	3/27/99	Snorkel check and clean	28
19 09	Fanous	3 72	616 09	163 50	779 59	3/27/99	Snorkel check and clean	25
20 01	Fanous	4 70	725 01	404 76	1129 77	3/27/99	Snorkel check and clean	27
20 02	Fanous	5 53	757 09	355 96	1113 05	3/27/99	Snorkel check and clean	28
20 03	Fanous	5 23	780 26	301 76	1082 02	3/27/99	Snorkel check and clean	27
20 04	Fanous	6 56	970 09	451 08	1421 17	3/27/99	Snorkel check and clean	28
41 04	Fanous 2	8 50	633 97	368 42	1002 39	3/28/99	Trying to hammer manta and remove broken axes	2
41 01	Fanous 2	3 00	262 82	470 78	733 60	3/23/99	Install manta buoy and lines	1
41 03	Fanous 2	6 00	433 19	478 34	911 53	3/24/99	Survey Install manta buoy and lines	1
41 02	Fanous 2	4 50	394 23	470 78	865 01	3/23/99	Survey Install manta buoy and lines	1
51 04	Gota Abu Galawa	5 67	190 89	368 30	559 19	1/28/99	Dive check	4
51 03	Gota Abu Galawa	4 83	147 04	128 08	275 12	2/7/99	Snorkel check	4
51 01	Gota Abu Galawa	4 78	149 12	128 08	277 20	2/7/99	Snorkel check	4
51 02	Gota Abu Galawa	4 43	136 12	128 08	264 20	2/7/99	Snorkel check	4
11 13	Gota Abu Ramada	5 28	590 85	526 63	1117 48	4/3/99	Free dive check	27
11 01	Gota Abu Ramada	11 08	1699 64	978 78	2678 42	4/3/99	Free dive check	31
11 02	Gota Abu Ramada	7 88	1376 57	1633 91	3010 48	4/3/99	Free dive check	32
11 03	Gota Abu Ramada	14 51	1618 75	1611 67	3230 42	4/3/99	Free dive check	28
11 04	Gota Abu Ramada	18 30	1998 72	1713 56	3712 28	4/3/99	Free dive check	34
11 05	Gota Abu Ramada	4 98	568 09	346 87	914 96	4/3/99	Free dive check and change top line	31
11 14	Gota Abu Ramada	9 58	880 37	189 53	1069 90	4/3/99	Free dive check	9
11 12	Gota Abu Ramada	7 96	835 57	794 87	1630 44	4/3/99	Free dive check	30
11 06	Gota Abu Ramada	8 04	1495 19	1554 05	3049 24	4/3/99	Free dive check	30
11 07	Gota Abu Ramada	4 78	552 31	417 47	969 78	4/3/99	Free dive check	30
11 09	Gota Abu Ramada	8 68	1371 89	1193 52	2565 41	4/3/99	Free dive check	30
11 10	Gota Abu Ramada	11 82	1474 62	1480 38	2955 00	4/3/99	Search for missing installation	31
11 11	Gota Abu Ramada	4 69	649 81	230 46	880 27	4/3/99	Free dive check	30

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Installation Reference	Reef Name	Summary of Diver Hours	Summary of Staff Costs	Summary of Material Costs (LE)	Maintenance Costs	Date of Last Maintence or Visit	Last Work Done	Total # of Maintenance Visits over Period
11 08	Gota Abu Ramada	6 96	956 61	1026 58	1983 19	4/3/99	Free dive check and change top line	32
24 06	Gota Dir	6 00	315 50	691 96	1007 46	1/28/99	Search for installation	2
24 03	Gota Dir	1 75	86 19	331 25	417 44	1/28/99	Dive check and change top line	2
24 02	Gota Dir	1 75	86 19	342 59	428 78	1/28/99	Dive check and change top line	2
24 01	Gota Dir	1 33	65 12	316 13	381 25	1/28/99	Search for installation	2
24 04	Gota Dir	1 75	136 51	342 59	479 10	1/28/99	Dive check and change top line	2
24 05	Gota Dir	0 33	16 86	0 00	16 86	1/28/99	Search for installation	1
24 07	Gota Dir	0 75	336 57	674 66	1011 23	1/28/99	Dive check needs new buoy	2
07 02	Halg Abu Ramada	1 74	794 10	202 97	997 07	2/23/99	Boat check	27
07 01	Halg Abu Ramada	4 16	750 77	230 01	980 78	2/23/99	Boat check	27
40 02	HEPCA Garden	12 30	2216 95	741 25	2958 20	2/28/99	Boat check	41
40 01	HEPCA Garden	11 92	1521 33	745 53	2266 86	2/28/99	Boat check	41
91 01	Holiday Inn	0 67	37 14	368 42	405 56	4/24/97	Install manta ray	1
33 02	Magawish	9 32	1720 16	743 37	2463 53	4/29/99	Free dive check	35
33 06	Magawish	10 13	2208 97	867 70	3076 67	4/29/99	Boat check	31
33 09	Magawish	14 76	3196 86	1317 48	4514 34	4/29/99	Boat check	32
33 07	Magawish	9 37	2580 66	748 70	3329 36	4/29/99	Boat check	30
33 08	Magawish	17 93	2086 85	899 45	2986 30	4/29/99	Boat check	29
33 01	Magawish	9 22	1707 52	1087 24	2794 76	4/29/99	Free dive check	35
33 05	Magawish	10 51	1403 80	886 48	2290 28	4/29/99	Free dive check	33
33 04	Magawish	15 88	2082 48	1368 88	3451 36	4/29/99	Free dive check	33
33 03	Magawish	7 87	1033 80	845 72	1879 52	4/29/99	Free dive check change top line and buoy	34
90 07	Marriot Harbour	2 00	125 81	84 50	210 31	3/1/97	Drill and cement pin	1
90 06	Marriot Harbour	3 65	650 00	84 50	734 50	2/2/97	Check bottom for drilling Drill and cement pin	1
90 05	Marriot Harbour	2 00	325 00	84 50	409 50	1/31/97	Drill and cement pin	1
90 15	Marriot Harbour	2 75	124 97	200 00	324 97	12/28/98	Install Egyptian manta ray	1
90 16	Marriot Harbour	2 75	124 97	200 00	324 97	12/28/98	Install Egyptian manta ray	1
90 11	Marriot Harbour	7 00	437 88	200 00	637 88	12/27/98	Probe for manta installation	2
90 10	Marriot Harbour	2 00	125 81	84 50	210 31	3/1/97	Drill and cement pin	1
90 09	Marriot Harbour	2 67	207 98	84 50	292 48	3/1/97	Drill and cement pin	2

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90 14	Marriot Harbour	3 00	136 33	200 00	336 33	12/28/98	Install Egyptian manta ray	1
90 08	Marriot Harbour	2 00	125 81	84 50	210 31	3/1/97	Drill and cement pin	1
90 12	Marriot Harbour	4 50	253 19	200 00	453 19	12/27/98	Install Egyptian manta ray	1
90 13	Marriot Harbour	4 50	204 50	200 00	404 50	12/28/98	Install Egyptian manta ray	1
90 01	Marriot Harbour	2 00	325 00	84 50	409 50	1/31/97	Drill and cement pin	1
90 02	Marriot Harbour	3 65	339 74	84 50	424 24	2/28/97	Check bottom for drilling Drill and cement pin	1
90 03	Marriot Harbour	2 00	155 98	84 50	240 48	3/1/97	Drill and cement pin	2
90 04	Marriot Harbour	3 00	218 89	84 50	303 39	3/1/97	Drill and cement pin	2
52 01	Marsa Gota Abu Galaw	7 18	209 19	128 08	337 27	2/7/99	Snorkel check	4
52 02	Marsa Gota Abu Galaw	6 17	181 77	128 08	309 85	2/7/99	Snorkel check	4
28 05	Petra Reef	3 43	580 77	232 62	813 39	4/29/99	Snorkel check	23
28 02	Petra Reef	4 62	694 88	469 71	1164 59	4/29/99	Dive check	27
28 03	Petra Reef	5 89	1368 65	744 41	2113 06	4/29/99	Free dive check	28
28 04	Petra Reef	9 81	1125 05	791 50	1916 55	4/29/99	Free dive check	28
28 01	Petra Reef	4 65	834 09	539 53	1373 62	4/29/99	Dive check and change lines and buoy	27
56 02	Sakhwa Abu Galawa	7 85	318 34	289 88	608 22	1/29/99	Dive check Attach buoy and top line	3
56 01	Sakhwa Abu Galawa	8 90	342 90	316 34	659 24	1/29/99	Dive check Attach buoy and top line	3
57 04	Seyoul Kebira	5 11	157 81	129 08	286 89	2/8/99	Boat check	3
57 03	Seyoul Kebira	5 11	157 81	129 08	286 89	2/8/99	Boat check	3
57 02	Seyoul Kebira	3 28	125 46	128 08	253 54	2/8/99	Boat check	3
57 01	Seyoul Kebira	5 03	190 17	331 46	521 63	2/8/99	Boat check	3
55 01	Seyoul Saghira	2 83	86 61	127 58	214 19	2/8/99	Boat check	3
55 04	Seyoul Saghira	4 13	123 73	327 68	451 41	2/8/99	Boat check	3
55 02	Seyoul Saghira	2 33	72 63	127 58	200 21	2/8/99	Boat check	3
55 03	Seyoul Saghira	2 33	72 63	127 58	200 21	2/8/99	Boat check	3
29 01	Shaab Disha	2 40	665 98	716 79	1382 77	4/5/99	Free dive check and clean	14
29 05	Shaab Disha	2 32	1041 47	955 70	1997 17	4/5/99	Replace buoy and line Down line cut	13
29 04	Shaab Disha	2 07	604 16	736 26	1340 42	4/5/99	Search for missing installation	12
29 03	Shaab Disha	3 72	803 82	944 11	1747 93	4/5/99	Free dive check and clean	15
29 02	Shaab Disha	3 50	692 39	540 25	1232 64	4/5/99	Free dive check and clean	14

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Installation Reference	Reef Name	Summary of Diver Hours	Summary of Staff Costs	Summary of Material Costs (LE)	Maintenance Costs	Date of Last Maintence or Visit	Last Work Done	Total # of Maintenance Visits over Period
22 03	Shaab El Erg	3 30	461 05	397 72	858 77	2/9/99	Snorkel check and clean	8
22 13	Shaab El Erg	4 65	227 18	132 58	359 76	2/9/99	Attach top line	2
22 04	Shaab El Erg	7 20	1010 51	1215 13	2225 64	2/9/99	Snorkel check and clean	8
22 05	Shaab El Erg	3 18	499 95	709 80	1209 75	2/9/99	Snorkel check and clean	8
22 06	Shaab El Erg	4 23	647 73	885 40	1533 13	2/9/99	Snorkel check and clean	8
22 07	Shaab El Erg	3 67	553 38	724 56	1277 94	2/9/99	Snorkel check and clean	8
22 08	Shaab El Erg	0 67	134 09	131 58	265 67	2/9/99	Attach line	2
22 09	Shaab El Erg	2 67	134 09	132 58	266 67	2/9/99	Attach line	2
22 02	Shaab El Erg	3 30	461 05	397 72	858 77	2/9/99	Snorkel check and clean	8
22 11	Shaab El Erg	3 00	130 73	132 58	263 31	2/9/99	Attach line	2
22 14	Shaab El Erg	4 35	197 67	132 58	330 25	2/9/99	Attach line	2
22 15	Shaab El Erg	4 00	330 68	677 98	1008 66	2/11/99	Install mainta buoy and lines	1
22 01	Shaab El Erg	4 10	546 11	524 32	1070 43	2/9/99	Search for missing installation attach new buoy and line	8
22 10	Shaab El Erg	3 50	145 81	132 58	278 39	2/9/99	Attach line	2
39 02	Shaab El Segala	12 67	1446 70	755 07	2201 77	4/13/99	Free dive check	35
39 01	Shaab El Segala	11 54	2076 58	840 31	2916 89	4/13/99	Free dive check	35
39 03	Shaab El Segala	8 63	1591 11	1392 54	2983 65	4/13/99	Free dive check	36
39 05	Shaab El Segala	8 22	1049 12	728 34	1777 46	4/13/99	Boat check	34
39 06	Shaab El Segala	8 01	1012 99	739 68	1752 67	4/13/99	Boat check	34
39 04	Shaab El Segala	10 69	1247 82	874 80	2122 62	4/13/99	Free dive check	33
16 01	Shaab Farasha	5 78	899 93	446 75	1346 68	4/7/99	Boat check	34
16 02	Shaab Farasha	5 39	807 94	444 97	1252 91	4/7/99	Boat check	33
16 03	Shaab Farasha	7 86	1022 38	444 97	1467 35	4/7/99	Boat check	32
16 04	Shaab Farasha	11 52	1802 41	809 42	2611 83	4/7/99	Boat check	33
26 03	Shaab Ishta	11 95	1173 13	1150 99	2324 12	4/29/99	Free dive check	29
26 02	Shaab Ishta	10 20	1133 00	861 27	1994 27	4/29/99	Free dive check	30
26 01	Shaab Ishta	8 99	977 43	761 31	1738 74	4/29/99	Free dive check	30
03 02	Shaab Ruhr	3 02	584 97	830 89	1415 86	3/18/99	Free dive check	16
03 04	Shaab Ruhr	10 77	1145 59	1492 95	2638 54	3/18/99	Free dive check	16
03 05	Shaab Ruhr	2 68	756 14	815 41	1571 55	3/18/99	Free dive check	17

HURGHADA Mooring Status Report 1 Jan 97 to 30 Apr 99

Installation Reference	Reef Name	Summary of Diver Hours	Summary of Staff Costs	Summary of Material Costs (LE)	Maintenance Costs	Date of Last Maintence or Visit	Last Work Done	Total # of Maintenance Visits over Period
03 06	Shaab Ruhr	5 33	630 35	458 91	1089 26	3/18/99	Free dive check	16
03 07	Shaab Ruhr	5 47	666 80	1150 72	1817 52	3/18/99	Free dive check	17
03 08	Shaab Ruhr	2 45	279 78	397 99	677 77	4/11/98	Installation missing	5
03 01	Shaab Ruhr	3 07	413 95	503 20	917 15	3/18/99	Free dive check and change top line	15
03 03	Shaab Ruhr	6 88	674 36	970 59	1644 95	3/18/99	Free dive check	16
58 01	Shaab Ruhr Siyul	4 67	150 52	127 58	278 10	1/25/99	Attach reef top line	2
58 02	Shaab Ruhr Siyul	4 67	150 52	128 08	278 60	1/25/99	Attach reef top line	2
58 03	Shaab Ruhr Siyul	2 00	87 05	61 00	148 05	1/25/99	Drill and cement pin	1
58 04	Shaab Ruhr Siyul	2 00	87 05	61 00	148 05	1/25/99	Drill and cement pin	1
13 06	Shaab Sabena	11 57	1514 46	810 58	2325 04	4/7/99	Snorkel check	40
13 11	Shaab Sabena	7 10	1327 15	787 52	2114 67	4/7/99	Boat check	34
13 01	Shaab Sabena	7 01	959 56	397 08	1356 64	4/7/99	Snorkel check	37
13 05	Shaab Sabena	16 88	2871 19	821 70	3692 89	4/7/99	Snorkel check	42
13 04	Shaab Sabena	18 48	2322 99	640 83	2963 82	4/7/99	Snorkel check	40
13 03	Shaab Sabena	11 19	1311 79	628 28	1940 07	4/7/99	Snorkel check	38
13 07	Shaab Sabena	11 56	2424 88	1946 29	4371 17	4/7/99	Install new manta and lines	36
13 12	Shaab Sabena	8 41	1485 02	792 51	2277 53	4/7/99	Boat check	33
13 02	Shaab Sabena	8 06	1103 99	417 80	1521 79	4/7/99	Snorkel check	35
15 02	Shaab Torfa	5 02	652 98	476 96	1129 94	4/7/99	Free dive check and clean	34
15 03	Shaab Torfa	6 14	906 66	616 56	1523 22	3/30/99	Free dive check and clean	33
15 04	Shaab Torfa	3 45	474 00	48 78	522 78	4/7/99	Free dive check and clean	32
15 05	Shaab Torfa	4 44	563 20	346 01	909 21	4/7/99	Free dive check and clean	32
15 06	Shaab Torfa	8 59	931 29	869 80	1801 09	4/7/99	Free dive check and clean	34
15 07	Shaab Torfa	7 72	1484 20	522 22	2006 42	4/7/99	Free dive check and clean	33
15 01	Shaab Torfa	5 19	677 91	469 04	1146 95	4/7/99	Free dive check and clean	34
53 02	Shabrahr	4 20	117 31	332 98	450 29	1/26/99	Attach lines and buoy Add more cement to pin	2
53 01	Shabrahr	4 30	119 89	336 76	456 65	1/26/99	Attach lines and buoy Add more cement to pin	2
06 02	Small Giftun	10 45	1431 98	501 03	1933 01	4/17/99	Free dive check and clean	58
06 10	Small Giftun	5 90	771 98	338 32	1110 30	4/17/99	Snorkel check	57
06 09	Small Giftun	9 13	1149 12	402 58	1551 70	4/17/99	Snorkel check	58

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HURGHADA Mooring Status Report 1 Jan 97 to 30 Apr 99

Installation Reference	Reef Name	Summary of Diver Hours	Summary of Staff Costs	Summary of Material Costs (LE)	Maintenance Costs	Date of Last Maintence or Visit	Last Work Done	Total # of Maintenance Visits over Period
06 08	Small Giftun	9 18	1102 79	606 26	1709 05	4/17/99	Change top line	58
06 07	Small Giftun	7 74	1055 18	794 19	1849 37	4/17/99	Change top line	58
06 06	Small Giftun	7 84	1176 95	485 91	1662 86	4/17/99	Snorkel check and change chafing loop	59
06 05	Small Giftun	8 90	1259 16	532 09	1791 25	4/17/99	Snorkel check	58
06 03	Small Giftun	8 27	1194 55	433 35	1627 90	4/17/99	Free dive check and clean	58
06 11	Small Giftun	7 13	895 36	306 28	1201 64	4/17/99	Snorkel check	57
06 01	Small Giftun	9 75	2144 82	977 87	3122 69	4/17/99	Free dive check and clean	60
06 19	Small Giftun	8 42	930 23	398 80	1329 03	4/17/99	Boat check	57
06 04	Small Giftun	10 59	1462 12	603 66	2065 78	4/17/99	Free dive check and clean	58
06 23	Small Giftun	10 14	1432 66	804 08	2236 74	4/17/99	Free dive check and clean	47
06 17	Small Giftun	5 80	834 51	306 28	1140 79	4/17/99	Boat check	57
06 24	Small Giftun	9 22	1114 28	457 14	1571 42	4/12/99	Dive check change buoy and top line	22
06 12	Small Giftun	7 58	977 82	328 96	1306 78	4/17/99	Snorkel check	58
06 22	Small Giftun	9 54	1365 96	727 98	2093 94	4/17/99	Free dive check and clean	48
06 21	Small Giftun	6 38	956 67	317 54	1274 21	4/17/99	Boat check	57
06 20	Small Giftun	6 72	920 73	459 06	1379 79	4/17/99	Boat check	57
06 18	Small Giftun	10 23	1196 40	600 85	1797 25	4/17/99	Boat check	57
06 16	Small Giftun	7 75	1083 57	660 80	1744 37	4/17/99	Snorkel check and change chafing loop	58
06 15	Small Giftun	8 20	1238 08	594 47	1832 55	4/17/99	Change top line	59
06 14	Small Giftun	8 50	1251 64	579 22	1830 86	4/17/99	Change top line	59
06 13	Small Giftun	10 83	1232 73	433 86	1666 59	4/17/99	Snorkel check	59
17 02	Stone Beach	17 68	1161 55	767 71	1929 26	3/30/99	Free dive check and clean	15
17 01	Stone Beach	9 64	1915 18	791 89	2707 07	3/30/99	Free dive check and clean	16
18 01	Torfa El Gas	5 33	591 78	336 62	928 40	3/27/99	Snorkel check and clean	24
18 02	Torfa El Gas	10 83	838 36	336 86	1175 22	3/27/99	Snorkel check and clean	25
18 03	Torfa El Gas	5 48	1080 70	369 49	1450 19	3/27/99	Snorkel check and clean	24
18 04	Torfa El Gas	11 57	878 62	472 44	1351 06	3/27/99	Change top line	25
18 05	Torfa El Gas	9 46	912 35	382 23	1294 58	3/27/99	Snorkel check and clean	25
18 06	Torfa El Gas	10 32	1089 40	263 88	1353 28	3/27/99	Snorkel check and clean	25
19 02	Torfa Fanous	4 48	813 04	372 83	1185 87	3/27/99	Free dive check	27

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HURGHADA Mooring Status Report 1 Jan 97 to 30 Apr 99

Installation Reference	Reef Name	Summary of Diver Hours	Summary of Staff Costs	Summary of Material Costs (LE)	Maintenance Costs	Date of Last Maintence or Visit	Last Work Done	Total # of Maintenance Visits over Period
19 01	Torfa Fanous	6 13	1153 68	805 59	1959 27	3/27/99	Free dive check	29
19 03	Torfa Fanous	9 53	1650 79	1075 05	2725 84	3/27/99	Chane buoy and check down line	30
19 04	Torfa Fanous	4 28	828 03	200 08	1028 11	3/27/99	Snorkel check and change top line	28
19 05	Torfa Fanous	4 40	802 56	390 12	1192 68	3/27/99	Snorkel check and clean	29
19 06	Torfa Fanous	4 28	812 47	242 50	1054 97	3/27/99	Snorkel check and clean	28
02 02	Um Gamar	6 50	1344 20	527 10	1871 30	3/18/99	Free dive check	20
02 03	Um Gamar	5 55	718 42	672 93	1391 35	3/18/99	Free dive check	18
02 07	Um Gamar	7 83	1734 09	505 18	2239 27	3/18/99	Free dive check	17
02 06	Um Gamar	8 55	1053 11	1177 51	2230 62	3/18/99	Free dive check and change buoy and top line	17
02 05	Um Gamar	6 17	765 95	970 55	1736 50	3/18/99	Free dive check and change top line	18
02 04	Um Gamar	4 43	620 12	596 96	1217 08	3/18/99	Free dive check and change top line	17
02 01	Um Gamar	4 43	565 55	632 67	1198 22	3/18/99	Free dive check	17
01 00	Um Gamar North	2 50	443 18	0 00	443 18	8/9/97	Check for installation	1
62 03	Yellow fish reef	3 50	312 70	693 60	1006 30	2/12/99	Install manta buoy and lines	1
62 01	Yellow fish reef	2 75	311 31	160 08	471 39	2/12/99	Attach line	2
62 02	Yellow fish reef	3 42	392 74	158 08	550 82	2/12/99	Attach line	2
317		**2,127 55**	**271,847 46**	**176,562 08**	**448,409 55**			**6,989**

SAFAGA Mooring Status Report 1 Jan 97 to 30 Apr 99

Installation Reference	Reef Name	Summary of Diver Hours	Summary of Staff Costs	Summary of Material Costs (LE)	Maintenance Costs	Date of Last Maintence or Visit	Last Work Done	Total # of Maintenance Visits over Period
15 05	Abu Kafan	1 57	151 74	315 85	467 59	10/4/98	Replace top line and fit marker buoy	3
15 04	Abu Kafan	3 60	248 87	292 35	541 22	10/4/98	Replace top line	3
15 03	Abu Kafan	2 40	191 55	292 35	483 90	10/4/98	Replace top line Old line frayed	3
15 02	Abu Kafan	2 50	196 32	315 85	512 17	10/4/98	Replace top line and fit marker buoy Old line frayed	3
15 01	Abu Kafan	2 73	275 09	471 43	746 52	10/4/98	Replace line Old line cut	3
08 05	Gamul Kebir	9 61	1159 19	254 14	1413 33	2/8/99	Snorkel check and change chafing loop	6
08 01	Gamul Kebir	1 22	154 02	660 67	814 69	2/8/99	Dive check Manta out 100cm Re attach missing buoy	5
08 02	Gamul Kebir	0 88	116 90	559 67	676 57	2/8/99	Dive check manta 100cm out Change top line	5
08 04	Gamul Kebir	1 92	276 34	158 90	435 24	2/8/99	Snorkel check and change chafing loop	4
08 06	Gamul Kebir	6 45	1221 52	250 36	1471 88	2/8/99	Snorkel check and change chafing loop	5
08 07	Gamul Kebir	4 88	491 31	162 32	653 63	10/10/98	Snorkel check and fit chafing loop	4
08 08	Gamul Kebir	10 88	1052 39	162 32	1214 71	10/10/98	Snorkel check and fit chafing loop	5
08 03	Gamul Kebir	2 90	266 94	868 04	1134 98	2/8/99	Dive check and change top line	4
07 01	Gamul Soraya	1 82	289 77	666 56	956 33	2/8/99	Dive check and replace chafing loop	6
07 02	Gamul Soraya	1 18	169 90	365 33	535 23	2/8/99	Dive check and fit chafing loop	5
11 04	Middle reef	1 58	192 20	990 88	1183 08	10/4/98	Dive check and change down line Line frayed Fit chafing loc	4
11 03	Middle reef	1 13	128 83	714 45	843 28	10/4/98	Dive check and fit chafing loop	4
11 02	Middle reef	5 90	509 98	1419 84	1929 82	10/4/98	Dive check and fit chafing loop	5
11 01	Middle reef	0 63	97 64	683 79	781 43	10/4/98	Dive check and fit chafing loop	4
09 04	Panorama	1 40	129 69	84 50	214 19	12/9/98	Snorkel check	4
09 01	Panorama	1 72	149 58	285 78	435 36	12/9/98	Snorkel check	5
09 03	Panorama	1 35	123 68	84 50	208 18	12/9/98	Snorkel check	4
09 05	Panorama	3 03	164 65	189 50	354 15	12/9/98	Snorkel check and change chafing loop	5
09 06	Panorama	4 18	248 64	235 36	484 00	12/9/98	Snorkel check and change chafing loop	4
09 07	Panorama	15 60	824 54	912 79	1737 33	10/5/98	Recover lost buoy down line cut search for installation and re	2
09 02	Panorama	1 47	128 08	200 82	328 90	12/9/98	Snorkel check and change top line	5
02 03	Ras Abu Soma	1 77	252 12	161 62	413 74	2/10/99	Free dive search for missing installation	7
02 04	Ras Abu Soma	2 77	421 05	204 40	625 45	2/10/99	Free dive check change top line	7
02 05	Ras Abu Soma	1 28	162 58	271 40	433 98	2/7/99	Free dive check and change top line	5

SAFAGA Mooring Status Report 1 Jan 97 to 30 Apr 99

Installation Reference	Reef Name	Summary of Diver Hours	Summary of Staff Costs	Summary of Material Costs (LE)	Maintenance Costs	Date of Last Maintence or Visit	Last Work Done	Total # of Maintenance Visits over Period
02 06	Ras Abu Soma	1 91	283 31	162 32	445 63	2/7/99	Free dive check	5
02 07	Ras Abu Soma	3 45	388 60	98 54	487 14	2/7/99	Free dive check and change top line	5
02 08	Ras Abu Soma	1 05	132 11	720 49	852 60	2/7/99	Free dive check	5
02 02	Ras Abu Soma	2 18	271 72	162 32	434 04	2/10/99	Free dive check	7
02 01	Ras Abu Soma	2 10	277 75	527 07	804 82	2/10/99	Free dive search for installation Attach buoy and lines	6
17 02	Sandy Island	2 27	494 18	191 94	686 12	2/8/99	Free dive check and change chafing loop	6
17 01	Sandy Island	2 23	489 81	191 94	681 75	2/8/99	Free dive check and change chafing loop	6
12 02	Shaab Claude	3 25	129 89	772 69	902 58	10/11/98	Dive check Change buoy and top lines Through line cut	3
12 01	Shaab Claude	3 25	129 89	761 35	891 24	10/11/98	Dive check Change buoy and top lines Through line cut	3
01 02	Shaab Salman	1 57	256 90	405 27	662 17	2/7/99	Search for missing installation Anchor out	3
01 01	Shaab Salman	1 35	230 50	52 32	282 82	2/7/99	Dive check and change top line	3
01 03	Shaab Salman	2 07	352 16	408 47	760 63	2/7/99	Dive check and change top line	3
14 02	Shaab Sheer	3 45	638 55	1044 57	1683 12	10/11/98	Free dive check change buoy and top line Buoy and top line	4
14 01	Shaab Sheer	0 38	95 89	134 38	230 27	10/11/98	Snorkel check	4
14 05	Shaab Sheer	0 75	165 16	257 54	422 70	10/11/98	Change top line	4
14 03	Shaab Sheer	0 40	95 89	134 38	230 27	10/11/98	Snorkel check	4
14 06	Shaab Sheer	2 50	338 50	809 79	1148 29	10/11/98	Replace all lines and buoy Down line cut	2
14 04	Shaab Sheer	2 53	326 96	1436 16	1763 12	10/11/98	Dive check	4
03 03	Tobia Arbaa	2 83	370 04	800 54	1170 58	2/10/99	Dive check	11
03 02	Tobia Arbaa	3 76	550 47	342 59	893 06	2/10/99	Dive check	10
03 01	Tobia Arbaa	5 70	807 17	427 49	1234 66	2/10/99	Dive check	11
04 02	Tobia Hamra	1 33	190 79	957 35	1148 14	2/7/99	Free dive check	5
04 03	Tobia Hamra	1 20	153 36	244 73	398 09	2/7/99	Free dive check	3
04 01	Tobia Hamra	4 90	690 84	863 51	1554 35	2/7/99	Search for anchor Replace buoy and lines Down line cut	7
05 01	Tobia Kebir	1 33	198 10	340 63	538 73	2/7/99	Free dive check and change top line	6
05 02	Tobia Kebir	1 90	300 83	413 59	714 42	2/7/99	Free dive check and change top line	7
05 03	Tobia Kebir	1 00	206 65	636 70	843 35	2/7/99	Free dive check	7
05 04	Tobia Kebir	2 88	602 65	341 81	944 46	2/7/99	Free dive check	5
06 01	Tobia Soraya	1 88	274 29	997 74	1272 03	2/8/99	Dive check and change top lines	7

SAFAGA Mooring Status Report 1 Jan 97 to 30 Apr 99

Installation Reference	Reef Name	Summary of Diver Hours	Summary of Staff Costs	Summary of Material Costs (LE)	Maintenance Costs	Date of Last Maintence or Visit	Last Work Done	Total # of Maintenance Visits over Period
06 03	Tobia Soraya	4 97	569 49	163 50	732 99	2/8/99	Free dive check and change chafing loop	6
06 02	Tobia Soraya	1 67	251 79	773 09	1024 88	2/8/99	Dive check and change top lines	7
60		**170 41**	**20,059 32**	**27,810 58**	**47,869 90**			**298**

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SOUTH & ISLANDS MOORING STATUS REPORT 1 Jan 97 to 30 Apr 99

Installation Reference	Reef Name	Summary of Diver Hours	Summary of Staff Costs	Summary of Material Costs (LE)	Maintenance Costs	Date of Last Maintence or Visit	Last Work Done	Total # of Mainten ance Visits over Period
16 01	Abu Dabbab 2	1 08	616 67	275 14	891 81	7/14/98	Attach top reef line	2
16 02	Abu Dabbab 2	0 25	616 67	275 14	891 81	7/14/98	Attach top reef line	2
07 03	Abu Dabbab Nuba	2 67	1343 44	814 87	2158 31	3/19/98	Install manta ray and attach buoy	1
07 02	Abu Dabbab Nuba	1 17	587 75	622 28	1210 03	3/19/98	Install manta ray and attach buoy	1
07 01	Abu Dabbab Nuba	4 17	2099 12	824 87	2923 99	3/19/98	Install manta ray and attach buoy	1
07 04	Abu Dabbab Nuba	1 50	755 68	362 18	1117 86	3/19/98	Drill and cement pin	1
03 03	Abu El Kizan	2 67	605 82	359 82	965 64	3/12/98	Drill and cement twin pin & chain	1
03 08	Abu El Kizan	2 53	575 53	359 82	935 35	3/12/98	Drill and cement twin pin & chain	1
03 07	Abu El Kizan	2 53	575 53	359 82	935 35	3/12/98	Drill and cement twin pin & chain	1
03 06	Abu El Kizan	3 00	681 55	359 82	1041 37	3/12/98	Drill and cement twin pin & chain	1
03 05	Abu El Kizan	3 00	681 55	359 82	1041 37	3/12/98	Drill and cement twin pin & chain	1
03 04	Abu El Kizan	2 00	454 37	359 82	814 19	3/12/98	Drill and cement twin pin & chain	1
03 01	Abu El Kizan	2 67	605 82	359 82	965 64	3/12/98	Drill and cement twin pin & chain	1
03 02	Abu El Kizan	2 67	605 82	359 82	965 64	3/12/98	Drill and cement twin pin & chain	1
01 05	Big Brother	3 93	622 42	627 74	1250 16	12/6/98	Replace reef top line Line missing	2
01 02	Big Brother	3 93	622 42	627 74	1250 16	12/6/98	Replace reef top line Line missing	2
01 04	Big Brother	3 93	622 42	627 74	1250 16	12/6/98	Replace reef top line Line missing	2
01 06	Big Brother	3 93	622 42	546 04	1168 46	12/6/98	Replace reef top line Line missing	2
01 03	Big Brother	3 93	622 42	627 74	1250 16	12/6/98	Replace reef top line Line missing	2
15 02	Elphinstone	1 75	965 22	180 04	1145 26	7/14/98	Attach top reef line	2
15 01	Elphinstone	2 33	1254 78	180 04	1434 82	7/14/98	Attach top reef line	2
18 01	Erg Marsa Alam	0 00	0 00	84 50	84 50	7/14/98	Drill and cement pin	1
18 02	Erg Marsa Alam	0 00	0 00	84 50	84 50	7/14/98	Drill and cement pin	1
17 02	Gota Marsa Alam	2 00	0 00	84 50	84 50	7/13/98	Drill and cement pin	1
17 04	Gota Marsa Alam	1 50	0 00	722 78	722 78	3/14/98	Install manta ray and attach buoy	1
17 03	Gota Marsa Alam	2 87	0 00	799 32	799 32	7/13/98	Install manta ray and attach buoy	1
17 01	Gota Marsa Alam	2 00	0 00	84 50	84 50	7/13/98	Drill and cement pin	1
19 01	Mahaleg	2 67	370 34	88 50	458 84	2/23/99	Drill and cement pin	1

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SOUTH & ISLANDS MOORING STATUS REPORT 1 Jan 97 to 30 Apr 99

Installation Reference	Reef Name	Summary of Diver Hours	Summary of Staff Costs	Summary of Material Costs (LE)	Maintenance Costs	Date of Last Maintence or Visit	Last Work Done	Total # of Mainten ance Visits over Period
11 02	Marsa Galeb	2 00	2220 00	180 04	2400 04	5/4/98	Attach top reef line	2
11 01	Marsa Galeb	2 00	2220 00	180 04	2400 04	5/4/98	Attach top reef line	2
09 06	Marsa Shuna	1 00	229 92	72 54	302 46	2/27/99	Attach line to old cable	1
09 05	Marsa Shuna	4 50	1034 63	719 88	1754 51	2/27/99	Install manta buoy and lines	1
09 04	Marsa Shuna	3 58	867 06	341 14	1208 20	2/27/99	Snorkel check and change top line	3
09 03	Marsa Shuna	2 58	637 15	272 02	909 17	2/27/99	Snorkel check	3
09 02	Marsa Shuna	2 58	637 15	272 02	909 17	2/27/99	Snorkel check	3
09 01	Marsa Shuna	2 58	637 15	272 02	909 17	2/27/99	Snorkel check	3
08 04	Ras Torombi	1 00	249 91	161 76	411 67	4/26/98	Drill and cement pin	1
08 02	Ras Torombi	3 40	849 68	801 73	1651 41	4/26/98	Search and install manta ray	1
08 03	Ras Torombi	1 00	249 91	161 76	411 67	4/26/98	Drill and cement pin	1
08 06	Ras Torombi	3 75	479 00	697 20	1176 20	2/26/99	Install manta buoy and lines	1
08 05	Ras Torombi	3 75	479 00	697 20	1176 20	2/26/99	Install manta buoy and lines	1
08 01	Ras Torombi	3 48	870 51	801 73	1672 24	4/26/98	Install manta ray and attach buoy	1
05 06	Rocky	3 00	863 31	359 82	1223 13	5/13/98	Attach line	2
05 01	Rocky	4 50	1236 59	427 70	1664 29	5/13/98	Attach line	2
05 02	Rocky	0 50	1025 06	359 82	1384 88	5/13/98	Attach line	2
05 03	Rocky	3 70	1025 06	359 82	1384 88	5/13/98	Attach line	2
05 04	Rocky	0 75	1114 51	359 82	1474 33	5/13/98	Attach line	2
05 05	Rocky	3 00	863 31	359 82	1223 13	5/13/98	Attach line	2
01 01	Rocky	3 93	622 42	627 74	1250 16	12/6/98	Replace reef top line Line missing	2
24 01	Serib Kebir	6 50	1724 38	88 50	1812 88	2/25/99	Search for location Drill and cement pin	1
14 02	Shaab Samadai	0 67	167 55	337 23	504 78	5/1/98	Attach buoy	1
14 03	Shaab Samadai	4 75	3310 56	274 02	3584 58	5/14/98	Attach line	2
14 04	Shaab Samadai	3 83	963 40	1074 71	2038 11	5/1/98	Install manta ray anchor & attach buoy	1
14 01	Shaab Samadai	0 42	2221 50	189 52	2411 02	5/14/98	Attach top reef line	1
13 02	Shaab Sharm	3 50	1110 00	84 50	1194 50	4/30/98	Drill and cement pin	1
13 01	Shaab Sharm	3 50	1110 00	84 50	1194 50	4/30/98	Drill and cement pin	1

SOUTH & ISLANDS MOORING STATUS REPORT 1 Jan 97 to 30 Apr 99

Installation Reference	Reef Name	Summary of Diver Hours	Summary of Staff Costs	Summary of Material Costs (LE)	Maintenance Costs	Date of Last Maintence or Visit	Last Work Done	Total # of Mainten ance Visits over Period
12 03	Sha abrur Wadi Gimal	2 33	621 60	687 39	1308 99	4/29/98	Install manta ray and attach buoy	1
12 02	Sha abrur Wadi Gimal	3 00	799 20	771 49	1570 69	4/29/98	Install manta ray and attach buoy	1
12 01	Sha abrur Wadi Gimal	3 00	799 20	771 49	1570 69	4/29/98	Install manta ray and attach buoy	1
21 02	Sharm Foughani	2 00	181 51	688 76	870 27	2/22/99	Install manta, buoy and lines	1
21 01	Sharm Foughani	4 50	408 41	700 10	1108 51	2/22/99	Install manta buoy and lines	1
22 02	Sharm Tahtani	6 25	567 23	88 50	655 73	2/22/99	Drill and cement pin	1
22 01	Sharm Tahtani	6 25	567 23	88 50	655 73	2/22/99	Drill and cement pin	1
02 05	Small Brother	3 30	1131 79	552 24	1684 03	12/7/98	Replace top reef line Line missing	2
02 02	Small Brother	4 07	629 60	552 24	1181 84	12/7/98	Replace top reef line	2
02 03	Small Brother	4 25	1506 01	552 24	2058 25	12/7/98	Replace top reef line Line missing	2
02 04	Small Brother	3 20	1126 02	552 24	1678 26	12/7/98	Replace top reef line	2
02 06	Small Brother	3 30	1131 79	552 24	1684 03	12/7/98	Replace top reef line Line missing	2
02 01	Small Brother	4 17	635 37	552 24	1187 61	12/7/98	Replace top reef line Line missing	2
20 02	Torfa Lassal	3 25	451 35	88 50	539 85	2/23/99	Drill and cement reef top pin	1
20 01	Torfa Lassal	3 25	451 35	88 50	539 85	2/23/99	Drill and cement reef top pin	1
10 02	Umm Rus	3 67	1306 19	683 61	1989 80	2/28/99	Snorkel check and clean	2
10 01	Umm Rus	3 67	1306 19	683 61	1989 80	2/28/99	Snorkel check and clean	2
06 01	Wadi Gamal Island	3 75	2475 52	908 19	3383 71	3/17/98	Install manta ray and attach buoy	1
06 02	Wadi Gamal Island	3 50	2310 48	912 75	3223 23	3/17/98	Install manta ray and attach buoy	1
23 01	Wizr	6 00	766 39	700 10	1466 49	2/26/99	Install manta buoy and lines	1
04 05	Zabargad	13 53	2578 22	344 82	2923 04	5/13/98	Attach line	3
04 01	Zabargad	7 70	1097 14	1045 12	2142 26	5/13/98	Attach line	2
04 02	Zabargad	7 70	1097 14	359 82	1456 96	5/13/98	Attach line	2
04 04	Zabargad	2 20	755 10	344 82	1099 92	5/13/98	Attach line	2
04 06	Zabargad	10 87	1666 84	582 90	2249 74	5/13/98	Attach line	3
04 07	Zabargad	2 72	931 95	354 82	1286 77	5/13/98	Attach line	2
04 08	Zabargad	2 72	931 95	354 82	1286 77	5/13/98	Attach line	2
04 09	Zabargad	1 72	614 27	354 82	969 09	5/13/98	Drill and cement pin attach line	1

SOUTH & ISLANDS

MOORING STATUS REPORT

1 Jan 97 to 30 Apr 99

Installation Reference	Reef Name	Summary of Diver Hours	Summary of Staff Costs	Summary of Material Costs (LE)	Maintenance Costs	Date of Last Maintence or Visit	Last Work Done	Total # of Mainten ance Visits over Period
04 10	Zabargad	4 92	1759 31	354 82	2114 13	5/13/98	Drill and cement pin attach line	1
04 11	Zabargad	0 40	143 13	187 52	330 65	5/13/98	Attach line to chain on rock	1
04 03	Zabargad	2 20	755 10	354 82	1109 92	5/13/98	Attach line	2
87		279 82	77,029 04	37,851 35	114,880 39			132

ANNEX 6C MOORING SUMMARY COSTS FOR HURGHADA, SAFAGA and the SOUTH and ISLANDS

FROM 1/1/97 TO 4/30/99

AREA	NUMBER OF VISITS MADE OVER PERIOD	TOTAL DIVERS HOURS OVER PERIOD	TOTAL MATERIAL COSTS OVER PERIOD (not inluding consumables) (LE)	TOTAL STAFF COSTS OVER PERIOD (not including overhead) (LE)	Total Costs (LE)
Hurghada	6,990	2,128 71	176,562 08	271,939 38	448,501 46
Safaga	298	170 41	27 810 58	20,059 32	47 869 90
Southern Coast & Islands	132	279 82	37 851 35	77 029 04	114 880 39
TOTALS	7,420	2,578 94	242,224 01	369,027 73	611,251 75

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HURGHADA INSTALLATION DETAILS REPORT As of April 30, 1999

Installation Reference	Buoy #	Attachment Type	Anchor Type	Location	Date Anchored	Date Moored	Depth (m)	Depth + Scope	Comments
Reef Name		**UM GAMAR NORTH**			**Reef Number**		**1**		
01-00				North					
Reef Name		**UM GAMAR**			**Reef Number**		**2**		
02-01	Small	Buoy	O MR-1M	South	9/12/93	3/9/97	15	15+3=18	
02-02	Small	Buoy	O MR-1M	South	9/10/93	3/9/97	14	13 5+2 5=16	
02-03	Small	Buoy	O MR-1M	South	9/10/93	3/9/97	16	15 5+3=18 5	
02-04	84	Buoy	O-MR-1M	South	9/10/93	3/9/97	15	15+3=18	
02-05	Small	Buoy	O-MR-1M	South	6/11/93	3/9/97	14	14+2=16	
02-06	Small	Buoy	O-MR-1M	South	6/11/93	3/9/97	16	16 5+3=19 5	
02-07	182	Buoy	MR-1M	South	7/6/97	7/6/97	20	19 7+1 5= 21	
Reef Name		**SHA'AB RUHR**			**Reef Number**		**3**		
03-01	Small	Buoy	O MR-1M	Um Gamar	8/22/93	3/20/97	20	19 5+3=22 5	
03-02	255	Buoy	MR-1M	Um Gamar	3/20/97	3/20/97	19	19+1 5=20 5	
03-03	Small	Buoy	MR-1M	Um Gamar	3/20/97	3/20/97	18	19+2 5=21 5	
03-04	Small	Buoy	MR-1M	Um Gamar	8/22/93	3/22/97	18	18 5+3=21 5	5-12-98 Installation missing Replaced with new manta further from the reef Old manta was at 17 metres and was an O MR-1M
03-05	194	Buoy	MR-1M	Um Gamar	7/27/97	7/27/97	18	17 5+2=19 5	
03-06	Small	Buoy	O MR-1M	Um Gamar	8/22/93	3/22/97	18	18+3=21	
03-07	Small	Buoy	O MR-1M	Um Gamar	8/22/93	3/22/97	18	18+3=21	
03-08	198	Buoy	O MR-1M	Um Gamar	8/29/93	3/22/97	21	21+3=24	

HURGHADA INSTALLATION DETAILS REPORT As of April 30, 1999

Installation Reference	Buoy #	Attachment Type	Anchor Type	Location	Date Anchored	Date Moored	Depth (m)	Depth + Scope	Comments
Reef Name		**CARLESS REEF**			**Reef Number**		**4**		
04-01	91	Buoy	O MR-1M		8/3/93	3/11/97	13	13+2=15	Manta eye has pulled off Chain attached by two cable clamps to shaft
04-02	Small	Buoy	O MR-1M		8/29/93	3/11/97	13	12 6+2=14 6	Manta eye has pulled off Chain attached by two cable clamps to shaft
04-03	Small	Buoy	O MR-1M		8/26/93	3/11/97	13	13 3+2=15 3	Manta eye has pulled off Chain attached by two cable clamps to shaft
04-04	Small	Buoy	O MR 1M		9/11/93	3/11/97	13	13 1+2=15 1	Old manta with clamps 23-11 98 clamps need replacing
04-05	Small	Buoy	O MR 1M		8/26/93	3/11/97	14	13 6+2=15 6	Manta eye has pulled off Chain attached by two cable clamps to shaft
04-06	246	Buoy	O MR-1M		8/26/93	3/11/97	16	15 7+2=17 7	Manta eye has pulled off Chain attached by two cable clamps to shaft
Reef Name		**ERG SOMAYA**			**Reef Number**		**5**		
05-01	OB77	Buoy	O MR 1M		10/10/93	12/31/96	24	24 5+3=27 5	
05-02	OB13	Buoy	O MR-1M		10/9/93	12/31/96	22	21 5+3=24 5	
05-03	OB49	Buoy	O PIN		10/10/93	12/31/96	7	7+2=9	Installation removed because it was too close to the reef
Reef Name		**SMALL GIFTUN**			**Reef Number**		**6**		
06-01	Small	Buoy	PIN	Lagoon	4/1/97	8/13/97	10	9 7+ 1 5= 11	
06-02	209	Buoy	PIN	Lagoon	4/1/97	8/13/97	8	8 5+ 1 5= 10	
06-03	151	Buoy	PIN	Lagoon	4/17/97	4/21/97	10	9+1 5	
06-04	Small	Buoy	PIN	Lagoon	4/17/97	4/21/97	6	6 5	
06-05	123	Buoy	PIN	Lagoon	4/17/97	4/21/97	5	6 5	
06-06	152	Buoy	PIN	Lagoon	4/17/97	4/21/97	6	7 5	
06-07	111	Buoy	MR 1M	Lagoon	4/17/97	4/24/97	6	6+1 5=7 5	
06-08		Line	PIN		4/2/97	4/5/97	1	8	
06-09		Line	PIN		4/2/97	4/5/97	1	8	
06-10		Line	PIN		4/3/97	4/5/97	1	10	
06-11		Line	PIN		4/3/97	4/5/97	1	8	
06-12		Line	PIN		4/3/97	4/5/97	1	8	

HURGHADA INSTALLATION DETAILS REPORT As of April 30, 1999

Installation Reference	Buoy #	Attachment Type	Anchor Type	Location	Date Anchored	Date Moored	Depth (m)	Depth + Scope	Comments
06-13		Line	PIN		4/3/97	4/17/97	1	10	
06-14		Line	PIN		4/4/97	4/15/97	1	10	
06-15		Line	PIN		4/4/97	4/15/97	1	10	
06-16		Line	PIN		4/5/97	4/15/97	1	10	
06-17		Line	PIN		4/5/97	4/15/97	1	10	
06-18		Line	PIN		4/5/97	4/15/97	1	10	
06-19		Line	PIN		4/17/97	4/21/97	1	10	
06-20		Line	PIN		4/2/97	4/15/97	0		
06-21		Line	PIN		4/2/97	4/15/97	0		
06-22	225	Buoy	MR-1M	Lagoon	10/6/97	10/6/97	8	8+1 5=9 5	
06-23	216	Buoy	MR-1M	Lagoon	10/6/97	10/6/97	7	7+1 5=7 5	
06-24	Scubapro	Buoy	Block	South	5/25/98	5/25/98	16	16+2	Large concrete block found to the south of the existing moorings Approx 40m from reef and suitable for Azieb mooring Scubapro buoy used with tripple down line and two top lines Another block lies some 20m SE of this one
Reef Name		**HALG ABU RAMADA**			**Reef Number**		**7**		
07-01		Line	PIN	North (The Halg)	7/26/97	8/1/97	10		
07-02		Line	PIN	North (The Halg)	7/26/97	8/1/97	10		
07-03	78	Buoy	PIN	North	8/2/97	8/8/97	19	18 7+1 5=20 2	Scubapro buoy fitted to treble line Buoy may be too heavy for strong currents Replaced with normal buoy and single line 27-10-98
Reef Name		**ERG ABU RAMADA**			**Reef Number**		**8**		
08-01	Small	Buoy	O-PIN		8/21/93	2/16/97	16	16+3=19	
08-02	31	Buoy	O-PIN		2/3/96	2/16/97	18	18+3=21	14-9-98 Small buoy changed because current kept taking it under
Reef Name		**ABU RAMADA**			**Reef Number**		**9**		
09-01		Line	PIN	South East	6/9/97	6/14/97	0	REEF LINE	
09-02		Line	PIN	South East	6/9/97	6/14/97	0	REEF LINE	
09-03		Line	PIN	South East	6/11/97	6/14/97	0	REEF LINE	
09-04		Line	PIN	South East	6/16/97	6/18/97	0	REEF LINE	
09-05		Line	PIN	South East	6/16/97	6/18/97	0	REEF LINE	

HURGHADA INSTALLATION DETAILS REPORT As of April 30, 1999

Installation Reference	Buoy #	Attachment Type	Anchor Type	Location	Date Anchored	Date Moored	Depth (m)	Depth + Scope	Comments
09-06		Line	PIN	South East	6/16/97	6/20/97	0	REEF LINE	
09-07		Line	PIN	South East	6/11/97	6/14/97	0	REEF LINE	
09-08		Line	PIN	South East	6/9/97	6/14/97	0	REEF LINE	
09-09		Line	PIN	South East	6/9/97	6/14/97	1	10	
Reef Name		**ABU RAMADA**			**Reef Number**		**10**		
05-21	PO	Buoy	O PIN	South	2/18/97		10	10+2=12	Pins only fitted by Phill Jones
10-01	Small	Buoy	PIN	South	12/5/96	2/17/97	9	9+2=11	
10-02	Small	Buoy	O-PIN	South	5/9/95	2/17/97	10	10+2=12	
10-03	Small	Buoy	O-PIN	South	5/9/95	2/17/97	11	10 7+2=12 7	
10-05	Small	Buoy	PIN	South	12/5/96	2/17/97	11	11+2=13	
10-06	PO	Buoy	O-PIN	South	2/18/97	2/25/97	14	13 5+2=15 5	Pin only fitted by Phil Jones
10-07	206	Buoy	PIN	South	12/5/96	2/17/97	13	13+3=16	
10-08	226	Buoy	O PIN	South	5/9/95	2/17/97	17	16 8+3=19 8	
10-09	30	Buoy	O-PIN	South	5/9/95	2/17/97	18	18 5+3=21 5	
10-10	175	Buoy	PIN	South East	6/11/97	6/16/97	18	18 5+3=21 5	
10-11	Scubapro	Buoy	PIN	South	5/6/98	5/12/98	18	18+2	Single pin with tripple platted line tripple upper line Scubapro buoy and two pickup lines Installed for Azieb (south wind)
Reef Name		**GOTA ABU RAMADA**			**Reef Number**		**11**		
11-01	25	Buoy	O MR-1M	South	3/10/97	2/19/97	12	11 5+2=13 5	
11-02	257	Buoy	E MR 1M	South West	3/4/97	3/5/97	12	11 5+2=13 5	
11-03	Scubapro	Buoy	PIN	South West	8/12/98		14	14+2	Installation too close to others to be of use Replaced with pin 30m south of old position for Azieb OLD anchor MR-1M at 11m, 3/3/97 buoy fitted same day New line triple with old scubapro buoy
11-04	253	Buoy	E MR-1M	South West	3/4/97	3/5/97	12	12+2=12	Manta damaged and replaced 9-12-98 Old manta at 10m
11-05	19	Buoy	O-MR-1M	South	7/19/93	2/18/97	8	7 5+2=9 5	
11-06	106	Buoy	MR-1M	South West	3/12/97	3/12/97	8	8 5+2=10 5	

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ANNEX 6D INSTALLATION DETAILS BY DIVE SITE FOR HURGHADA, SAFAGA, and the SOUTH and ISLANDS

HURGHADA INSTALLATION DETAILS REPORT As of April 30, 1999

Installation Reference	Buoy #	Attachment Type	Anchor Type	Location	Date Anchored	Date Moored	Depth (m)	Depth + Scope	Comments
11-07	18	Buoy	O-MR-1M	South	7/19/93	2/18/97	8	8 5+2=10 5	
11-08	Small	Buoy	MR-1M	South West	3/5/97	3/5/97	10	10+2=12	
11-09	Small	Buoy	MR-1M	South West	3/5/97	3/5/97	11	11+2=13	
11-10	Small	Buoy	MR-1M	South West	3/6/97	3/6/97	11	11+2=13	
11-11	Small	Buoy	O MR-1M	South West	7/19/93	2/18/97	12	12+2=14	
11-12	24	Buoy	O-MR-1M	South	7/19/93	2/18/97	13	12 6+2=14 6	
11-13	Small	Buoy	O-MR-1M	South	7/19/93	2/18/97	11	11+2=13	
11-14		Buoy	PIN	Gota	11/21/98		15	15+2	Installed as part of the mooring workshop with John Halas Missed installation on 2 -May 99
Reef Name		**EL ARUK**			**Reef Number**		**12**		
12-01	147	Buoy	PIN	Maksour	3/30/97	4/6/97	12	13 5	
12-02	39	Buoy	PIN	Maksour	3/30/97	4/6/97	12	14 5	
12-03	149	Buoy	PIN	Maksour	3/30/97	4/6/97	12	14 5	
12-04	150	Buoy	PIN	Maksour	3/30/97	4/6/97	13	15 5	
12-05	Small	Buoy	PIN	Middle	3/31/97	4/6/97	11	11+2	
12-06	Small	Buoy	PIN	Middle	3/31/97	4/6/97	12		
12-07	119	Buoy	PIN	Middle	3/25/97	3/30/97	11		
12-08	Small	Buoy	PIN	Middle	3/25/97	3/30/97	10	10+2	
12-09	104	Buoy	PIN	Middle	3/25/97	3/30/97	12	11 5+2=13 5	
12-10	120	Buoy	PIN	Middle	3/25/97	3/30/97	10	12	
12-11	125	Buoy	PIN	Middle	3/25/97	3/30/97	10	12	
12-12	156	Buoy	PIN	Middle	3/31/97	4/6/97	12	13 5	
12-13	246	Buoy	PIN	Middle	3/31/97	4/6/97	12	14	
12-14	154	Buoy	PIN	Gigi	4/2/97	4/21/97	11	13	
12-15	153	Buoy	PIN	Gigi	4/2/97	4/21/97	12	13 5	
12-16	Small	Buoy	O-PIN	Middle		10/22/98	10	10+2	Old pin located Enough room for additional buoy so one attached 9-11-98 pin reported as lose Recommend removal
Reef Name		**SHA'AB SABINA**			**Reef Number**		**13**		

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ANNEX 6D INSTALLATION DETAILS BY DIVE SITE FOR HURGHADA, SAFAGA, and the SOUTH and ISLANDS

HURGHADA INSTALLATION DETAILS REPORT As of April 30, 1999

Installation Reference	Buoy #	Attachment Type	Anchor Type	Location	Date Anchored	Date Moored	Depth (m)	Depth + Scope	Comments
13-01		Line	PIN	Giftun Channel	3/17/97	3/21/97	1	TOP=6	
13-02		Line	PIN	Giftun Channel	3/17/97	3/21/97	1	TOP=6	
13-03		Line	PIN	Giftun Channel	3/17/97	3/21/97	1	REEF LINE 10m	
13-04	Small	Buoy	PIN	Giftun Channel	12/2/96	3/21/97	6	5 5+2=7 5	
13-05	Small	Buoy	PIN	Giftun Channel	3/19/97	3/23/97	8	8 1+2=9 6	
13-06	241	Buoy	PIN	Giftun Channel	12/2/96	3/21/97	6	5 8+2=7 8	
13-07	74	Buoy	MR 1M	Sabena	7/24/97	7/24/97	12	12 5+2=14 5	
13-08	PO	PO	PIN	Gifton Channel	12/2/96		9	9 1+2=11 1	No longer in use Pin put in by John Halas
13-09	PO	PO	PIN	Giftun Channel	12/2/96		9	9 1+2=11 1	No longer in use Pin put in by John Halas
13-10	PO	PO	PIN	Giftun Channel	12/2/96		7	7+2=9	No longer in use Pin put in by John Halas
13-11	211	Buoy	MR-SRM	Sabena 2	8/28/97	8/28/97	8	7 5+ 1 5= 9	
13-12	212	Buoy	MR-SRM	Sabena 2	8/28/97	8/28/97	10	9 5+ 1 5= 11	
Reef Name		**ERG SABINA**			**Reef Number**		**14**		
14-01	237	Buoy	O MR-1M	Gifton Channel	8/15/93	8/16/96	10	9 5+2=11 5	
14-02	35	Buoy	O-MR 1M	Gifton Channel	8/15/96	8/24/96	10	OLD	
Reef Name		**SHA'AB TORFA**			**Reef Number**		**15**		
15-01	5	Buoy	MR-SRM	Gifton Channel	12/3/96	2/15/97	8	7 6+2=9 6	
15-02	6	Buoy	MR-1M	Giftun Channel	12/3/96	2/15/97	12	11 6+2=13 6	
15-03	178	Buoy	O MR-1M	Gifton Channel	8/15/96	2/15/97	7	7+2=9	
15-04	O7	Buoy	MR-1M	Gifton Channel	12/3/96	12/7/96	7	6 7+2=8 7	
15-05	32	Buoy	O MR-1M	Gifton Channel	8/24/93	2/15/97	7	7+2=9	
15-06	33	Buoy	MR-SRM	Gifton Channel	12/7/96	2/15/97	7	7+2=9	
15-07	173	Buoy	O MR 1M	Gifton Channel	8/15/96	2/15/97	11	11+2=13	
Reef Name		**SHA AB FARASHA**			**Reef Number**		**16**		

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HURGHADA INSTALLATION DETAILS REPORT As of April 30, 1999

Installation Reference	Buoy #	Attachment Type	Anchor Type	Location	Date Anchored	Date Moored	Depth (m)	Depth + Scope	Comments
16-01	Small	Buoy	O-MR-1M	Giftun Channel	8/24/93	2/16/97	14	13 5+2=15 5	
16-02	Small	Buoy	O MR-1M	Giftun Channel	10/7/93	2/16/97	13	13+2=15	
16-03	190	Buoy	O MR-1M	Giftun Channel	10/7/93	2/16/97	12	OLD	
16-04	189	Buoy	MR-1M	Banana Reef	7/28/97	7/28/97	14	13 5+1 5=15	
Reef Name		**STONE BEACH**			**Reef Number**		**17**		
17-01	48	Buoy	O-MR-1M		8/26/93	3/9/97	30	29 5+3=32 5	Remenants of old mooring using Scubapro buoy Steel cable left on installation
17-02	177	Buoy	MR-1M	Torfa Hamda	6/27/97	6/27/97	27	27+2= 29	Second buoy with manta set on the slope Captains not too happy with it being so close to the reef They have to keep line short and attach a loop to the top line Top line pulled over gunwale
Reef Name		**TORFA EL GAZ**			**Reef Number**		**18**		
18-01		Line	PIN	Outside	5/25/97	6/12/97	0	REEF LINE	
18-02		Line	PIN	Outside	5/26/97	6/12/97	0	REEF LINE	
18-03		Line	PIN	Outside	5/26/97	6/12/97	0	REEF LINE 10m	
18-04		Line	PIN	Lagoon	5/25/97	5/31/97	0	REEF LINE	
18-05		Line	PIN	Lagoon	5/25/97	5/31/97	0	REEF LINE	
18-06		Line	PIN	Lagoon	5/25/97	5/31/97	0	REEF LINE	

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Installation Reference	Buoy #	Attachment Type	Anchor Type	Location	Date Anchored	Date Moored	Depth (m)	Depth + Scope	Comments
Reef Name		**TORFA FANOUS**			**Reef Number**		**19**		
19-01	247	Buoy	PIN	Middle Erg	12/4/96	1/21/97	6	6 1+2=8 1	
19-02	9	Buoy	PIN	Middle Erg	12/4/96	1/21/97	4	4 3+2=6 3	
19-03	Small	Buoy	O MR-1M	East	9/1/93	8/3/97	10	10+2=12	
19-04		Line	PIN		12/4/96	2/6/97	3	6	
19-05		Line	PIN		12/4/96	2/6/97	2	6	
19-06		Line	PIN		12/4/96	2/6/97	2	6	
19-07		Line	PIN		5/24/97	5/31/97	0		
19-08		Line	PIN		5/24/97	5/31/97	0	10	
19-09		Line	PIN		5/24/97	5/31/97	0		
Reef Name		**FANOUS**			**Reef Number**		**20**		
20-01		Line	PIN	Fosma	12/6/96	1/15/97	1	6	
20-02		Line	PIN	West Fosma	12/6/96	1/15/97	1	6	1m of chain fitted
20-03		Line	PIN	West Fosma	12/6/96	1/15/97	1	6	
20-04		Line	PIN	West Fosma	1/15/97	8/3/97	0		
Reef Name		**BIG GIFTUN**			**Reef Number**		**21**		
21-01	Small	Buoy	PIN	South East	7/18/98	7/22/98	5	5+2	Pin on top of erg
21-02	Small	Buoy	PIN	South East	7/18/98	7/22/98	5	4 4+2	Pin on top of erg
21-03	Small	Buoy	MR-1M	South East	7/18/98	7/18/98	7	6 5+2	
21-04	Small	Buoy	MR SRM	South East	7/18/98	7/18/98	4	4+2	Manta out 30 cm 21-11-98
21-05	Small	Buoy	MR SRM	South East	7/19/98	7/19/98	5	4 5+2	Required SRM but none available Manta came out and was replaced with an SRM on 24/9/98
21-06	Small	Buoy	MR-SRM	South East	7/19/98	7/19/98	4	3 8+2	
21-07	Dock	Dock	PIN	South East	7/19/98	7/22/98	3	3+none	Anchor for floating water/sewage dock Four pins with 8 lines Concrete blocks for anchorage of pipes and swimming area markers
21-08		Dock	PIN	Lagoon	3/11/99		2	2	Anchor for floating dock
21-09		Buoy	MR 1M	Lagoon	3/22/99	3/22/99	5	4 5+1	
21 10		Buoy	MR-1M	Lagoon	3/22/99	3/22/99	5	4 2+1	

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Installation Reference	Buoy #	Attachment Type	Anchor Type	Location	Date Anchored	Date Moored	Depth (m)	Depth + Scope	Comments
Reef Name		**SHA'AB EL ERG**			**Reef Number**		**22**		
22-01	133	Buoy	O MR 1M	Gota West		6/7/97	12		
22-02	7	Buoy	O-MR-1M	Gota West		6/7/97	12		
22-03	127	Buoy	O-MR-1M	Gota West		6/7/97	12		
22-04	134	Buoy	MR-1M	El Gouna	6/8/97	6/8/97	10		
22-05	Small	Buoy	MR-1M	El Gouna	6/8/97	6/8/97	10		
22-06	Small	Buoy	MR-1M		6/23/97	6/23/97	10	9 8+1 5=11	
22-07	172	Buoy	MR-1M		6/23/97	6/23/97	8	8 5+1 5=10	
22-08		Line	PIN	Lighthouse	1/24/99	2/9/99	2	1 5	Mooring funded by El Gouna
22-09		Line	PIN	Lighthouse	1/24/99		2	1 5	Mooring funded by El Gouna
22 10		Line	PIN	Manta Point	1/24/99		2	1 5	Mooring funded by El Gouna
22-11		Line	PIN	Manta Point	1/24/99		2	1 5	Mooring funded by El Gouna
22-13		Line	PIN	Poseidon Garden	1/27/99		1	1	Mooring funded by El Gouna
22-14		Line	PIN	Poseidon Garden	1/27/99		1	1	Mooring funded by El Gouna
22-15		Buoy	MR-1M	Poseidon Garden	2/11/99	2/11/99	14	14+2	Funded by El Gouna
Reef Name		**ABU NUGAR**			**Reef Number**		**23**		
23-01		Buoy	MR-1M	Torfa	8/5/97	8/5/97	8	8 5+ 1 5= 10	
23-02	242	Buoy	MR-1M	Torfa	8/6/97	8/6/97	8	8 5+ 1 5= 10	
23-03	206	Buoy	PIN	Lagoon	8/6/97	8/10/97	6	6+ 1 5= 7 5	
23-04	221	Buoy	PIN	Lagoon	8/6/97	8/10/97	6	6+ 1 5= 7 5	
23-05	203	Buoy	MR-1M	Gota	8/11/97	8/11/97	10	9 5+ 1 5= 11	
23-06	202	Buoy	MR-1M	Gota	8/12/97	8/12/97	8	8 5+ 1 5= 10	
23-07	Small	Buoy	PIN		8/10/97	8/23/97	14	13 7+ 1 5= 15 2	
23-08	205	Buoy	PIN		8/10/97	8/23/97	13	13 3+ 1 5= 15	
Reef Name		**GOTA DIR**			**Reef Number**		**24**		
24-01	37	Buoy	O MR-1M	El Gouna	6/12/94	2/18/97	7	7+1 5=8 5	
24-02	38	Buoy	O MR-1M	El Gouna	6/12/94	2/18/97	7	7+1 5=8 5	

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Installation Reference	Buoy #	Attachment Type	Anchor Type	Location	Date Anchored	Date Moored	Depth (m)	Depth + Scope	Comments
24-03	39	Buoy	O MR-1M	El Gouna	6/12/94	2/18/97	5	5+1=6	
24-04	40	Buoy	O MR-1M	El Gouna	6/12/94	2/18/97	7	7+1 5=8 5	
24-05		Buoy	O MR-1M	El Gouna	6/12/94		6	6+1=7	
24-06		Buoy	MR-1M	El Gouna	2/21/97	2/21/97	7	7+1 5=8 5	
24-07		Buoy	MR 1M	El Gouna	2/21/97	2/21/97	7	7+1 5=8 5	
Reef Name		**FANADIR**			**Reef Number**		**25**		
25-01		Line	PIN		6/5/97	6/12/97	0	REEF LINE	
25-02		Line	PIN		6/5/97	6/12/97	0	REEF LINE	
25-03		Line	PIN		6/5/97	6/12/97	0	REEF LINE	
25-04		Line	PIN		6/5/97	6/12/97	0	REEF LINE	
25-05		Line	Pin		6/5/97	6/12/97	0	REEF LINE	
25-06	Small	Buoy	PIN	East	7/13/98	7/15/98	20	20 5+2	Horizontal pin cemented into natural hole in reef wall @ 27m 7 11-98 Pin pulled out and now lose Chain removed an new pin required New pin 25-11-98
25-07	66	Buoy	PIN	East	7/13/98	7/15/98	20	20 5+2	Horizontal pin cemented into natural hole in reef wall Pin pulled out New pin drilled 11-11 98
25-08	Small	Buoy	PIN	East	7/13/98	7/15/98	20	20+2	Horizontal pin cemented into natural hole in reef wall Pin pulled out New pin drilled 12-11 98 21m Pin lost 24-11-98 New pin drilled 26-11-98 20m
25-09	Small	Buoy	PIN	East	7/13/98	7/15/98	20	20+2	Horizontal pin cemented into natural hole in reef wall Pin pulled out New pin drilled 12-11-98
25-10	Small	Buoy	MR 1M	Lagoon	7/29/98	7/29/98	4	3 5+1	Inside the lagoon 7-11-98 manta shaft reported 30cm out Soft sand sea bed prone to wash out Manta came out Jan 99, then replaced at 3 5m as deeper installation using chain extention
25-11		Line	PIN	Lagoon	7/29/98	8/1/98	1	1	For use with buoy in lagoon
25-12		Buoy	PIN	South fosma	3/28/99		16	16 5+2	Glass boat use
25-13		Buoy	MR 1M	South fosma	3/27/99	3/27/99	14	14	

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Installation Reference	Buoy #	Attachment Type	Anchor Type	Location	Date Anchored	Date Moored	Depth (m)	Depth + Scope	Comments
25-14		Buoy	PIN	South fosma	3/29/99		3	3	
25-15		Line	PIN	South fosma	3/29/99		1	1	Glass boat use only
Reef Name		**SHA AB ISHTA**			**Reef Number**		**26**		
26-01	113	Buoy	PIN		5/12/97	5/17/97	10	11	
26-02	Small	Buoy	PIN		5/12/97	5/17/97	10	11 5	
26-03	164	Buoy	MR-1M		5/18/97	5/17/97	10	11	
Reef Name		**ERG BRIDET/TIFFANY**			**Reef Number**		**27**		
27-01	232	Buoy	MR-1M	Left Side	10/26/97	5/27/97	10	12	
27-02	132	Buoy	PIN	Right Side	5/22/97	5/27/97	11	12 5	
Reef Name		**PETRA REEF**			**Reef Number**		**28**		
28-01	142	Buoy	PIN		5/11/97	5/14/97	10	11 5	
28-02	115	Buoy	PIN		5/10/97	5/14/97	10	9 5+1 5=11	
28-03	118	Buoy	PIN		5/11/97	5/14/97	8	10	
28-04	129	Buoy	PIN		5/11/97	5/14/97	10	9 5+2=11 5	New pin inserted 31-12-98 Old pin at 8m
28-05		Line	PIN		5/11/97	5/14/97	1	9	
Reef Name		**SHA'AB DISHA**			**Reef Number**		**29**		
29-01	169	Buoy	MR-1M		5/15/97	5/18/97	8	9 5	
29-02	Small	Buoy	PIN		5/15/97	5/18/97	9	11 5	
29-03	Small	Buoy	MR-1M		5/15/97	5/18/97	10	11 5	
29-04	1	Buoy	MR 1M		5/18/97	5/18/97	11	12 5	
29-05	162	Buoy	MR-1M		5/21/97	5/21/97	10	12	
Reef Name		**ABU HASHISH**			**Reef Number**		**30**		
30-01	112	Buoy	MR-1M		4/22/97	4/22/97	4	5	
30-02	240	Buoy	MR-1M		4/22/97	4/22/97	4	5	
30-03	243	Buoy	MR-SRM		4/24/97	4/24/97	4	5	
30-04	146	Buoy	MR-1M		4/24/97	4/24/97	7	8	
30-05		Buoy	MR-SRM		4/25/97	4/25/97	5	5+ 1= 6	
30-06	Small	Buoy	MR-1M	Erg	5/9/97	5/9/97	12	14	
30-07		Line	PIN	Erg	5/23/97	5/28/97	0	10	
Reef Name		**ABU MACHADIG**			**Reef Number**		**31**		

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Installation Reference	Buoy #	Attachment Type	Anchor Type	Location	Date Anchored	Date Moored	Depth (m)	Depth + Scope	Comments
31-01	132	Buoy	MR-1M	South	7/21/98	7/21/98	10	9 5+2	New mooring requested by Sub Aqua 18 9-98 Sub Aqua reported manta coming out New one installed 20-9-98
31-02	37	Buoy	MR-SRM	South	7/21/98	7/21/98	7	7+2	New mooring requested by Sub Aqua 2-10-98 Bob dived site and manta has come up approx 1m Anchor pulled out 18-10-98 New SRM fitted 20-10-98
31-03		Line	PIN	Gota	11/22/98		1	0 5	Reef top pin installed as part of the mooring workshop with John Halas Ranger Yasser
31-04		Line	PIN	Gota	11/22/98		1	0 5	Reef top pin installed as part of the mooring workshop with John Halas Ranger Yasser
31-05	Small	Buoy	MR-1M	Gota	11/22/98	11/22/98	6	6 5+1	MR 1M installed as part of the mooring workshop with John Halas Ranger Yasser
Reef Name		**ERG ALI**			**Reef Number**		**32**		
32-01	141	Buoy	PIN		5/10/97	5/14/97	10	11 5	
32-02		Buoy	PIN		5/10/97	5/14/97	12	13 5	
Reef Name		**MAGAWISH**			**Reef Number**		**33**		
33-01	166	Buoy	PIN	Erg	5/13/97	5/17/97	11	11+2=13	May 98 Installation had been lost completely New pin cemented 40m out from the reef, suitable for Azieb Dec 98 pin lost again New pin inserted 31-12 98 Old pin at 9m
33-02	Small	Buoy	PIN	Erg	5/13/97	5/17/97	8	10	
33-03	236	Buoy	PIN	Erg	5/13/97	5/17/97	10	11	Missed
33-04	163	Buoy	MR 1M	Erg	5/13/97	5/17/97	10	11 5	Pin has been damaged three times Installed manta ray instead
33-05	Small	Buoy	PIN	Erg	5/13/97	5/17/97	10	12	
33-06	231	Buoy	MR-1M	Small Magawish South	10/19/97	10/19/97	4	3 5+ 1= 4 5	
33-07	230	Buoy	MR-1M	South	10/20/97	10/20/97	4	3 7+ 1= 4 7	
33-08	234	Buoy	MR-1M	East	10/21/97	10/21/97	6	6+1 = 7	
33-09	Small	Buoy	MR-1M	Small Magawish East	10/21/97	10/23/97	7	7+1 = 8	

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Installation Reference	Buoy #	Attachment Type	Anchor Type	Location	Date Anchored	Date Moored	Depth (m)	Depth + Scope	Comments
Reef Name		**ERG ADEL**			**Reef Number**		**34**		
34-01	13	Buoy	PIN	Left	5/10/97	5/14/97	10	11	
34-02	161	Buoy	PIN	Right	5/10/97	5/14/97	10	12	11-4-99 installation missing
Reef Name		**BEN EL GEBAL 1**			**Reef Number**		**35**		
35-01	Small	Buoy	MR-SRM		7/20/97	7/20/97	8	8+1 5= 9 5	Buoy reported missing 31-Mar-98 Recovered 27-Apr-98 complete with manta ray Buoy has been damaged by boat Replaced 20-5-98
35-02	87	Buoy	MR-1M	Last	7/1/97	7/31/97	8	7 5+1 5= 8	
35-03	213	Buoy	MR-1M	Last	7/1/97	7/1/97	6	6+1 5= 7 5	
Reef Name		**BEN EL GEBAL 2**			**Reef Number**		**36**		
36-01	Small	Buoy	MR-SRM	Last	7/4/97	7/7/97	5	5+1=6	Pin changed to manta
36-02		Buoy	MR-1M	Last	8/2/97	7/7/97	8	8+2=10	Change installition as too many pins were coming out Manta ray installed Manta came out October 98 Replaced 18-10-98
Reef Name		**BEN EL GEBAL 3**			**Reef Number**		**37**		
37-01	Small	Buoy	MR-1M	Middle	6/28/97	6/28/97	6	6+1 5=7 5	1-11-98 mooring came out Replaced at 6m with SRM
37-02	179	Buoy	MR-1M	Middle	6/28/97	6/28/97	4	4 5+1 5=6	
Reef Name		**BEN EL GEBAL 4**			**Reef Number**		**38**		
38-01	41	Buoy	PIN		6/30/97	7/3/97	5	4 7+1 5= 6	
38-02	171	Buoy	PIN	Last	6/30/97	7/3/97	5	5 1+1 5= 6 5	
Reef Name		**SHA'AB EL SEGALA**			**Reef Number**		**39**		
39-01	Small	Buoy	MR-1M	South	10/9/97	10/9/97	4	4 5+ 1= 5 5	
39-02	Small	Buoy	MR-1M	South	10/12/97	10/12/97	5	5+ 1 5= 6 5	
39-03	Small	Buoy	MR-1M	West	10/13/97	10/13/97	6	6+ 1 5= 7 5	Bouy recoverred 27-Apr-98 complete with down line and manta shaft
39-04	Small	Buoy	MR-1M	West	10/12/97	10/12/97	6	6+ 1 5= 7 5	
39-05	215	Buoy	MR-1M	North	10/14/97	10/14/97	5	5+ 1= 6	
39-06	228	Buoy	MR-1M	North	10/14/97	10/14/97	5	4 8+1= 5 8	
Reef Name		**HEPCA GARDEN**			**Reef Number**		**40**		
40-01	185	Buoy	MR-1M		7/22/97	7/22/97	11	11+2=13	
40-02	186	Buoy	MR-1M		7/21/97	7/21/97	10	10+2= 12	

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Installation Reference	Buoy #	Attachment Type	Anchor Type	Location	Date Anchored	Date Moored	Depth (m)	Depth + Scope	Comments
Reef Name		**FANOUS 2**			**Reef Number**		**41**		
41-01	Small	Buoy	MR-1M	Abu Munka	3/23/99	3/23/99	4	3 5+1	
41-02	Small	Buoy	MR-1M	Abu Munka	3/23/99	3/23/99	4	3 5+1	
41-03	Small	Buoy	MR-1M	Abu Munka	3/24/99	3/24/99	6	5 5+1	
41-04	Small	Buoy	MR-1M	Abu Munka	3/24/99	3/24/99	6	6+1	
Reef Name		**BIG MEGAWISH**			**Reef Number**		**42**		
42-01	Small	Buoy	PIN		3/25/99	3/31/99	5	5+1	
42-02	Small	Buoy	PIN		3/25/99	3/31/99	5	5+1	
42-03	Small	Buoy	PIN		3/25/99		4	3 8	
42-04		Buoy	PIN		4/1/99		8	8+1	
Reef Name		**ABU GALAWA**			**Reef Number**		**50**		
50-01		Line	PIN	Lagoon	1/13/99	1/23/99	1	1	Mooring funded by El Gouna
50-02		Line	PIN	Lagoon	1/13/99		1	1	Mooring funded by El Gouna
50-03	FG	Buoy	MR-1M	Lagoon	1/23/99	1/23/99	7	6 5+1 5	Mooring funded by El Gouna
Reef Name		**GOTA ABU GALAWA**			**Reef Number**		**51**		
51-01		Line	PIN	South Canyon	1/14/99	1/23/99	1	1	Mooring funded by El Gouna
51-02		Line	PIN	South Canyon	1/14/99	1/23/99	1	1	Mooring funded by El Gouna
51-03		Line	PIN	South Canyon	1/14/99	1/23/99	1	1	Mooring funded by El Gouna
51-04	FG	Buoy	MR-1M	South	1/17/99	1/17/99	11	11+2	Mooring funded by El Gouna
54-01		Line	PIN		1/17/99		3	2 5	Mooring funded by El Gouna
Reef Name		**MARSA GOTA ABU GALAWA**			**Reef Number**		**52**		
52-01		Line	PIN	Coral Forest	1/15/99	1/23/99	2	1 5	Mooring funded by El Gouna
52-02		Line	PIN	Coral Forest	1/15/99	1/23/99	1	1	Mooring funded by El Gouna
Reef Name		**SHABAHA**			**Reef Number**		**53**		
53-01	FG	Buoy	PIN	Erg	1/16/99		5	4 5+1	Mooring funded by El Gouna
53-02	FG	Buoy	PIN	Erg	1/16/99		4	4+1	Mooring funded by El Gouna
Reef Name		**ABU SOMBOK**			**Reef Number**		**54**		
54-02		Buoy	MR-1M	Ras Fanadir	1/26/99	1/26/99	10	10+2	Mooring funded by El Gouna
Reef Name		**SEYOUL SEGHIRA**			**Reef Number**		**55**		
55-01		Line	PIN		1/18/99		3	3 2	Mooring funded by El Gouna
55-02		Line	PIN		1/18/99		2	1 5	Mooring funded by El Gouna

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Installation Reference	Buoy #	Attachment Type	Anchor Type	Location	Date Anchored	Date Moored	Depth (m)	Depth + Scope	Comments
55-03		Line	PIN		1/18/99		1	1	Mooring funded by El Gouna
55-04		Buoy	MR 1M		1/18/99	1/18/99	18	18+2	Mooring funded by El Gouna
Reef Name		**SAKHWA ABU GALAWA**			**Reef Number**		**56**		
56-01	FG	Buoy	MR-1M		1/19/99	1/19/99	15	15+2	Mooring funded by El Gouna
56-02	FG	Buoy	MR-1M		1/19/99	1/19/99	8	8+2	Mooring funded by El Gouna
Reef Name		**SEYOUL KEBIRA**			**Reef Number**		**57**		
57-01		Buoy	MR-1M		1/20/99	1/20/99	19	18 5+2	Mooring funded by El Gouna
57-02		Line	PIN		1/20/99		1	1	Mooring funded by El Gouna
57-03		Line	PIN	South	1/22/99		2	2	Mooring funded by El Gouna
57-04		Line	PIN	South	1/22/99		2	2	Mooring funded by El Gouna
Reef Name		**SHA'AB RUHR SIYUL**			**Reef Number**		**58**		
58-01		Line	PIN	East	1/21/99		2	2	Mooring funded by El Gouna
58-02		Line	PIN	East	1/21/99		1	1	Mooring funded by El Gouna
58-03		Line	PIN	West	1/25/99		2	2	Mooring funded by El Gouna
58-04		Line	PIN	West	1/25/99		2	2	Mooring funded by El Gouna
Reef Name		**DOLPHIN CIRCUS**			**Reef Number**		**59**		
59-01	Small FG	Buoy	PIN		2/7/99	2/11/99	4	4+1	Funded by El Gouna
59-02	Small FG	Buoy	PIN		2/7/99	2/11/99	4	4+1	Funded by El Gouna
Reef Name		**YELLOWFISH REEF**			**Reef Number**		**62**		
62-01		Line	PIN		2/8/99		1		
62-02		Line	PIN		2/8/99		1		
62-03	Small	Buoy	MR-1M		2/12/99	2/12/99	18	18+2	
Reef Name		**ABU NUHAS**			**Reef Number**		**63**		
63-01	FG	Buoy	MR-1M	Erg	2/13/99	2/13/99	20	20+2	
Reef Name		**MARRIOTT HARBOUR**			**Reef Number**		**90**		
90-01		Buoy	PIN		1/31/97		3		
90-02		MOR	PIN	North	2/28/97		3	n/a	
90-03		MOR	PIN	North	3/1/97		3	n/a	
90-04		MOR	PIN	North	3/1/97		3	n/a	
90-05		Buoy	PIN		1/31/97		3		

HURGHADA INSTALLATION DETAILS REPORT As of April 30, 1999

Installation Reference	Buoy #	Attachment Type	Anchor Type	Location	Date Anchored	Date Moored	Depth (m)	Depth + Scope	Comments
90-06		MOR	PIN	North	2/28/97		3	n/a	
90-07		Buoy	PIN		3/1/97		3		
90-08		Buoy	PIN		3/1/97		3		
90-09		MOR	PIN	North	3/1/97		3	n/a	
90-10		Buoy	PIN		3/1/97		3		
90-11		MOR	EMR-1M	Marina	12/27/98		6	5 7	Replacement for lost pins
90-12			E-MR-1M	Marina	12/27/98		0		
90-13		MOR	E MR-1M	Marina	12/28/98		7	6 5	Replacement for pins used on Sheriton side
90-14		MOR	E-MR-1M	Harbour	12/28/98		6	6	Replacement for pins used on Shereton side
90-15		MOR	E MR 1M	Harbour	12/28/98		6	6	Replacement for pins used on Shereton side
90-16		MOR	E-MR-1M	Harbour	12/28/98		6	6	Replacement for pins used on Shereton side
Reef Name		**HOLIDAY INN**			**Reef Number**		**91**		
91-01		MOR	MR-1M		4/23/97		9	10	

ANNEX 6D INSTALLATION DETAILS BY DIVE SITE FOR HURGHADA, SAFAGA, and the SOUTH and ISLANDS

SAFAGA — INSTALLATION DETAILS REPORT — As of April 30, 1999

Installation Reference	Buoy #	Attachment Type	Anchor Type	Location	Date Anchored	Date Moored	Depth (m)	Depth + Scope	Comments
Reef Name		**SHA'AB SAIMAN**			**Reef Number**		**1**		
01-01	23	Buoy	MR-1M	North	4/7/96		21	21+2	Installation by volunteers co ordinated by Laurenze from Barakuda DC
01-02	511	Buoy	MR-1M	North	4/7/96		21	21+2	Installation by volunteers co-ordinated by Laurenz from Barakuda DC
01-03	510	Buoy	MR-1M	South	4/7/96		22	22+2	Installation by volunteers co-ordinated by Laurenz from Barakuda DC
Reef Name		**RAS ABU SOMA**			**Reef Number**		**2**		
02-01	64	Buoy	MR-1M	North East	4/6/96	3/9/97	20	19 6+2	Installed by volenteers co ordinated by Laurenz at Barakuda dive centre
02-02		Line	Pin	North East	3/12/98	6/3/98	2	2	
02-03	21	Buoy	MR-1M	North East	4/8/96	3/9/96	19	19 3+2=12	Installed by volenteers co ordinated by Laurenz at Barakuda dive centre
02-04		Line	Pin	North East	3/14/98	6/3/98	2	1	
02-05	501	Buoy	EMR-1M	Middle	4/6/96	3/9/97	22	21 5+2=	Installed by volenteers co-ordinated by Laurenz at Barakuda dive centre Heavy duty down line used
02-06		Line	Pin	Middle	3/14/98	6/3/98	2	1	
02-07	76	Buoy	EMR-1M	Garden	4/6/96	3/9/97	15	14 6+2	Installed by volenteers co ordinated by Laurenz at Barakuda dive centre Installed in patch of sand leading up from reef Heavy duty down line used
02-08		Buoy	MR-1M	South Garden	4/5/96	2/27/97	14	?	Installed by volenteers co ordinated by Laurenz at Barakuda dive centre Estimate depth
Reef Name		**TOBIA ARBAA**			**Reef Number**		**3**		
03-01	508	Buoy	Pin	East	6/2/98	6/9/98	14	14+2	Replacement for broken pin Pin on small coral block
03-02	80	Buoy	Pin	Middle	1/5/96	3/12/98	19	18 6+2	Installation put in by Barakuda dive centre volenteers Old rope, tyre and chain removed 7-10-98
03-03	64	Buoy	Pin	West	3/8/97		14	14+2	Installation put in by Barakuda dive centre volenteers Chain and tyre fitted

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Reef Name		**TOBIA HAMRA**			**Reef Number**		**4**		
04-01	72	Buoy	EMR-1M	North	4/5/96	2/27/98	9	9 1+2	Installation completed by volenteers co ordinated by Barakuda dive centre Installed north east of old block in small sand patch
04-02	512	Buoy	EMR 1M	Middle	4/5/96	2/27/98	17	16 7+2	Manta 10cm out Installed in sand cleft running down reef
04-03	506	Buoy	EMR-1M	South	4/5/96	2/27/98	23	22 8+2	Installed by volunteers form Barakuda DC Heavy duty down line used
Reef Name		**TOBIA KEBIR**			**Reef Number**		**5**		
05-01	502	Buoy	Pin		1/6/96	3/7/97	8	8+2	Installation put in by volenteers co-ordinated by Laurenz at Barakuda dive centre
05-02	69	Buoy	Pin		1/6/96	3/7/97	5	5+2	Installation put in by volenteers co-ordinated by Laurenz at Barakuda dive centre
05-03	504	Buoy	Pin		1/6/96	3/7/97	8	8+2	Installation put in by volenteers co ordinated by Laurenz at Barakuda dive centre
05-04	515	Buoy	MR-1M		6/16/98	6/16/98	8	8+2	
Reef Name		**TOBIA SORAYA**			**Reef Number**		**6**		
06-01	503	Buoy	MR-1M		3/6/97	3/8/97	13	13+2	Installation completed by volenteers co ordinated by Laurenz at Barakuda
06-02	4	Buoy	MR-1M		3/5/97	3/8/97	13	13+2	Installation completed by volenteers co ordinated by Laurenz at Barakuda Buoy 54 Double down line
06-03		Line	Pin	South Erg	6/4/98	6/9/98	3	3+1	Area not suitable for manta Manta broken Pin fitted to South Erg
Reef Name		**GAMUL SORAYA**			**Reef Number**		**7**		
07-01	507	Buoy	Pin		1/7/96	3/9/97	16	15 5+2	Installation completed by volenteers Double pin used Heavy duty rope chain and old tyres
07-02	74	Buoy	EMR-1M	East	4/8/96	3/9/97	15	15+2	Installation completed by volenteers Short MR used
Reef Name		**GAMUL KEBIR**			**Reef Number**		**8**		
08-01	26	Buoy	MR-1M	Lagoon	12/10/96	2/27/97	7	7+2	Installation by volunteers co-ordinated by Laurenz fro Barakuda DC Manta 10cm out
08-02	23	Buoy	MR-1M	Middle	12/10/96	2/27/97	7	7+2	Installation by volunteers co ordinated by Laurenz fro Barakuda DC Manta 10cm out
08-03	508	Buoy	MR SR M	West	6/6/98	6/6/98	11	11+2	Replacement for S-MR-D lost manta MR1
08-04		Line	Pin	West	6/6/98	6/10/98	1	1	Pin bent but serviceable
08-05		Line	Pin	South of lagoon	6/24/98	6/28/98	1	1	6-6-98 Attempt to drill reef top pin Drill stuck and coring barrel broken
08-06		Line	Pin	South of lagoon	6/23/98	6/28/98	1	1	

ANNEX 6D INSTALLATION DETAILS BY DIVE SITE FOR HURGHADA, SAFAGA, and the SOUTH and ISLANDS

08-07		Line	Pin	Small Erg East	3/18/98	6/24/98	4	4	Pin installed in the centre of the erg
08-08		Line	Pin	Erg	3/18/98	6/24/98	3	3	Two volenteers attempted to drill a pin but couldn't Mohamed starteed to complete the work but the volenteers told him not to Second attempt made on 18-3-98
Reef Name		**PANORAMA**			**Reef Number**		**9**		
09-01		Line	Pin	South	1/6/96	3/1/97	1	1	Installation by volunteers co ordinated by Laurenz from Barakuda DC
09-02		Line	Pin	South	1/6/96	3/1/97	1	1	Installation by volunteers co ordinated by Laurenz from Barakuda DC
09-03		Line	Pin	West	6/26/98		1	1	
09-04		Line	Pin	West	6/26/98		1	1	
09-05		Line	Pin	West	3/15/98	6/13/98	1	1	West side of reef
09-06		Line	Pin	South West	3/15/98	6/13/98	1	1	North west side of reef
09-07	99	Buoy	MR-1M	North East	3/15/98	3/15/98	16	16 2+2	Installed by 4 volenteer divers Took 3 hours to hammer in and is not in fully (30 cm out) Very close to large coral prone to chafing
Reef Name		**MIDDLE REEF**			**Reef Number**		**11**		
11-01	62	Buoy	MR-1M	East	3/3/97	3/10/97	8	8+2	Installed by volunteers co ordinated by Laurenz at Barakuda DC
11-02	248	Buoy	MR-1M	Middle	3/3/97	3/10/97	9	9+2	Anchor missing 13-6-98 Replaced 26-6-98
11-03	None	Buoy	MR-1M	Middle	3/3/97	3/10/97	9	9+2	Installation by volunteers co-ordinated by Laurenz at Barakuda DC Manta is 80cm out
11-04	509	Buoy	MR-1M	West	3/3/97	3/10/97	14	14+2	Installation by volunteers co-ordinated by Laurenz at Barakuda DC Manta shaft is 10cm out
Reef Name		**SHA'AB CLAUDE**			**Reef Number**		**12**		
12-01		Buoy	MR-1M	South East	3/4/97	3/8/97	16	15 5+2	Installation put in by volunteers co-ordinated y Laurenz at Barakuda DC
12-02		Buoy	MR-1M	South West	3/4/97	3/8/97	18	18+2	Installation put in by volunteers co-ordinated y Laurenz at Barakuda DC
Reef Name		**SHA'AB SHEER**			**Reef Number**		**14**		
14-01		Line	Pin	East	12/9/96	3/1/97	1	1	Installed by volunteers from Barakuda dive centre
14-02	79	Buoy	MR-SRM	West	12/9/96	3/1/97	13	13+2	Installed by Barakuda DC Replaced 11-3-98 with MR-SRM Installed by 1 HEPCA diver (Ahmed) and two volunteers
14-03		Line	Pin	West	12/9/96	3/1/97	1	1	
14-04	514	Buoy	MR-1M	East	3/6/97	3/11/97	17	17+2	

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14-05		Line	Pin	East	3/6/97	3/11/97	1	1	Installed by Barakuda DC Reef reported as being weak
14-06	15	Buoy	MR 1M	West	6/27/98	6/27/98	15	15+2	
Reef Name		**ABU KAFAN**			**Reef Number**		**15**		
15-01		Line	Pin	Erg	3/10/98	6/11/98	0		Installation of reef top pin on the erg by one HEPCA diver and two volunteers Requires 1m of chain Triple line fitted
15-02		Line	Pin		3/10/98	6/11/98	0		Installation of reef top pin by one HEPCA diver and two volenteers Chain removed as chafing coral
15-03		Line	Pin		3/10/98		0		Installation of reef top pin by two volenteers
15-04		Line	Pin		3/10/98		0		Installation of reef top pin by one HEPCA diver and one volenteer
15-05		Line	Pin	South	3/10/98		1	1	Installation of reef top pin by one HEPCA diver and one volenteer Requires 1m of chain
Reef Name		**SANDY ISLAND**			**Reef Number**		**17**		
17-01		Line	Pin	East	12/10/96	3/11/97	1	1	Installaled by volenteers co ordinateed by Laurenz from Barakuda DC
17-02		Line	Pin	West	12/10/96	3/11/97	1	1	Installaled by volenteers co ordinateed by Laurenz from Barakuda DC

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Installation Reference	Buoy #	Attachment Type	Anchor Type	Location	Date Anchor	Date Moored	Depth (m)	Depth + Scope	Comments
Reef Name		**ROCKY**			**Reef Number**			**1**	
01-01		Line	2-PIN	South	3/10/98		1	0 5	Twin pin and chain with sliding eye Tripple braded pick up line
01-02		Line	2-PIN	South	3/10/98		1	0 5	Twin pin and chain with sliding eye Tripple braded pick up line
01-03		Line	2-PIN	South	3/10/98		1	0 5	Twin pin and chain with sliding eye Tripple braded pick up line
01-04		Line	2-PIN	South	3/10/98		1	0 5	Twin pin and chain with sliding eye Tripple braded pick up line
01-05		Line	2-PIN	South	3/10/98		1	0 5	Twin pin and chain with sliding eye Tripple braded pick up line
01-06		Line	2-PIN	South	3/10/98		1	0 5	Twin pin and chain with sliding eye
Reef Name		**SMALL BROTHER**			**Reef Number**			**2**	
02-01		Line	2-PIN	South	3/10/98		1	0 5	Twin pin and chain with sliding eye
02-02		Line	2-PIN	South	3/10/98		1	0 5	Twin pin and chain with sliding eye
02-03		Line	2-PIN	South	3/11/98		1	0 5	Twin pin and chain with sliding eye
02-04		Line	2-PIN	South	3/11/98		1	0 5	Twin pin and chain with sliding eye
02-05		Line	2-PIN	South	3/11/98		1	0 5	Twin pin and chain with sliding eye
02-06		Line	2-PIN	South	3/11/98		1	0 5	Twin pin and chain with sliding eye
Reef Name		**ABU EL KIZAN**			**Reef Number**			**3**	
03-01		Line	2-PIN	South	3/12/98		1	0 5	Twin pin and chain with sliding eye
03-02		Line	2-PIN	South East	3/12/98		1	0 5	Twin pin and chain with sliding eye
03 03		Line	2-PIN	South East	3/12/98		1	0 5	Twin pin and chain with sliding eye
03-04		Line	2-PIN	South East	3/12/98		1	0 5	Twin pin and chain with sliding eye
03-05		Line	2-PIN	South East	3/12/98		1	0 5	Twin pin and chain with sliding eye
03-06		Line	2-PIN	South East	3/12/98		1	0 5	Twin pin and chain with sliding eye
03-07		Line	2-PIN	South West	3/12/98		1	0 5	Twin pin and chain with sliding eye
03-08		Line	2-PIN	South West	3/12/98		1	0 5	Twin pin and chain with sliding eye

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Installation Reference	Buoy #	Attachment Type	Anchor Type	Location	Date Anchor	Date Moored	Depth (m)	Depth + Scope	Comments
Reef Name		ZABARGAD			Reef Number			4	
04-01		Line	2-PIN	South East	3/14/98	5/13/98	1	0 5	Twin pin and chain with sliding eye Reef structure very weak Recommend not to use further installations in view of possible damage to the reef
04-02		Line	2-PIN	South East	3/14/98	5/13/98	1	0 5	Twin pin and chain with sliding eye Reef structure very weak Recommend not to use further installations in view of possible damage to the reef
04-03		Line	2-PIN	South	5/12/98	5/13/98	1	0 5	Double reef top pins with sliding chain and shackle
04 04		Line	2-PIN	South	5/12/98	5/13/98	1	0 5	Double reef top pins with sliding chain and shackle
04-05		Line	2-PIN	South West	5/12/98	5/13/98	1	0 5	Twin pin and chain with sliding eye Reef structure very weak Installation incomplete due to cement washout overnight Manta ray installation probed and recommended but insufficient time to complete
04-06		Line	2-PIN	South West	5/12/98	5/13/98	1	0 5	Twin pin and chain with sliding eye Reef structure very weak Installation incomplete due to cement washout overnight Manta ray installation probed and recommended but insufficient time to complete
04-07		Line	2-PIN	South	5/12/98	5/13/98	1	0 5	Double reef top pins with sliding chain and shackle
04-08		Line	2-PIN	South	5/12/98	5/13/98	1	0 5	Double reef top pins with sliding chain and shackle
04-09		Line	2-PIN	South	5/13/98	5/13/98	1	0 5	Double reef top pins with sliding chain and shackle
04-10		Line	2-PIN	South	5/13/98	5/13/98	1	0 5	Double reef top pins with sliding chain and shackle
04-11		Line	2-PIN	South	5/13/98	5/13/98	1	0 5	Double reef top pins with sliding chain and shackle

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Installation Reference	Buoy #	Attachment Type	Anchor Type	Location	Date Anchor	Date Moored	Depth (m)	Depth + Scope	Comments
Reef Name		**ROCKY**			**Reef Number**			**5**	
05-01		Line	2-PIN	South East	3/15/98	5/13/98	2	2	Twin pin and chain with sliding eye
05-02		Line	2-PIN	South East	3/15/98	5/13/98	1	0 5	Twin pin and chain with sliding eye
05-03		Line	2-PIN	South East	3/15/98	5/13/98	1	0 5	Twin pin and chain with sliding eye
05-04		Line	2-PIN	South East	3/15/98	5/13/98	1	0 5	Twin pin and chain with sliding eye
05-05		Line	2-PIN	South East	3/15/98	5/13/98	1	0 5	Twin pin and chain with sliding eye
05-06		Line	2-PIN		3/15/98	5/13/98	1	0 5	Twin pin and chain with sliding eye
Reef Name		**WADI GEMAL ISLAND**			**Reef Number**			**6**	
06-01	S1	Buoy	MR-SRM	South East	3/17/98	3/17/98	10	10+2=12	Manta ray SRM heavy duty with triple braided down line and pickup line (attached to down line not through line)
06-02	S2	Buoy	MR-SRM	South East	3/17/98	3/17/98	10	10+2=12	Manta ray SRM heavy duty with triple braided down line and pickup line (attached to down line not through line)
Reef Name		**ABU DABBAB NABA**			**Reef Number**			**7**	
07-01	S3	Buoy	MR-1M	South	3/19/98	3/19/98	9	9+2=11	Manta ray 1M with triple braided down line and pickup line (attached to down line not through line)
07-02	Small	Buoy	MR-1M	South	3/19/98	3/19/98	10	10+2=12	Manta ray 1M with triple braided down line and pickup line (attached to down line) Small marker bouy fitted
07-03	S4	Buoy	MR-1M	South	3/19/98	3/19/98	10	10+2=12	Manta ray 1M with triple braided down line and pickup line (attached to down not through line)
07-04		Line	2-PIN	South	3/19/98	3/23/98	1	0 5	Twin reef top pin with chain and large sliding eye Three lines attached Two for rear mooring and the third for front mooring for additional boat
Reef Name		**RAS TOROMBI**			**Reef Number**			**8**	
08-01	S6	Buoy	MR-SRM	North	4/26/98	4/26/98	16	16+2	Survey and Install SRM Manta ray anchor Use standard lines and buoy
08-02	S5	Buoy	MR-SRM	North	4/26/98	4/26/98	16	15 5+2	Survey and Install SRM Manta ray anchor Use standard lines and buoy

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Installation Reference	Buoy #	Attachment Type	Anchor Type	Location	Date Anchor	Date Moored	Depth (m)	Depth + Scope	Comments
08-03		Line	PIN	North	4/26/98	4/26/98	1	1	Single reef top pin west of buoys
08 04		Line	PIN	North	4/26/98	4/26/98	1	1	Single reef top pin west of buoys
08-05		Buoy	MR-1M		2/26/99	2/26/99	10	10+2	
08-06		Buoy	MR-1M		2/26/99	2/26/99	10	10+2	
Reef Name		**MARSA SHUNA**			**Reef Number**			**9**	
09 01		Line	PIN	North east	4/27/98	5/3/98	1	1	Single reef top pin Tripple plated top line
09-02		Line	PIN	North east	4/27/98	5/3/98	1	1	Single reef top pin
09 03		Line	PIN	North west	4/27/98	5/3/98	1	1	Single reef top pin
09 04		Line	PIN	North west	4/27/98	5/3/98	1	1	Single reef top pin
09 05		Buoy	MR-1M		2/27/99	2/27/99	16	16+2	
09 06		Line	Cable		2/27/99	2/27/99	1	1	Reef top line attached to existing cable
Reef Name		**UMM RUS**			**Reef Number**			**10**	
10-01	S7	Buoy	MR-1M	North west	4/27/98	4/27/98	8	8+2	Manta with single line Dugongs live herell
10-02	S8	Buoy	MR-1M	North west	4/27/98	4/27/98	8	8+2	Manta with single line Dugongs live herell
Reef Name		**MARSA GALEB**			**Reef Number**			**11**	
11-01		Line	PIN	North west	4/28/98	5/4/98	2	1 5	Single pin reef top line
11-02		Line	PIN	North west	4/28/98	5/4/98	2	1 5	Single pin reef top line
Reef Name		**SHA'ABRUR WADI GEMAL**			**Reef Number**			**12**	
12-01	S9	Buoy	MR-SRM	West Peninsula	4/29/98	4/29/98	8	8+2	Heavy duty manta ray with single line and buoy
12-02	S10	Buoy	MR-SRM	West Peninsula	4/29/98	4/29/98	8	8+2	Heavy duty manta ray with single line
12 03	S11	Buoy	MR-1M	West Peninsula	4/29/98	4/29/98	9	8 5+2	Manta ray and single line
Reef Name		**SHA'AB SHARM**			**Reef Number**			**13**	
13-01		Line	PIN	South	4/30/98	4/30/98	1	1	Single reef top pin and triple line
13-02		Line	PIN	South	4/30/98	4/30/98	1	1	Single reef top pin and triple line

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Installation Reference	Buoy #	Attachment Type	Anchor Type	Location	Date Anchor	Date Moored	Depth (m)	Depth + Scope	Comments
Reef Name		**SHA'AB SAMEDI**			**Reef Number**			**14**	
14-01		Line	PIN	West	5/1/98	5/1/98	1	1	Single reef top pin
14-02	S12	Buoy	Wire	West	5/1/98	5/1/98	14		Attached buoy to old mooring Mooring is wire wrapped around substantial rock Anchor will be replaced later
14-03		Line	PIN	West	5/1/98	5/1/98	1	1	Single reef top pin and line
14-04	S13	Buoy	MR-1M	West	5/1/98	5/1/98	14	14+2	Second attempt to install manta First got stuck Single line and buoy
Reef Name		**ELPHINSTONE**			**Reef Number**			**15**	
15 01		Line	PIN		5/2/98	5/4/98	1	1	Single top reef pin Left lines with a safari boat to attach
15 02		Line	PIN		5/2/98	5/4/98	1	1	Single top reef pin Left lines with a safari boat to attach
Reef Name		**ABU DABBAB 2**			**Reef Number**			**16**	
16-01		Line	PIN		5/3/98	5/3/98	0	1	Single reef top pins
16-02		Line	PIN		5/3/98	5/3/98	1	1	Single reef top pins
Reef Name		**GOTA MARSA ALAM**			**Reef Number**			**17**	
17-01		Line	PIN	Outside	7/13/98		1	1	
17-02		Line	PIN	Outside	7/13/98		1	1	
17-03	S19	Buoy	MR-SRM	Lagoon	7/13/98	7/13/98	14	14+2	
17-04	S18	Buoy	MR-1M	Lagoon	7/14/98	7/14/98	17	7+2	
Reef Name		**ERG MARSA ALAM**			**Reef Number**			**18**	
18-01		Line	PIN	Erg	7/14/98		1	1	
18-02		Line	PIN	Erg	7/14/98		1	1	
Reef Name		**MAHALEG**			**Reef Number**			**19**	
19-01		Line	PIN		2/23/99		1		
Reef Name		**TORFA LASSAL**			**Reef Number**			**20**	
20-01		Line	PIN		2/23/99		1	1	
20 02		Line	PIN		2/23/99		1	1	

SOUTH AND ISLANDS INSTALLATION DETAILS REPORT As of April 30, 1999

Installation Reference	Buoy #	Attachment Type	Anchor Type	Location	Date Anchor	Date Moored	Depth (m)	Depth + Scope	Comments
Reef Name		**SHARM FOUGHANI**			**Reef Number**			**21**	
21-01		Buoy	MR-1M		2/22/99	2/22/99	11	11 2+2	
21-02		Buoy	MR-1M		2/23/99	2/23/99	9	8 5+1	
Reef Name		**SHARM TAHTANI**			**Reef Number**			**22**	
22-01		Line	PIN		2/22/99		1	1	
22-02		Line	PIN		2/22/99		1	1	
Reef Name		**WIZR**			**Reef Number**			**23**	
23 01		Buoy	MR-1M		2/26/99	2/26/99	12	12+2	
Reef Name		**SERIB KEBIR**			**Reef Number**			**24**	
24-01		Line	PIN		2/25/99		1	1	

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ANNEX 6E INSTALLATION SUMMARY BY REEF SITES FOR HURGHADA, SAFAGA and the SOUTH and ISLANDS

HURGHADA

REEF NAME	REEF NUMBER	NUMBER OF INSTALLATIONS
Um Gamar	2	7
Shaab Ruhr	3	8
Carless Reef	4	6
Erg Somaya	5	3
Small Giftun	6	24
Abu Ramada	7	1
Halg Abu Ramada	7	2
Erg Abu Ramada	8	2
Abu Ramada	9	9
Abu Ramada	10	11
Gota Abu Ramada	11	14
El Aruk	12	16
Shaab Sabena	13	12
Erg Sabena	14	2
Shaab Torfa	15	7
Shaab Farasha	16	4
Stone Beach	17	2
Torfa El Gas	18	6
Fanous	19	3
Torfa Fanous	19	6
Fanous	20	4
Big Gifton	21	10
Shaab El Erg	22	14
Abu Nugar	23	8
Gota Dir	24	7
Fanadir	25	15
Shaab Ishta	26	3
Erg Bridget/Tiffany	27	2
Petra Reef	28	5
Shaab Disha	29	5
Abu Hashish	30	7
Abu Machadig	31	5
Erg Ali	32	2
Magawish	33	9
Erg Adel	34	2
Ben El Gebal 1	35	3

ANNEX 6E INSTALLATION SUMMARY BY REEF SITES FOR HURGHADA, SAFAGA and the SOUTH and ISLANDS

HURGHADA

REEF NAME	REEF NUMBER	NUMBER OF INSTALLATIONS
Ben El Gebal 2	36	2
Ben El Gebal 3	37	2
Ben El Gebal 4	38	2
Shaab El Segala	39	6
HEPCA Garden	40	2
Fanous 2	41	4
Big Magawish	42	4
Abu Galawa	50	3
Abu Sombok	51	1
Gota Abu Galawa	51	4
Marsa Gota Abu Galawa	52	2
Shabaha	53	2
Abu Sombok	54	1
Seyoul Saghira	55	4
Sakhwa Abu Galawa	56	2
Seyoul Kebira	57	4
Shaab Ruhr Siyul	58	4
Dolphin Circus	59	2
Yellow fish reef	62	3
Abu Nuhas	63	1
Marriot Harbour	90	16
Holiday Inn	91	1
TOTAL		318

ANNEX 6E INSTALLATION SUMMARY BY REEF SITES FOR HURGHADA, SAFAGA and the SOUTH and ISLANDS

SAFAGA

REEF NAME	REEF NUMBER	NUMBER OF INSTALLATIONS
Sha'ab Saıman	1	3
Ras Abu Soma	2	8
Tobıa Arbaa	3	3
Tobıa Hamra	4	3
Tobıa Kebır	5	4
Tobıa Soraya	6	3
Gamul Soraya	7	2
Gamul Kebır	8	8
Panorama	9	7
Mıddle reef	11	4
Sha'ab Claude	12	2
Sha'ab Sheer	14	6
Abu Kafan	15	5
Sandy Island	17	2
TOTAL		60

SOUTH and ISLANDS

REEF NAME	REEF NUMBER	NUMBER OF INSTALLATIONS
Rocky	1	1
Big Brother	1	5
Small Brother	2	6
Abu El Kizan	3	8
Zabargad	4	11
Rocky	5	6
Wadi Gamal Island	6	2
Abu Dabbab Nuba	7	4
Ras Torombi	8	6
Marsa Shuna	9	6
Umm Rus	10	2
Marsa Galeb	11	2
Sha'abrur Wadi Gimal	12	3
Sha'ab Sharm	13	2
Sha'ab Samadai	14	4
Elphinstone	15	2
Abu Dabbab 2	16	2
Gota Marsa Alam	17	4
Erg Marsa Alam	18	2
Mahaleg	19	1
Torfa Lassal	20	2
Sharm Foughani	21	2
Sharm Tahtani	22	2
Wizr	23	1
Serib Kebir	24	1
TOTAL		87

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ANNEX 6F GPS Locations of Reefs with Moorings (Hurghada Unedited Data)

Reef Name	Reef Number	# of Moorings	GPS Location
Abu Galawa	50	3	
Abu Hashish	30	2	N27*00 613'-E033*55 410'
Abu Hashish	30	5	N27*00 748'-E033*55 447'
Abu Machadig	31	2	
Abu Machadig	31	3	N26*59 562'-E033*54 641'
Abu Nugar	23	2	N27*20 744'-E033*50 389'
Abu Nugar	23	2	N27*20 868'-E033*50 131'
Abu Nugar	23	2	N27*21 271'-E033*50 128'
Abu Nugar	23	2	N27*21 715'-E033*47 791'
Abu Nuhas	63	1	
Abu Ramada	7	1	N27*11 000'-E033*58 500'
Abu Ramada	9	9	N27*09 490'-E033*58 741'
Abu Ramada	10	1	N27*09 490'-E033*58 741'
Abu Ramada	10	10	N27*09 514'-E033*58 741'
Abu Sombok	51	1	
Abu Sombok	54	1	
Ben El Gebal 1	35	3	N27*11 077'-E033*57 888'
Ben El Gebal 2	36	2	N27*11 224'-E033*57 847'
Ben El Gebal 3	37	2	N27*11 459'-E033*57 786'
Ben El Gebal 4	38	2	N27*11 597'-E033*57 724'
Big Gifton	21	3	
Big Gifton	21	1	N27*10 935'-E033*57 666'
Big Gifton	21	6	N27*10 988'-E033*57 771'
Big Magawish	42	4	
Carless Reef	4	6	N27*18 400'-E033*56 200'
Dolphin Circus	59	2	
El Aruk	12	16	N27*10 037'-E033*57 057'
Erg Abu Ramada	8	2	N27*10 000'-E033*59 000'
Erg Adel	34	2	N27*09 601'-E033*53 099'
Erg Ali	32	2	N27*09 407'-E033*52 873'
Erg Bridget/Tiffany	27	1	N27*09 601'-E033*53 390'
Erg Bridget/Tiffany	27	1	N27*09 601'-E033*53 400'
Erg Sabena	14	2	N27*12 999'-E033*57 278'
Erg Somaya	5	3	
Fanadir	25	4	
Fanadir	25	2	N27*17 089'-E033*49 841'
Fanadir	25	9	N27*17 693'-E033*49 823'
Fanous	19	3	N27*16 072'-E033*53 262'
Fanous	20	3	
Fanous	20	1	N27*16 072'-E033*53 262'
Fanous 2	41	4	
Gota Abu Galawa	51	4	
Gota Abu Ramada	11	1	
Gota Abu Ramada	11	1	N27*08 286'-E033*57 125'
Gota Abu Ramada	11	12	N27*09 000'-E033*35 500'
Gota Dir	24	7	
Halg Abu Ramada	7	2	N27*11 000'-E033*58 500'
HEPCA Garden	40	2	

ANNEX 6F GPS Locations of Reefs with Moorings (Hurghada Unedited Data)

Reef Name	Reef Number	# of Moorings	GPS Location
Holiday Inn	91	1	
Magawish	33	2	N27*08 401'-E033*52 976'
Magawish	33	7	N27*08 404'-E033*52 970'
Marriot Harbour	90	16	
Marsa Gota Abu Galawa	52	2	
Petra Reef	28	3	N27*09 026'-E033*53 425'
Petra Reef	28	2	N27*09 050'-E033*53 487'
Sakhwa Abu Galawa	56	2	
Seyoul Kebira	57	4	N27*33 460'-E033*52 970'
Seyoul Saghira	55	4	N27*32.840'-E033*52 200'
Shaab Disha	29	5	N27*02 479'-E033*54 401'
Shaab El Erg	22	7	
Shaab El Erg	22	7	N27*24 526'-E033*51 245'
Shaab El Segala	39	6	
Shaab Farasha	16	4	
Shaab Ishta	26	3	N27*09 008'-E033*53 665'
Shaab Ruhr	3	8	N27*20 100'-E033*54 900'
Shaab Ruhr Siyul	58	2	
Shaab Ruhr Siyul	58	2	N27*32 980'-E033*53 750'
Shaab Sabena	13	6	
Shaab Sabena	13	6	N27*12 983'-E033*57 256'
Shaab Torfa	15	7	
Shabaha	53	2	
Small Giftun	6	7	N27*11 175'-E033*58 943'
Small Giftun	6	3	N27*11 175'-E033*59 055'
Small Giftun	6	14	N27*11.241'-E033*59 055'
Stone Beach	17	2	N27*14 251'-E033*55 730'
Torfa El Gas	18	3	
Torfa El Gas	18	3	N27*16 187'-E033*53 652'
Torfa Fanous	19	6	N27*16 000'-E033*53 100'
Um Gamar	2	7	N27*21 100'-E033*54 300'
Yellow fish reef	62	3	

ANNEX 6F GPS Locations of Reefs with Moorings (Safaga· Unedited Data)

Reef Name	Reef Number	# of Moorings	GPS Location
Abu Kafan	15	1	N26*39 165'-E034*06 580'
Abu Kafan	15	4	N26*39 200'-E034*06 500'
Gamul Kebir	8	6	N26*47 123'-E033*59 201'
Gamul Kebir	8	2	N26*47 306'-E033*59 322'
Gamul Soraya	7	2	N26*47 754'-E033*59 460'
Middle reef	11	4	N26*42 307'-E034*05 917'
Panorama	9	2	N26*45 050'-E034*04 680'
Panorama	9	2	N26*45 080'-E034*04 685'
Panorama	9	2	N26*45 101'-E034*04 685'
Panorama	9	1	N26*45 417'-E034*04 715'
Ras Abu Soma	2	2	N26*50 286'-E033*59 928'
Ras Abu Soma	2	2	N26*50 505'-E034*00 174'
Ras Abu Soma	2	4	N26*50 803'-E034*00 484'
Sandy Island	17	2	
Sha'ab Claude	12	2	
Sha'ab Samman	1	3	
Sha'ab Sheer	14	6	
Tobia Arbaa	3	3	N26*50 171'-E033*59 508'
Tobia Hamra	4	1	N26*49 643'-E033*59 142'
Tobia Hamra	4	1	N26*49 757'-E033*59 152'
Tobia Hamra	4	1	N26*49 857'-E033*59 162'
Tobia Kebir	5	4	N26*48 481'-E033*59 726'
Tobia Soraya	6	3	N26*48 265'-E033*59 650'

ANNEX 6F Location of Reefs with Moorings (South and Islands Unedited Data)

Reef Name	Reef Number	# of Moorings	GPS Location
Abu Dabbab 2	16	2	N25*20 420'-E034*47 660'
Abu Dabbab Nuba	7	4	N25*18 822'-E034*46 093'
Abu El Kizan	3	3	N24*55 825'-E035*52 276'
Abu El Kizan	3	2	N24*55 889'-E035*52 128'
Abu El Kizan	3	3	N24*55 922'-E035*52 296'
Big Brother	1	5	N26*18 733'-E034*50 817'
Elphinstone	15	2	N25*18 400'-E035*51 700'
Erg Marsa Alam	18	2	
Gota Marsa Alam	17	1	
Gota Marsa Alam	17	3	N25*04 250'-E034*56 330'
Mahaleg	19	1	
Marsa Galeb	11	2	N25*31 950'-E034*38 560'
Marsa Shuna	9	2	
Marsa Shuna	9	4	N25*28 340'-E034*41 310'
Ras Torombi	8	2	
Ras Torombi	8	4	N25*39 690'-E034*35 240'
Rocky	1	1	N26*18 733'-E034*50 817'
Rocky	5	6	N23*33 761'-E036*14 960'
Serib Kebir	24	1	
Sha'ab Samadai	14	4	N24*59 150'-E035*00 040'
Sha'ab Sharm	13	2	N24*47 340'-E035*10 820'
Sha'abrur Wadi Gin	12	3	N24*39 220'-E035*07 980'
Sharm Fougham	21	2	
Sharm Tahtani	22	2	
Small Brother	2	6	N26*18 043'-E034*51 758'
Torfa Lassal	20	2	
Umm Rus	10	2	N25*30 800'-E034*39 220'
Wadi Gamal Island	6	2	N24*38 610'-E035*10 533'
Wizr	23	1	
Zabargad	4	11	N23*36 080'-E036*12 720'

PD-ABS-087

Final Report

from the

Hurghada Field Office

On Program Activities From

January 1998 to August 1999

VOLUME 2 of 2

Product of the USAID/Cairo-Funded Policy Management Group (PMG)'s Program

Contracted by EPIQ

Delivered October 1999

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Final Report from the Hurghada Field Office
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END OF VOLUME 1

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ANNEX 8	*Reports and Data from the Crown-of-Thorns Starfish Program*	**42 Pages**
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END OF VOLUME 2

ANNEX 7

EEAA/USAID Red Sea Coral Reef Monitoring Program

31 Pages of Tables, 77 Pages of Text and 11 Charts

This Annex consists of 4 pieces 2 Summary Sections (Annex 7A and 7B) that are presented separately for easy reference in the Main PMG report, a Complete Monitoring Program Report (Annex 7C) with all of the data, analysis, graphs and text, and a Site Log for all Descriptions and Raw Data from the Field Program (Annex 7D)

ANNEX 7A: Summary of Monitoring Surveys Completed on Red Sea Coral Reefs. *3 Tables (Index of Red Sea Coral Reef Surveys (1996-98), Locations of EST and PMG Monitoring Sites, Details of Methods for Recent Hurghada Surveys) – Total of 9 Pages*

ANNEX 7B: Summary of Coral Reef Index for 21 Sites in Hurghada and Safaga, 1996-1998 *1-Page Table (Figure 5 from Main Report is within this Excel File on Disk, see Also Figure 11 in Annex 7C-2)*

ANNEX 7C: Report and Data from the 1998 USAID/PMG Coral Reef Monitoring Program and Comparison to the 1996 Rapid Underwater Assessment Data

- Report Text *14 Pages Text*
- 1998 Data and Graphs Comparing 1996-1998 Data
  - Hurghada *11-Page Table and 5 Charts*
  - Safaga *10-Page Table and 5 Charts*
  - Comparison of 1996 and 1998 CRI for Both Areas *1 Chart (Same as Figure 5 of Main report, without Caption.)*

ANNEX 7D: Site Logs, Raw Data and Maps for 21 Sites: *63 Pages Text and Drawings*

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ANNEX 7A-1 SUMMARY INDEX OF RED SEA CORAL REEF SURVEYS (1996-1998)

		1996 Survey Details							1998 Details	
Site Name	Area	1996 Survey	Method of Survey	Depth (m)	# of Reps	Date of Last Survey	Last Surveyors	1997 Survey	1998 Survey	# of Quads Sampled
Abu Dahab 1 - Naba	South							1		
Abu Dahab 2	South							1		
Abu Dahab 5	South							1		
Abu Galawa Kebir	South							1		
Abu Galawa Saghir (2)	South							1		
Abu Hamra (Elphinstone)	South							1		
Abu Hashish Island	Hurghada	1	Quads	4	8	96-10-14	SJ,MS,ES		1	
Abu Hashish W	Hurghada	1	Quads	4	8	96-10-14	SJ,MS,ES		1	
Abu Kifan (E?)	Safaga	1	Quads	4	7	96-11-10	SJ,MS,ES		1	8
Abu Kifan W	Safaga	1	Quads	4	8	96-11-10	SJ,MS,ES		1	8
Abu Makhadeg	Safaga	1	Quads	4	8	96-10-31	SJ,MS,ES		1	
Abu Nuger	Hurghada	1	Quads	4	7	96-10-09	SJ,MS,ES		1	
Abu Ramada North East	Hurghada	1					MCS			
Abu Ramada South East	Hurghada	1	Quads	4	8	96-09-19	SJ,MS,ES		1	
Abu Ramada South West	Hurghada	1	Quads	4	7	96-09-19	SJ,MS,ES		1	8
Big Giftun	Hurghada	1	Quads	4	8	96-09-30	SJ,MS,ES		1	
Carless Reef	Hurghada	1	Quads	4	6	96-10-01	SJ,MS,ES		1	8
El Arg 1 (Shaab El Erg 1)	Hurghada	1	Quads	4	8	96-10-02	SJ,MS,ES		1	
El Arg 2 (Shaab El Erg 2)	Hurghada	1	Quads	4	10	96-10-02	SJ,MS,ES		1	
El Erg 3	Hurghada	1	Quads	4	10	96-10-09	SJ,MS,ES		1	
El Eruk	Hurghada	1	Quads	4	9	96-09-30	SJ,MS,ES		1	
El Maalka (El Mealeka)	Hurghada	1	Quads	4	6	96-10-07	SJ,MS,ES		1	
Erg Dynamite - Wadi El Gamal	South							1		
Erg Ghadeira	South							1		
Erg Ghadir Douani	South							1		
Erg Guei	Safaga							1		
Erg Lassal (Monica)	Quseir							1		
Erg (Eruk) Magawish	Hurghada	1	Quads	4	8	96-09-20	SJ,MS,ES		1	
Erg Marsa Alam	South							1		
Erg Sabina	Hurghada	1	Quads	4	9	96-10-05	SJ,MS,ES		1	8
Eshta (Shaab Eshta)	Hurghada	1	Quads	4	8	96-09-20	SJ,MS,ES		1	8
Fanadir	Hurghada	1	Quads	4	10	96-10-04	SJ,MS,ES		1	

ANNEX 7

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Abu Dahab 1 - Naba	South							1		
Abu Dahab 2	South							1		
Abu Dahab 5	South							1		
Abu Galawa Kebir	South							1		
Abu Galawa Saghir (2)	South							1		
Abu Hamra (Elphinstone)	South							1		
Abu Hashish Island	Hurghada	1	Quads	4	8	96-10-14	SJ,MS,ES		1	
Abu Hashish W	Hurghada	1	Quads	4	8	96-10-14	SJ,MS,ES		1	
Abu Kifan (E?)	Safaga	1	Quads	4	7	96-11-10	SJ,MS,ES		1	8
Abu Kifan W	Safaga	1	Quads	4	8	96-11-10	SJ,MS,ES		1	8
Abu Makhadeg	Safaga	1	Quads	4	8	96-10-31	SJ,MS,ES		1	
Abu Nuger	Hurghada	1	Quads	4	7	96-10-09	SJ,MS,ES		1	
Abu Ramada North East	Hurghada	1					MCS			
Abu Ramada South East	Hurghada	1	Quads	4	8	96-09-19	SJ,MS,ES		1	
Abu Ramada South West	Hurghada	1	Quads	4	7	96-09-19	SJ,MS,ES		1	8
Big Giftun	Hurghada	1	Quads	4	8	96-09-30	SJ,MS,ES		1	
Carless Reef	Hurghada	1	Quads	4	6	96-10-01	SJ,MS,ES		1	8
El Arg 1 (Shaab El Erg 1)	Hurghada	1	Quads	4	8	96-10-02	SJ,MS,ES		1	
El Arg 2 (Shaab El Erg 2)	Hurghada	1	Quads	4	10	96-10-02	SJ,MS,ES		1	
El Erg 3	Hurghada	1	Quads	4	10	96-10-09	SJ,MS,ES		1	
El Eruk	Hurghada	1	Quads	4	9	96-09-30	SJ,MS,ES		1	
El Maalka (El Mealeka)	Hurghada	1	Quads	4	6	96-10-07	SJ,MS,ES		1	
Erg Dynamite - Wadi El Gamal	South							1		
Erg Ghadeira	South							1		
Erg Ghadir Douani	South							1		
Erg Guei	Safaga							1		
Erg Lassal (Monica)	Quseir							1		
Erg (Eruk) Magawish	Hurghada	1	Quads	4	8	96-09-20	SJ,MS,ES		1	
Erg Marsa Alam	South							1		
Erg Sabina	Hurghada	1	Quads	4	9	96-10-05	SJ,MS,ES		1	8
Eshta (Shaab Eshta)	Hurghada	1	Quads	4	8	96-09-20	SJ,MS,ES		1	8
Fanadir	Hurghada	1	Quads	4	10	96-10-04	SJ,MS,ES		1	

ANNEX 7A-1 SUMMARY INDEX OF RED SEA CORAL REEF SURVEYS (1996-1998)

		1996 Survey Details							1998 Details	
Site Name	Area	1996 Survey	Method of Survey	Depth (m)	# of Reps	Date of Last Survey	Last Surveyors	1997 Survey	1998 Survey	# of Quads Sampled
Fanous (E) (El Fanous)	Hurghada	1							1	8
Fanous W (Torfa Fanous W)	Hurghada	1	Trans	4,8	5	96-10-11	SJ,MS,ES		1	8
Gamul Kebir (Other Name?)	Safaga	1							1	8
Gamul Sagir	Safaga	1	Quads	4	9	96-11-01	SJ,MS,ES		1	8
Ghadir - Umm Halhalla	South							1		
Giftun Canal	Hurghada	1	Trans	4,8 m	5	96-10-15	SJ,MS,ES			
Giftun Seghir, South East	Hurghada							1	1	
Giftun Seghir, East Wall	Hurghada	1					MCS			
Gota Abu Nuhas (Yellowfish Reef)	Hurghada								1	
Gota Abu Ramada (East)	Hurghada	1					MCS	1	1	
Gota Abu Ramada (North)	Hurghada	1					MCS	1		
Gota Abu Ramada (South)	Hurghada	1						1		
Gota Abu Ramada (West)	Hurghada	1	Trans	4,8 m	5	96-09-12	SJ,MS,ES			
Gota Marsa Alam	South							1		
Gota T(D)orfa E	Hurghada	1	Quads	4	5	96-10-08	SJ,MS,ES		1	8
Gota T(D)orfa SW	Hurghada	1	Quads	4	7	96-10-08	SJ,MS,ES		1	
Gubal Seghir (Bluff Point)	Hurghada								1	
Habili - (See Samadai?)	South							1		
Maheleg								1		
Mangrove Bay	Quseir							1		
Marsa Galeb	South							1		
Middle Reef (Umm Hel)	Safaga	1	Quads	4	8	96-11-09	SJ,MS,ES		1	
Movenpick North	Quseir							1		
Neckane	South							1		
Panorama (East)	Safaga	1	Quads	4	7	96-11-08	SJ,MS,ES		1	8
Panorama (West)	Safaga	1							1	8
Panorama Reef	Safaga							1		
Quseir Movenpick South	Quseir							1		
Ranga	South							1		
Ras Abu Soma	Safaga	1	Trans	4	5	96-11-05	SJ,MS,ES			
Ras Hankorab (See Shaab Torfa)	South									
Ras Torombi	Quseir							1		

ANNEX 7A-1 SUMMARY INDEX OF RED SEA CORAL REEF SURVEYS (1996-1998)

		1996 Survey Details							1998 Details	
Site Name	Area	1996 Survey	Method of Survey	Depth (m)	# of Reps	Date of Last Survey	Last Surveyors	1997 Survey	1998 Survey	# of Quads Sampled
Ras Um Hesswa (R U Hesewah)	Safaga	1	Quads	4	10	96-11-14	SJ,MS,ES		1	
Samadai (Habili)	South							1		
Senb Kebir								1		
Senb Sorya								1		
Shaab Abdallah	Safaga	1	Quads	4	8	96-11-04	SJ,MS,ES		1	
Shaab Disha 2	Hurghada	1	Quads	4	5	96-10-07	SJ,MS,ES		1	
Shaab Disha 3	Hurghada	1							1	
Shaab Mahsur	South							1		
Shaab Rur Abu Nuhas	Hurghada								1	
Shaab Rur Siyul (Blind Reef)	Hurghada								1	
Shaab Sabina	Hurghada	1							1	8
Shaab Sattaia	South							1		
Shaab Sharm	South							1		
Shaab Sheer	Safaga	1						1	1	
Shaab Tawila	Hurghada								1	
Shaab Torfa (Ras Hankorab)	Hurghada	1						1	1	8
Shaab Umm Usk	Hurghada								1	
Shabrour Abu Dahab	South							1		
Shabrour Umm Gamar	Hurghada	1							1	8
Shabrour Wadi El Gemal	South							1		
Shahr Salem	Safaga	1							1	
Sharm El Arab	Safaga	1						1	1	
Sharm El Naga	Safaga	1						1	1	
Sharm Tahtani	South							1		
Shuna										
Siyul Kebir	Hurghada								1	
Small Giftun	Hurghada	1								
Somaya	Hurghada	1							1	
Soug Bahar 2/Marsa Amin								1		
Stone Beach (Umm Doma)	Hurghada	1							1	
Tobya Arba	Safaga	1							1	8
Tobya Bada S	Safaga	1							1	

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ANNEX 7A-1 SUMMARY INDEX OF RED SEA CORAL REEF SURVEYS (1996-1998)

		1996 Survey Details							1998 Details	
Site Name	Area	1996 Survey	Method of Survey	Depth (m)	# of Reps	Date of Last Survey	Last Surveyors	1997 Survey	1998 Survey	# of Quads Sampled
Fanous (E) (El Fanous)	Hurghada	1							1	8
Fanous W (Torfa Fanous W)	Hurghada	1	Trans	4,8	5	96-10-11	SJ,MS,ES		1	8
Gamul Kebir (Other Name?)	Safaga	1							1	8
Gamul Sagir	Safaga	1	Quads	4	9	96-11-01	SJ,MS,ES		1	8
Ghadir - Umm Halhalla	South							1		
Giftun Canal	Hurghada	1	Trans	4,8 m	5	96-10-15	SJ,MS,ES			
Giftun Seghir, South East	Hurghada							1	1	
Giftun Seghir, East Wall	Hurghada	1					MCS			
Gota Abu Nuhas (Yellowfish Reef)	Hurghada								1	
Gota Abu Ramada (East)	Hurghada	1					MCS	1	1	
Gota Abu Ramada (North)	Hurghada	1					MCS	1		
Gota Abu Ramada (South)	Hurghada	1						1		
Gota Abu Ramada (West)	Hurghada	1	Trans	4,8 m	5	96-09-12	SJ,MS,ES			
Gota Marsa Alam	South							1		
Gota T(D)orfa E	Hurghada	1	Quads	4	5	96-10-08	SJ,MS,ES		1	8
Gota T(D)orfa SW	Hurghada	1	Quads	4	7	96-10-08	SJ,MS,ES		1	
Gubal Seghir (Bluff Point)	Hurghada								1	
Habili - (See Samadai?)	South							1		
Maheleg								1		
Mangrove Bay	Quseir							1		
Marsa Galeb	South							1		
Middle Reef (Umm Hel)	Safaga	1	Quads	4	8	96-11-09	SJ,MS,ES		1	
Movenpick North	Quseir							1		
Neckane	South							1		
Panorama (East)	Safaga	1	Quads	4	7	96-11-08	SJ,MS,ES		1	8
Panorama (West)	Safaga	1							1	8
Panorama Reef	Safaga							1		
Quseir Movenpick South	Quseir							1		
Ranga	South							1		
Ras Abu Soma	Safaga	1	Trans	4	5	96-11-05	SJ,MS,ES			
Ras Hankorab (See Shaab Torfa)	South									
Ras Torombi	Quseir							1		

ANNEX 7A-1 SUMMARY INDEX OF RED SEA CORAL REEF SURVEYS (1996-1998)

		1996 Survey Details							1998 Details	
Site Name	Area	1996 Survey	Method of Survey	Depth (m)	# of Reps	Date of Last Survey	Last Surveyors	1997 Survey	1998 Survey	# of Quads Sampled
Ras Um Hesswa (R U Hesewah)	Safaga	1	Quads	4	10	96-11-14	SJ,MS,ES		1	
Samadai (Habili)	South							1		
Senb Kebir								1		
Senb Sorya								1		
Shaab Abdallah	Safaga	1	Quads	4	8	96-11-04	SJ,MS,ES		1	
Shaab Disha 2	Hurghada	1	Quads	4	5	96-10-07	SJ,MS,ES		1	
Shaab Disha 3	Hurghada	1							1	
Shaab Mahsur	South							1		
Shaab Rur Abu Nuhas	Hurghada								1	
Shaab Rur Siyul (Blind Reef)	Hurghada								1	
Shaab Sabina	Hurghada	1							1	8
Shaab Sattaia	South							1		
Shaab Sharm	South							1		
Shaab Sheer	Safaga	1						1	1	
Shaab Tawila	Hurghada								1	
Shaab Torfa (Ras Hankorab)	Hurghada	1						1	1	8
Shaab Umm Usk	Hurghada								1	
Shabrour Abu Dahab	South							1		
Shabrour Umm Gamar	Hurghada	1							1	8
Shabrour Wadi El Gemal	South							1		
Shahr Salem	Safaga	1							1	
Sharm El Arab	Safaga	1						1	1	
Sharm El Naga	Safaga	1						1	1	
Sharm Tahtani	South							1		
Shuna										
Siyul Kebir	Hurghada								1	
Small Giftun	Hurghada	1								
Somaya	Hurghada	1							1	
Soug Bahar 2/Marsa Amin								1		
Stone Beach (Umm Doma)	Hurghada	1							1	
Tobya Arba	Safaga	1							1	8
Tobya Bada S	Safaga	1							1	

ANNEX 7A-1 SUMMARY INDEX OF RED SEA CORAL REEF SURVEYS (1996-1998)

		1996 Survey Details							1998 Details	
Site Name	Area	1996 Survey	Method of Survey	Depth (m)	# of Reps	Date of Last Survey	Last Surveyors	1997 Survey	1998 Survey	# of Quads Sampled
Tobya Hamra	Safaga	1							1	8
Tobya Kabir	Safaga	1							1	8
Tobya Sorya (Tobia Saguir)	Safaga	1							1	8
Torfa El Gaz	Hurghada	1					MCS	1	1	
Torfa Lassall	Quseir							1		
Umm Gamar (W)	Hurghada	1							1	7
Umm Rus (Marsa Embark)	South							1		
Wizr	South							1		
Total Number of Sites		**57**						**46**	**57**	
BOLD "1"= EST or PMG CRI Site		Non-Bold MCS, GEF, EEAA/Sinai Sites or ReefCheck Sites,								
Information Not Complete, Reference to Original Reports Could Add Information										

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ANNEX 7A-2 LOCATIONS OF EST and PMG MONITORING SITES (1996-1998)

Site Name	Area	N Deg	N Dec Min	N Dec Deg	E Deg	E Dec Min	E DecDeg
Abu Dahab 1 - Naba	South	25	18 81	25 314	34	46 12	34 769
Abu Dahab 2	South	25	20.82	25 347	34	46 57	34 776
Abu Dahab 5	South	25	19.52	25 325	34	47 92	34 799
Abu Galawa Kebir	South	24	13 66	24 228	35	34 44	35 574
Abu Galawa Saghir (2)	South	24	15.20	24 253	35	32 41	35 540
Abu Hamra (Elphinstone)	South	25	18.41	25 307	34	51.68	34 861
Abu Hashish Island	Safaga	27	0.62	27 010	33	54.60	33 910
Abu Hashish W	Hurghada	27	0.62	27 010	33	54 60	33 910
Abu Kifan (E?)	Safaga	26	0.18	26 003	34	6 52	34 109
Abu Kifan W	Safaga	26	39.18	26 653	34	6 52	34 109
Abu Makhadeg	Safaga	26	59.82	26 997	33	45 56	33 759
Abu Nuger	Hurghada	27	28.74	27 479	33	50 36	33 839
Abu Ramada North East	Hurghada						
Abu Ramada South East	Hurghada	27	9.96	27 166	33	58 90	33 982
Abu Ramada South West	Hurghada	27	9.52	27 159	33	58 71	33 978
Big Giftun	Hurghada	27	11 06	27 184	33	57.84	33 964
Carless Reef	Hurghada	27	19.97	27 333	33	55.03	33 917
El Arg 1 (Shaab El Erg 1)	Hurghada						
El Arg 2 (Shaab El Erg 2)	Hurghada	27	18.67	27 311	33	56 42	33 940
El Erg 3	Hurghada	27	23.79	27 396	33	52 78	33 880
El Eruk	Hurghada	27	10.06	27 168	33	57.03	33 951
El Maalka (El Mealeka)	Hurghada	27	3.55	27 059	33	54 08	33 901
Erg Dynamite - Wadi El Gamal	South	24	38.37	24 640	35	10 88	35 181
Erg Ghadeira	South	24	50.03	24 834	35	4 33	35 072
Erg Ghadir Douani	South	24	50.30	24 838	35	1 94	35 032
Erg Guei	Safaga	26	22.65	26 378	34	10 60	34 177
Erg Lassal (Monica)	Quseir	25	57.76	25 963	34	24.38	34 406
Erg (Eruk)Magawish	Hurghada	27	8.99	27 150	33	53 64	33 894
Erg Marsa Alam	South						
Erg Sabina	Hurghada	27	12.66	27 211	33	57.28	33 955
Eshta (Shaab Eshta)	Hurghada	27	8.99	27 150	33	53.64	33 894
Fanadir	Hurghada	27	17.71	27 295	33	49 87	33 831
Fanous (E) (El Fanous)	Hurghada						
Fanous W (Torfa Fanous W)	Hurghada	27	16.07	27 268	33	53 23	33 887
Gamul Kebir (Other Name?)	Safaga						
Gamul Sagir	Safaga	26	47.11	26 785	33	59 26	33 988

ANNEX 7A-1 SUMMARY INDEX OF RED SEA CORAL REEF SURVEYS (1996-1998)

		1996 Survey Details							1998 Details	
Site Name	Area	1996 Survey	Method of Survey	Depth (m)	# of Reps	Date of Last Survey	Last Surveyors	1997 Survey	1998 Survey	# of Quads Sampled
Tobya Hamra	Safaga	1							1	8
Tobya Kabir	Safaga	1							1	8
Tobya Sorya (Tobia Saguir)	Safaga	1							1	8
Torfa El Gaz	Hurghada	1					MCS	1	1	
Torfa Lassall	Quseir							1		
Umm Gamar (W)	Hurghada	1							1	7
Umm Rus (Marsa Embark)	South							1		
Wizr	South							1		
Total Number of Sites		**57**						**46**	**57**	
BOLD "1 '= EST or PMG CRI Site		Non-Bold MCS, GEF, EEAA/Sinai Sites or ReefCheck Sites,								
Information Not Complete, Reference to Original Reports Could Add Information										

ANNEX 7A-2 LOCATIONS OF EST and PMG MONITORING SITES (1996-1998)

Site Name	Area	N Deg	N Dec Min	N Dec Deg	E Deg	E Dec Min	E DecDeg
Abu Dahab 1 - Naba	South	25	18.81	25 314	34	46 12	34 769
Abu Dahab 2	South	25	20.82	25 347	34	46 57	34 776
Abu Dahab 5	South	25	19.52	25 325	34	47.92	34 799
Abu Galawa Kebir	South	24	13.66	24 228	35	34 44	35 574
Abu Galawa Saghir (2)	South	24	15.20	24 253	35	32 41	35 540
Abu Hamra (Elphinstone)	South	25	18.41	25 307	34	51.68	34 861
Abu Hashish Island	Safaga	27	0.62	27 010	33	54.60	33 910
Abu Hashish W	Hurghada	27	0.62	27 010	33	54 60	33 910
Abu Kifan (E?)	Safaga	26	0.18	26 003	34	6 52	34 109
Abu Kifan W	Safaga	26	39.18	26 653	34	6 52	34 109
Abu Makhadeg	Safaga	26	59.82	26 997	33	45 56	33 759
Abu Nuger	Hurghada	27	28.74	27 479	33	50 36	33 839
Abu Ramada North East	Hurghada						
Abu Ramada South East	Hurghada	27	9.96	27 166	33	58 90	33 982
Abu Ramada South West	Hurghada	27	9.52	27 159	33	58 71	33 978
Big Giftun	Hurghada	27	11 06	27 184	33	57.84	33 964
Carless Reef	Hurghada	27	19.97	27 333	33	55 03	33 917
El Arg 1 (Shaab El Erg 1)	Hurghada						
El Arg 2 (Shaab El Erg 2)	Hurghada	27	18 67	27 311	33	56 42	33 940
El Erg 3	Hurghada	27	23.79	27 396	33	52 78	33 880
El Eruk	Hurghada	27	10.06	27 168	33	57.03	33 951
El Maalka (El Mealeka)	Hurghada	27	3.55	27 059	33	54 08	33 901
Erg Dynamite - Wadi El Gamal	South	24	38.37	24 640	35	10 88	35 181
Erg Ghadeira	South	24	50.03	24 834	35	4 33	35 072
Erg Ghadir Douani	South	24	50.30	24 838	35	1.94	35 032
Erg Guei	Safaga	26	22.65	26 378	34	10 60	34 177
Erg Lassal (Monica)	Quseir	25	57 76	25 963	34	24 38	34 406
Erg (Eruk)Magawish	Hurghada	27	8.99	27 150	33	53 64	33 894
Erg Marsa Alam	South						
Erg Sabina	Hurghada	27	12.66	27 211	33	57.28	33 955
Eshta (Shaab Eshta)	Hurghada	27	8.99	27 150	33	53.64	33 894
Fanadir	Hurghada	27	17.71	27 295	33	49 87	33 831
Fanous (E) (El Fanous)	Hurghada						
Fanous W (Torfa Fanous W)	Hurghada	27	16.07	27 268	33	53 23	33 887
Gamul Kebir (Other Name?)	Safaga						
Gamul Sagir	Safaga	26	47.11	26 785	33	59 26	33 988

ANNEX 7A-2 LOCATIONS OF EST and PMG MONITORING SITES (1996-1998)

Site Name	Area	N Deg	N Dec Min	N Dec Deg	E Deg	E Dec Min	E DecDeg
Ghadir - Umm Halhalla	South	24	51.77	24 863	35	3.77	35 063
Giftun Canal	Hurghada						
Giftun Seghir, East Wall	Hurghada						
Giftun Seghir, South East	Hurghada						
Gota Abu Nuhas (Yellowfish Reef)	Hurghada						
Gota Abu Ramada, East	Hurghada						
Gota Abu Ramada, North	Hurghada						
Gota Abu Ramada, South	Hurghada						
Gota Abu Ramada, West	Hurghada						
Gota Marsa Alam	South						
Gota T(D)orfa E	Hurghada	27	13.43	27 224	33	57.09	33 952
Gota T(D)orfa SW	Hurghada	27	13.43	27 224	33	57.09	33 952
Gubal Seghir (Bluff Point)	Hurghada						
Habili - (See Samadai?)	South	24	58 84	24 981	35	0.08	35 001
Maheleg							
Mangrove Bay	Quseir						
Marsa Galeb	South	25	31.95	25 533	34	38.56	34 643
Middle Reef (Umm Hel)	Safaga	26	42.28	26 705	34	6.03	34 100
Movenpick North	Quseir						
Neckarie	South	24	56.74	24 946	35	59.05	35 984
Panorama (East)	Safaga	26	44.93	26 749	34	5 08	34 085
Panorama (West)	Safaga						
Panorama Reef	Safaga	26	24.04	26 401	34	4 88	34 081
Quseir Movenpick South	Quseir						
Ranga	South	24	24.78	24 413	35	15.45	35 258
Ras Abu Soma	Safaga	26	50.29	26 838	33	59 80	33 997
Ras Hankorab (See Shaab Torfa)	South	24	33 60	24 560	35	10.19	35 170
Ras Torombi	Quseir	25	39.69	25 662	34	35 24	34 587
Ras Um Hesswa (Ras Umm Hesewah)	Safaga						
Samadai (Habili)	South	24	59 04	24 984	35	0 19	35 003
Serib Kebir							
Serib Sorya							
Shaab Abdallah	Safaga	26	38.60	26 643	34	2 88	34 048
Shaab Disha 2	Hurghada	27	2 97	27 050	33	54 30	33 905

ANNEX 7A-2 LOCATIONS OF EST and PMG MONITORING SITES (1996-1998)

Site Name	Area	N. Deg	N. Dec Min	N Dec Deg	E. Deg	E. Dec Min	E DecDeg
Shaab Disha 3	Hurghada	27	2.48	27 041	33	54.36	33 906
Shaab Mahsur	South	24	14.48	24 241	35	39.10	35 652
Shaab Rur Abu Nuhas	Hurghada						
Shaab Rur Siyul (Blind Reef)	Hurghada						
Shaab Sabina	Hurghada	27	18.67	27 311	33	56 42	33 940
Shaab Sattala	South	24	9.58	24 160	35	42.99	35 717
Shaab Sharm	South	24	47.34	24 789	35	90.82	36 514
Shaab Sheer	Safaga	26	39.58	26 660	34	3.41	34 057
Shaab Tawila	Hurghada						
Shaab Torfa (Ras Hankorab)	Hurghada	24	33.60	24 560	35	10.19	35 170
Shaab Umm Usk	Hurghada						
Shabrour Abu Dahab	South	25	20.42	25 340	34	47.66	34 794
Shabrour Umm Gamar	Hurghada	27	19.97	27 333	33	55 03	33 917
Shabrour Wadi El Gemal	South	24	39 22	24 654	35	7.98	35 133
Shahr Salem	Safaga	26	38 54	26 642	34	3 75	34 062
Sharm El Arab	Safaga	26	58 04	26 967	33	55 32	33 922
Sharm El Naga	Safaga	26	53.89	26 898	33	57.79	33 963
Sharm Tahtani	South	25	50.63	25 844	34	26 39	34 440
Shuna							
Siyul Kebir	Hurghada						
Small Giftun	Hurghada						
Somaya	Hurghada	27	11.59	27 193	33	58 92	33 982
Soug Bahar 2/Marsa Amin							
Stone Beach (Umm Doma)	Hurghada						
Tobya Arba	Safaga	26	50.17	26 836	33	59.50	33 992
Tobya Bada S	Safaga	26	48.91	26 815	33	58.78	33 980
Tobya Hamra	Safaga	26	49.82	26 830	33	59.16	33 986
Tobya Kabir	Safaga	26	48.53	26 809	33	59 77	33 996
Tobya Sorya (Tobia Saguir)	Safaga	26	48.21	26 803	33	59 64	33 994
Torfa El Gaz	Hurghada						
Torfa Lassall	Quseir						
Umm Gamar (W)	Hurghada	27	21 22	27 354	33	54 92	33 915
Umm Rus (Marsa Embark)	South	25	30 80	25 513	34	39 22	34 654
Wizr	South						

Information Taken from EST Final Reports and PMG Field Program

ANNEX 7A-2 LOCATIONS OF EST and PMG MONITORING SITES (1996-1998)

Site Name	Area	N. Deg	N. Dec Min	N Dec Deg	E. Deg	E. Dec Min	E DecDeg
Ghadir - Umm Halhalla	South	24	51.77	24 863	35	3.77	35 063
Giftun Canal	Hurghada						
Giftun Seghir, East Wall	Hurghada						
Giftun Seghir, South East	Hurghada						
Gota Abu Nuhas (Yellowfish Reef)	Hurghada						
Gota Abu Ramada, East	Hurghada						
Gota Abu Ramada, North	Hurghada						
Gota Abu Ramada, South	Hurghada						
Gota Abu Ramada, West	Hurghada						
Gota Marsa Alam	South						
Gota T(D)orfa E	Hurghada	27	13.43	27 224	33	57.09	33 952
Gota T(D)orfa SW	Hurghada	27	13.43	27 224	33	57 09	33 952
Gubal Seghir (Bluff Point)	Hurghada						
Habili - (See Samadai?)	South	24	58 84	24 981	35	0.08	35 001
Maheleg							
Mangrove Bay	Quseir						
Marsa Galeb	South	25	31.95	25 533	34	38.56	34 643
Middle Reef (Umm Hel)	Safaga	26	42.28	26 705	34	6.03	34 100
Movenpick North	Quseir						
Neckarie	South	24	56.74	24 946	35	59.05	35 984
Panorama (East)	Safaga	26	44.93	26 749	34	5 08	34 085
Panorama (West)	Safaga						
Panorama Reef	Safaga	26	24 04	26 401	34	4 88	34 081
Quseir Movenpick South	Quseir						
Ranga	South	24	24.78	24 413	35	15.45	35 258
Ras Abu Soma	Safaga	26	50.29	26 838	33	59.80	33 997
Ras Hankorab (See Shaab Torfa)	South	24	33.60	24 560	35	10.19	35 170
Ras Torombi	Quseir	25	39.69	25 662	34	35 24	34 587
Ras Um Hesswa (Ras Umm Hesewah)	Safaga						
Samadai (Habili)	South	24	59 04	24 984	35	0 19	35 003
Senb Kebir							
Senb Sorya							
Shaab Abdallah	Safaga	26	38.60	26 643	34	2 88	34 048
Shaab Disha 2	Hurghada	27	2 97	27 050	33	54 30	33 905

ANNEX 7A-2 LOCATIONS OF EST and PMG MONITORING SITES (1996-1998)

Site Name	Area	N. Deg	N. Dec Min	N Dec Deg	E. Deg	E. Dec Min	E DecDeg
Shaab Disha 3	Hurghada	27	2.48	27 041	33	54.36	33 906
Shaab Mahsur	South	24	14.48	24 241	35	39.10	35 652
Shaab Rur Abu Nuhas	Hurghada						
Shaab Rur Siyul (Blind Reef)	Hurghada						
Shaab Sabina	Hurghada	27	18.67	27 311	33	56 42	33 940
Shaab Sattala	South	24	9.58	24 160	35	42.99	35 717
Shaab Sharm	South	24	47.34	24 789	35	90.82	36 514
Shaab Sheer	Safaga	26	39.58	26 660	34	3.41	34 057
Shaab Tawila	Hurghada						
Shaab Torfa (Ras Hankorab)	Hurghada	24	33.60	24 560	35	10.19	35 170
Shaab Umm Usk	Hurghada						
Shabrour Abu Dahab	South	25	20.42	25 340	34	47.66	34 794
Shabrour Umm Gamar	Hurghada	27	19.97	27 333	33	55 03	33 917
Shabrour Wadi El Gemal	South	24	39 22	24 654	35	7.98	35 133
Shahr Salem	Safaga	26	38 54	26 642	34	3 75	34 062
Sharm El Arab	Safaga	26	58.04	26 967	33	55 32	33 922
Sharm El Naga	Safaga	26	53.89	26 898	33	57.79	33 963
Sharm Tahtani	South	25	50.63	25 844	34	26.39	34 440
Shuna							
Siyul Kebir	Hurghada						
Small Giftun	Hurghada						
Somaya	Hurghada	27	11.59	27 193	33	58.92	33 982
Soug Bahar 2/Marsa Arnin							
Stone Beach (Umm Doma)	Hurghada						
Tobya Arba	Safaga	26	50.17	26 836	33	59.50	33 992
Tobya Bada S	Safaga	26	48.91	26 815	33	58.78	33 980
Tobya Hamra	Safaga	26	49.82	26 830	33	59.16	33 986
Tobya Kabir	Safaga	26	48.53	26 809	33	59.77	33 996
Tobya Sorya (Tobia Saguir)	Safaga	26	48.21	26 803	33	59 64	33 994
Torfa El Gaz	Hurghada						
Torfa Lassall	Quseir						
Umm Gamar (W)	Hurghada	27	21 22	27 354	33	54 92	33 915
Umm Rus (Marsa Embark)	South	25	30 80	25 513	34	39 22	34 654
Wizr	South						

Information Taken from EST Final Reports and PMG Field Program

ANNEX 7A-3 INDEX OF RECENT MONITORING SITES AND METHODS FOR HURGHADA REEFS

	EST TOPOGRAPHY							1996 SURVEY											1997 MCS SURVEY									1998 SURVEYS						
	Diva Frequency (1)		Steep Slopes	Large Patch Reefs	Small Patch Reefs	Coral Gardens	Fringing Reef	Line Transects 3m 10m (English 94)	Line Transects 3m 10m (Reefck II)	Invertebrate (Reefck II)	Fish Survey 3m 10m (1996)	Fish Survey 3m 10m (RfCk II TMRU97)	Photodocumentation	# of Line Transects @ 4m 8m (English IUCN)	# of %Cover-Quadrants @ 4m (CRI EST 96)	# of Line Transects @ 4m 3m (English IUCN)	# of Line Transects @ 3m 10m 15m (Reefck II)	Invertebrate (Reefck II)	Fish Survey 3m 10m (1996)	# of Fish Survey @ 3m 10m 15m (RfCk II TMRU97)	Photodocumentation	/ Cover-Quadrants 4m (CRI EST 97)	Line Transects 3m 10m (English 94)	Line Transects 3m 10m (Reefck II)	Invertebrate (Reefck II)	Fish Survey 3m 10m (1996)	Fish Survey 3m 10m (RfCk II TMRU97)	Fish Survey 10 Min Count (1998)	Photodocumentation	% Cover-Quadrants 4m (CRI EST 97)	Crown-of Thorns Starfish Herds and Monitoring			
HURGHADA SITES																																			
Abu Nugar	R		X	X																								G	G						
Abu Ramada North East	R	X						MCS			MCS														MCS			MCS	MCS	G					
Abu Ramada South	R														8										MCS			MCS	MCS	G					
Abu Ramada West	R														7															PMG	8				
Carless	R		X												6															PMG	8	Yes			
El Erg 1 (Shaab El Erg)	R H		X	X																									4,3 1						
Erg Sabina	R			X				MCS			MCS				9		5 5	Y		1 1					MCS	Y		MCS	MCS	G PMG	8				
Eshta (Shaab Eshta)															8															PMG	8				
Fanadir (Moriha Erouk Fanadir)	N			X				MCS			MCS						2,2	Y		1 1	2				MCS	Y		MCS	MCS	MCS					
Fanous East (1) (El Fanous)	H				X			MCS			MCS			5 5	9		1 1 1	Y		1 1 1					MCS	N		MCS	MCS	G PMG	8				
Fanous West (2) (Torfa el Fanous)	H														8															PMG	8				
Giftun Canal														5 5																					
Giftun Seghir East Wall		X						MCS			MCS																								
Giftun Seghir EST															8																				
Giftun Seghir South East	H					X											4 4	Y		2,2					MCS	Y		MCS	1 MCS	G					
Gota Abu Nuhas (Yellowfish Reef)	L			X																								1 1	1 1	G					
Gota Abu Ramada East	H		X					MCS			MCS						2,2	Y		1 1	5				MCS	Y		MCS	MCS	MCS					
Gota Abu Ramada North	R		X					MCS			MCS			1 1			2,2	Y		1 1					MCS	Y		MCS	MCS	G					
Gota Abu Ramada South														3 3																					
Gota Abu Ramada West														1 1																					

ANNEX 7A-3 INDEX OF RECENT MONITORING SITES AND METHODS FOR HURGHADA REEFS

	EST - TOPOGRAPHY						1996 SURVEY												1997 MCS SURVEY												1998 SURVEYS					
	Dive Frequency (*1)	Steep Slopes	Large Patch Reefs	Small Patch Reefs	Coral Gardens	Fringing Reef	Line Transects 3m 10m (English 94)	Line Transects 3m 10m (Reefck II)	Invertebrate (ReefCk II)	Fish Survey 3m 10m (1996)	Fish Survey 3m 10m (RfCk II TMRU97)	Photodocumentation	# of Line Transects @ 4m 8m (English IUCN)	# of %Cover-Quadrants @ 4m (CRI EST 96)	# of Line Transects @ 4m 8m (English IUCN)	Invertebrate (ReefCk II)	Fish Survey 3m 10m (1996)	# of Fish Survey @ 3m 10m 15m (RfCk II TMRU97)	Photodocumentation	/ Cover-Quadrants 4m (CRI EST 97)	Line Transects 3m 10m (English 94)	Line Transects 3m 10m (Reefck II)	Invertebrate (ReefCk II)	Fish Survey 3m 10m (1996)	Fish Survey 3m 10m (RfCk II TMRU97)	Fish Survey 10 Min Count (1998)	Photodocumentation	% Cover-Quadrants 4m (CRI EST 97)	Crown-of Thorns Starfish Herds and Monitoring					
Gota Torfa East													5													PMG	8							
Gubal Seghir (Bluff Point)	R				X																				2										
Shaab Rur Abu Nuhas	R		X	X	X																				44										
Shaab Rur Siyul (Blind Reef)	L			X																				11	11										
Shaab Sabina	H				X		MCS			MCS			9		2,2	Y		11			MCS	Y		MCS	MCS	G PMG	8							
Shaab Tawila	L			X																					7										
Shaab Umm Usk	R		X	X																					11										
Shabrour Umm Gamar													9													PMG	8	Yes							
Siyul Kebira	R				X																			11	211										
Small Giftun												55																							
Torfa El Gaz (Turtle Bay)	L			X			MCS			MCS					2,2	Y		11			MCS	Y		MCS	MCS	G									
Umm Gamar West													8													PMG	8								

(*1) KEY N=Not Dived L=Lightly Visited Low Frequency R= Regularly Visited H=High Frequency From EST Report 1997

MCS = Surveyed by Marine Conservation Society UK (Report on file) 1999 Surveys not yet in final report form but did occur

= Number of quadrants or transacts surveyed at each depth at the site by the EST/PMG/EEAA Team

G =

ReefCheck Data is available on line and report is on file with EEAA.

(This list is based upon best available information from reports, and can be improved and expanded)

ANNEX 7A-3 INDEX OF RECENT MONITORING SITES AND METHODS FOR HURGHADA REEFS

	EST - TOPOGRAPHY							1996 SURVEY												1997 MCS SURVEY									1998 SURVEYS					
	Dive Frequency (*1)		Steep Slopes	Large Patch Reefs	Small Patch Reefs	Coral Gardens	Fringing Reef	Line Transects 3m 10m (English 94)	Line Transects 3m 10m (Reefck II)	Invertebrate (ReefCk II)	Fish Survey 3m 10m (1996)	Fish Survey 3m 10m (RfCk II TMRU97)	Photodocumentation	# of Line Transects @ 4m 8m (English IUCN)	# of / Cover-Quadrants @ 4m (CRI EST 96)	# of Line Transects @ 4m 8m (English IUCN)	# of Line Transects @ 3m 10m 15m (Reefck II)	Invertebrate (ReefCk II)	Fish Survey 3m 10m (1996)	# of Fish Survey @ 3m 10m 15m (RfCk II TMRU97)	Photodocumentation	/ Cover-Quadrants 4m (CRI EST 97)	Line Transects 3m 10m (English 94)	Line Transects 3m 10m (Reefck II)	Invertebrate (ReefCk II)	Fish Survey 3m 10m (1996)	Fish Survey 3m 10m (RfCk II TMRU97)	Fish Survey 10 Min Count (1998)	Photodocumentation	% Cover-Quadrants 4m (CRI EST 97)	Crown-of Thorns Starfish Herds and Monitoring			
HURGHADA SITES																																		
Abu Nugar	R		X	X																								G	G					
Abu Ramada North East	R	X						MCS			MCS												MCS			MCS	MCS	G					
Abu Ramada South	R													8									MCS			MCS	MCS	G					
Abu Ramada West	R													7														PMG	8				
Carless	R		X											6														PMG	8	Yes			
El Erg 1 (Shaab El Erg)	R H		X	X																							4,3 1						
Erg Sabina	R			X				MCS			MCS			9		5 5	Y		1 1				MCS	Y		MCS	MCS	G PMG	8				
Eshta (Shaab Eshta)														8														PMG	8				
Fanadir (Moriha Erouk Fanadir)	N			X				MCS			MCS					2,2	Y		1 1	2			MCS	Y		MCS	MCS	MCS					
Fanous East (1) (El Fanous)	H				X			MCS			MCS		5 5	9		1 1 1	Y		1 1 1				MCS	N		MCS	MCS	G PMG	8				
Fanous West (2) (Torfa el Fanous)	H													8														PMG	8				
Giftun Canal													5 5																					
Giftun Seghir East Wall		X						MCS			MCS																							
Giftun Seghir EST														8																				
Giftun Seghir South East	H					X										4 4	Y		2,2				MCS	Y		MCS	1 MCS	G					
Gota Abu Nuhas (Yellowfish Reef)	L			X																						1 1	1 1	G					
Gota Abu Ramada East	H		X					MCS			MCS					2 2	Y		1 1	5			MCS	Y		MCS	MCS	MCS					
Gota Abu Ramada North	R		X					MCS			MCS		1 1			2,2	Y		1 1				MCS	Y		MCS	MCS	G					
Gota Abu Ramada South													3 3																					
Gota Abu Ramada West													1 1																					

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ANNEX 7A-3 INDEX OF RECENT MONITORING SITES AND METHODS FOR HURGHADA REEFS

	EST - TOPOGRAPHY							1996 SURVEY											1997 MCS SURVEY										1998 SURVEYS					
	Dive Frequency (*1)	Steep Slopes	Large Patch Reefs	Small Patch Reefs	Coral Gardens	Fringing Reef	Line Transects 3m 10m (English 94)	Line Transects 3m 10m (Reefck II)	Invertebrate (ReefCk II)	Fish Survey 3m 10m (1996)	Fish Survey 3m 10m (RfCk II TMRU97)	Photodocumentation	# of Line Transects @ 4m 8m (English IUCN)	# of %Cover-Quadrants @ 4m (CRI EST 96)	# of Line Transects @ 4m 8m (English IUCN)	Invertebrate (ReefCk II)	Fish Survey 3m 10m 15m (Reefck II)	# of Fish Survey @ 3m 10m (1996)	Photodocumentation	%Cover-Quadrants 4m (CRI EST 97)	Line Transects, 3m 10m (English 94)	Line Transects 3m 10m (Reefck II)	Invertebrate (ReefCk II)	Fish Survey 3m 10m (1996)	Fish Survey 3m 10m (RfCk II TMRU97)	Fish Survey 10 Min Count (1998)	Photodocumentation	%Cover-Quadrants 4m (CRI EST 97)	Crown-of Thorns Starfish Herds and Monitoring				
Gota Torfa East													5													PMG	8						
Gubal Seghir (Bluff Point)	R				X																				2								
Shaab Rur Abu Nuhas	R		X	X	X																				4 4								
Shaab Rur Siyul (Blind Reef)	L			X																				1 1	1 1								
Shaab Sabina	H				X		MCS			MCS			9		2,2	Y		1 1			MCS	Y		MCS	MCS	G PMG	8					
Shaab Tawila	L			X																					7								
Shaab Umm Usk	R		X	X																					1 1								
Shabrour Umm Gamar													9													PMG	8	Yes					
Siyul Kebira	R				X																			1 1	2 1 1								
Small Giftun												5,5																					
Torfa El Gaz (Turtle Bay)	L			X			MCS			MCS					2,2	Y		1 1			MCS	Y		MCS	MCS	G							
Umm Gamar West													8													PMG	8						

(*1) KEY N=Not Dived L=Lightly Visited Low Frequency R= Regularly Visited H=High Frequency From EST Report 1997

MCS = Surveyed by Marine Conservation Society UK (Report on file) 1999 Surveys not yet in final report form but did occur

= Number of quadrants or transacts surveyed at each depth at the site by the EST/PMG/EEAA Team

G =

ReefCheck Data is available on line and report is on file with EEAA.

(This list is based upon best available information from reports, and can be improved and expanded)

ANNEX 7B SUMMARY TABLE FOR CORAL REEF INDEX ANALYSIS (1996 and 1998)

Comparison of 1996 and 1998 Monitoring of "Coral Reef Cover" In Quadrants In 21 Hurghada and Safaga Diving Sites

Each value is the average Percent Cover" of hard coral soft cover or other substrates for ~ 8 replicate quadrants per dive site or the average ' Coral Reef Index (CRI) of the hard coral soft coral or other substrates for the replicates at the dive site

HURGHADA	1996						1998					
	Average % Cover			Average CRI			Average % Cover			Average CRI		
SITE	Hard Coral	Soft Coral	Other	Hard Coral	Soft Coral	Other	Hard Coral	Soft Coral	Other	Hard Coral	Soft Coral	Other
Abu Ramada West	33 6	7 2	51 4	2 6	1 1	2 9	43 8	9 4	46 9	3 1	1 5	3 0
Carless	43 0	6 0	51 0	2 8	1 2	2 5	21 9	38 1	40 0	1 9	2 6	3 0
El Fanous 1 (E)	11 9	4 4	83 8	1 6	1 1	4 6	8 3	2 8	89 0	1 3	1 0	4 9
El Fanous 2 (W)	14 8	3 4	81 7	1 5	1 1	4 5	27 9	9 8	62 4	2 1	1 3	3 8
Erg Sabina	49 0	1 6	49 4	3 2	1 1	3 3	48 8	0 0	51 3	3 3	1 0	3 4
Gotta Torfa East	22 8	2 0	75 2	2 0	1 0	4 4	49 4	6 5	44 1	3 4	1 4	3 0
Shaab Eshta	34 8	14 2	52 2	2 6	1 6	3 6	40 0	9 3	50 8	2 9	1 4	3 5
Shaab Sabina	29 3	3 9	67 3	2 1	1 1	4 2	53 8	7 5	38 8	3 4	1 4	2 6
Shaab Torfa	20 0	3 6	76 5	1 8	1 1	4 3	34 4	0 9	64 8	2 5	1 0	4 0
Shabrour Umm Gama	32 6	19 3	48 1	2 3	1 7	2 8	40 0	14 4	45 6	2 8	1 6	3 1
Umm Gamar West	41 9	20 8	38 5	2 9	2 0	2 8	28 6	22 3	48 4	2 4	1 9	3 3
Mean Hurghada Values	30 3	7 9	61 4	2 3	1 3	3 6	36 1	11 0	52 9	2 6	1 5	3 4

SAFAGA	1996						1998					
	Average % Cover			Average CRI			Average % Cover			Average CRI		
SITE	Hard Coral	Soft Coral	Other	Hard Coral	Soft Coral	Other	Hard Coral	Soft Coral	Other	Hard Coral	Soft Coral	Other
Abu Kefan East	40 7	8 9	50 4	2 7	0 9	3 3	40 0	11 9	48 1	2 9	1 5	3 1
Abu Kefan West	49 5	4 5	46 0	3 2	0 8	3 1	33 1	11 9	55 0	2 4	1 4	3 6
Gamul Kebir	32 0	2 9	65 0	2 4	1 0	3 6	40 6	3 8	56 3	3 0	1 1	3 6
Gamul Sagir	20 3	1 6	78 4	2 0	1 0	4 6	28 1	11 9	60 0	2 3	1 6	3 8
Panorama East	71 7	2 8	25 4	4 4	1 0	2 3	58 1	16 3	25 6	3 8	1 6	2 1
Panorama West	60 2	3 9	35 9	3 8	1 1	2 8	35 6	25 6	39 4	2 5	2 1	2 8
Tobia Arba	27 4	33 7	38 9	2 4	2 5	2 8	31 9	31 3	36 9	2 4	2 4	2 8
Tobia Hamra	27 4	33 8	38 8	2 4	2 6	2 8	53 5	9 9	34 1	3 6	1 5	2 9
Tobia Kebir	47 8	7 1	45 1	3 1	1 3	3 4	57 5	5 0	36 3	3 6	1 3	2 9
Tobia Sagir	52 0	5 2	42 8	3 4	1 1	3 0	54 4	8 8	38 1	3 6	1 3	2 9
Mean Safaga Values	42 9	10 4	46 7	3 0	1 3	3 2	43 3	13 6	43 0	3 0	1 6	3 1

Table prepared by S Tighe Feb1999 Modified by S Tighe Oct 99

ANNEX 7C-1

Final Report on the
1998 Coral Reef Index (CRI)
Monitoring Program
For Hurghada and Safaga

And

Comparative Analysis of the CRI for 1996-98

Product of the USAID-Funded
Policy Management Group (PMG)'s
Hurghada Field Program

Delivered October 1999

ANNEX 7B SUMMARY TABLE FOR CORAL REEF INDEX ANALYSIS (1996 and 1998)

Comparison of 1996 and 1998 Monitoring of "Coral Reef Cover ' in Quadrants in 21 Hurghada and Safaga Diving Sites

Each value is the average "Percent Cover" of hard coral, soft cover or other substrates for ~ 8 replicate quadrants per dive site, or the average "Coral Reef Index (CRI) of the hard coral, soft coral or other substrates for the replicates at the dive site

HURGHADA	1996						1998					
	Average % Cover			Average CRI			Average % Cover			Average CRI		
SITE	Hard Coral	Soft Coral	Other	Hard Coral	Soft Coral	Other	Hard Coral	Soft Coral	Other	Hard Coral	Soft Coral	Other
Abu Ramada West	33 6	7 2	51 4	2 6	1 1	2 9	43 8	9 4	46 9	3 1	1 5	3 0
Carless	43 0	6 0	51 0	2 8	1 2	2 5	21 9	38 1	40 0	1 9	2 6	3 0
El Fanous 1 (E)	11 9	4 4	83 8	1 6	1 1	4 6	8 3	2 8	89 0	1 3	1 0	4 9
El Fanous 2 (W)	14 8	3 4	81 7	1 5	1 1	4 5	27 9	9 8	62 4	2 1	1 3	3 8
Erg Sabina	49 0	1 6	49 4	3 2	1 1	3 3	48 8	0 0	51 3	3 3	1 0	3 4
Gotta Torfa East	22 8	2 0	75 2	2 0	1 0	4 4	49 4	6 5	44 1	3 4	1 4	3 0
Shaab Eshta	34 8	14 2	52 2	2 6	1 6	3 6	40 0	9 3	50 8	2 9	1 4	3 5
Shaab Sabina	29 3	3 9	67 3	2 1	1 1	4 2	53 8	7 5	38 8	3 4	1 4	2 6
Shaab Torfa	20 0	3 6	76 5	1 8	1 1	4 3	34 4	0 9	64 8	2 5	1 0	4 0
Shabrour Umm Gama	32 6	19 3	48 1	2 3	1 7	2 8	40 0	14 4	45 6	2 8	1 6	3 1
Umm Gamar West	41 9	20 8	38 5	2 9	2 0	2 8	28 6	22 3	48 4	2 4	1 9	3 3
Mean Hurghada Values	30 3	7 9	61 4	2 3	1 3	3 6	36 1	11 0	52 9	2 6	1 5	3 4

SAFAGA	1996						1998					
	Average % Cover			Average CRI			Average % Cover			Average CRI		
SITE	Hard Coral	Soft Coral	Other	Hard Coral	Soft Coral	Other	Hard Coral	Soft Coral	Other	Hard Coral	Soft Coral	Other
Abu Kefan East	40 7	8 9	50 4	2 7	0 9	3 3	40 0	11 9	48 1	2 9	1 5	3 1
Abu Kefan West	49 5	4 5	46 0	3 2	0 8	3 1	33 1	11 9	55 0	2 4	1 4	3 6
Gamul Kebir	32 0	2 9	65 0	2 4	1 0	3 6	40 6	3 8	56 3	3 0	1 1	3 6
Gamul Sagir	20 3	1 6	78 4	2 0	1 0	4 6	28 1	11 9	60 0	2 3	1 6	3 8
Panorama East	71 7	2 8	25 4	4 4	1 0	2 3	58 1	16 3	25 6	3 8	1 6	2 1
Panorama West	60 2	3 9	35 9	3 8	1 1	2 8	35 6	25 6	39 4	2 5	2 1	2 8
Tobia Arba	27 4	33 7	38 9	2 4	2 5	2 8	31 9	31 3	36 9	2 4	2 4	2 8
Tobia Hamra	27 4	33 8	38 8	2 4	2 6	2 8	53 5	9 9	34 1	3 6	1 5	2 9
Tobia Kebir	47 8	7 1	45 1	3 1	1 3	3 4	57 5	5 0	36 3	3 6	1 3	2 9
Tobia Sagir	52 0	5 2	42 8	3 4	1 1	3 0	54 4	8 8	38 1	3 6	1 3	2 9
Mean Safaga Values	42 9	10 4	46 7	3 0	1 3	3 2	43 3	13 6	43 0	3 0	1 6	3 1

Table prepared by S Tighe Feb1999 Modified by S Tighe Oct 99

ANNEX 7C-1

Final Report on the
1998 Coral Reef Index (CRI)
Monitoring Program
For Hurghada and Safaga

And

Comparative Analysis of the CRI for 1996-98

Product of the USAID-Funded
Policy Management Group (PMG)'s
Hurghada Field Program

Delivered October 1999

REPORT SUMMARY

In 1998, 11 diving sites in Hurghada and 10 in Safaga, Red Sea, Egypt were re-surveyed by the U S Agency for International Development (USAID)-supported project with the assistance of the Egyptian Environmental Affairs Authorities Red Sea Rangers The objective was to observe any measurable change in the status of the coral reefs since 1996 The 21 sites represent a statistically-significant sub-set of the 43 sites surveyed with a Rapid Underwater Assessment designed and described in the 1997 Environmentally Sustainable Tourism Project sponsored by USAID/Cairo The only parameter measured in the 1998 surveys was coral abundance the area covered by coral within fixed quadrants that was converted into a non-linear parameter known as the Coral Reef Index (CRI) The Coral Reef Index is a scale from 1 to 5 that compares the relative ratio of area covered by hard corals to the area covered by soft corals to the area covered by other substrate (Hard Coral Coverage Soft Coral Coverage Other Coverage) within the quadrants at each site The CRI of 1996 was then compared to the CRI for 1998 at the 21 sites

The average CRI for Hurghada changed from **2.1 4** in 1996 to **3.2 3** in 1998 This indicates a slight increase in the area-coverage of hard and soft corals, and a slight decline in the coverage of other substrates The changes in the coverage were significant in approximately 20% of the measurements taken from the individual survey sites (i.e , 7 out of 33 values)

The average CRI for Safaga changed from **3 1 3** in 1996 to **3:2 3** in 1998 This indicates a slight change, an increase, in the coverage of soft corals only The measurements of change were significant approximately 23% of the time (7 out of 30 values) taken from the individual Safaga survey sites

These results are encouraging in they suggest that there is an increase in coral coverage in Hurghada and Safaga over the study period However they are not definitive of the overall health and status of the reef ecosystem or of the probable cause for the change (i.e , the use of moorings instead of anchoring vs global warming or other potential factors) These surveys should be repeated again in the future for comparison within a larger, resource-management program for monitoring the Red Sea marine ecosystem.

BACKGROUND

The level of exploitation of the Red Sea reefs through fishing and tourism activities has grown rapidly in the last decade from a few hotels and tens of boats a decade ago to more than 130 hotels and more than 200 active diving and fishing boats in 1999 Until recently there was little management of activities at reef sites along the western Red Sea coast As a result, there has been significant physical damage to the reefs, mainly through the indiscriminate anchoring on coral reefs, extensive fishing of colorful reef fishes that recreational scuba divers come to see, direct and indirect damage to the reefs by divers and their boats, and other destructive practices Accurate information concerning the

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evaluation of the condition of the Red Sea diving sites is critical for effective management

There are many types of indicators that scientists and managers use to estimate the status and health of coral reefs, from the number and diversity of butterfly fish to the area of the sea floor covered in corals, and from rapid assessments to decade-long intensive programs Sophisticated monitoring approaches includes a suite of protocols to address different scales, monitoring resources available, and types of issues within a reef system and monitoring program. A standard indicator in many reef programs includes some indication of the ratio between the amount and types of coral present over a given area, commonly known as an area s "percent cover" At least two standard procedures are used to collect this data over large reef areas a) estimating the relative substrate coverage in ½m to 2m-squared quadrants which can be fixed or random, and b) calculating the relative length of fixed or random transect lines that touch different substrate types Details and debate continue over the number of samples needed and the preferences of fixed or random samples, and the level of species details for informative monitoring However, as long as a consistent approach is taken throughout one monitoring program over time the observations of statistically significant change are the important information for analysis and interpretation

In 1997, the Egyptian Environmental Affairs Authority (EEAA), with the support of USAID, opened an office of the Red Sea Protectorates in Hurghada, Red Sea The initial objectives of the office and program included establishing mooring sites to avoid the need for boats to anchor on the reefs, and to establish regular marine patrols of Rangers to protect the reefs that are under the management of the EEAA. In order to establish where the first moorings should go, and to begin a baseline for monitoring progress on the conservation and management of the reefs, the USAID Environmentally Sustainable Tourism Project (EST) executed a series of surveys in 1996 within the Hurghada and Safaga area of the Red Sea to collect ecological data for and with the EEAA.

A Rapid Underwater Assessment (RUA) was necessary to cover the large area of reefs in a short period of time The RUA developed and used in 1996 included reporting a number of parameters, one of which was coral abundance Other parameters measured included fish and macro-invertebrate surveys, and subjective indicators of coral diversity and dive-site quality This was intended to be used neither as a sole indicator of the health of the reef ecosystem nor as the definative monitoring baseline study For instance, there was no information collected along the fringing shallow reef-tops, the mangroves or the seagrass beds, all of which are critical elements to the health of the reef ecosystem and would be components of full monitoring program to track a reef ecosystem. Rather, the principal purpose of the Rapid Assessment was to provide information to prioritize various diving sites that would receive moorings under the new USAID-supported EST program. In 1996, 43 sites total were assessed using quadrants in Hurghada and Safaga The results of these first surveys were reported in the Final Report of the EST Project in December 1997

In addition to collecting and tracking general coral reef ecological parameters, the surveys hopefully would provide some information to test a specific management hypothesis The hypothesis here is that at sites where moorings were installed, the loss of hard and soft-coral cover due to anchordamage would cease, and possibly, given enough time, the reef might regenerate corals, thereby eventually gaining area covered in living corals A related consequence is that at properly-used mooring sites, there would be no increase in the amount of area covered by "other substrates" (since rubble and dead or broken coral often dominate this type of substrate) Subsequent surveying would be required

In 1998, a field program was designed by the PMG project to repeat one of the key elements of the Rapid Assessment the monitoring of coral abundance Due to limited time and resources in 1998, the number of sites surveyed (11 in Hurghada and 10 in Safaga) and the number of parameters studied were reduced, including only this parameter of coral abundance The objective was to compare this coverage, using the Coral Reef Index (described below in Methods), to the coral coverage from the same sites from 1996 The results of the 1998 survey program are reported here, its results are compared to the 1996 values for the Coral Reef Index, and their comparison interpreted and discussed below

Additional surveys and studies conducted by the EEAA Sinai program, Reef Check, the Global Environmental Facility's Red Sea Coastal Resources Management Program, and the Marine Conservation Society from the UK are listed below for reference, but have not been incorporated into this analysis

BASELINE AND MONITORING DATA AVAILABLE

A number of baseline, one-time and repeated reef and marine surveys have been implemented within the last few years in the Hurghada and Red Sea areas Copies of all of the recent work described below have been placed into the EEAA or the PMG/USAID archives by the original sources These include

- transects and quadrant surveys at various dive sites executed by the EEAA Sinai rangers with logistical support from the EST and PMG projects (1997-99),
- a set of 1996 baseline rapid assessments of the diving sites executed by the USAID/EST Project to determine where the moorings should go (described here and repeated in part in 1998 by the PMG Program for USAID project monitoring),
- a set of 1996-97 baseline surveys for the 1998 Global Environmental Facility (GEF) Red Sea Coastal Resources Management Program Report that includes coastal marine surveys every 70km from Hurghada to the southern areas of the Elba Protectorate,
- an annual monitoring program on several reefs in Hurghada by the U K.-based Marine Conservation Society (MCS, 1996-1999),
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Many of these are listed in ANNEX 7A-1 *Summary Index of Red Sea Coral Reef Surveys (1996-1998)* which is presented in alphabetical order by survey site and includes the year of the survey(s) The geographical locations, determined using the Global Positioning System (GPS), of the EST, PMG, and a few other sites are listed in the same alphabetical order in ANNEX 7A-2 These locations should concur with but could be verified to match the same locations for the sites as are being collected and used by the Red Sea Mooring Program.

Most of the surveys were done in the Hurghada area A summary of the known different methods and sources of surveys in Hurghada for 1996-1998 are presented in greater detail in ANNEX 7A-3 listed alphabetically by the sites where the work was completed Only the USAID/EST and PMG projects and the EEAA/Sinai have current data for the far islands The GEF Project, the EST Project and EEAA/Sinai have current data for the southern coastal sites We report here the outcomes only of the PMG Hurghada/Safaga Monitoring Program and its comparison to the 1996 data collected under the EST Project

These recent surveys are in addition to a body of earlier research and work in the governmental archives in published journals and in the private archive of researchers There has been no known attempt yet to compile (much less to integrate) this existing information into a single set of baseline data with follow-on repeated surveys Likewise, there is no known analysis of the integrated data This integration may be a desirable early task in the process of building a structured monitoring program for the Red Sea region

METHODS

1996 Methodology Review

In 1996 a Rapid Underwater Assessment was completed at 26 Hurghada sites and 17 Safaga sites at what were considered to be most or all of the present popular recreational diving sites The assessment included fish and invertebrate surveys that, although important, are not described here Only the parameters relevant to the 1998 re-surveys are presented For each survey site, approximately eight replicate quadrants were established along a linear transect set at 4 meters constant depth along the reef slope This depth was chosen as the depth of greatest coral diversity and abundance A 2-meter-by-2-meter polyurethane frame was lain on the substrate, centered at 4 meters depth, and the percentages of the area covered by the different life forms within the quadrant (% Cover) were assessed Each of the eight quadrants was marked by one plastic tie-wrap connected to the base of a coral within the quadrant and its location within the quad noted in the field log Each quadrant was placed approximately 20 meters away from the adjacent quadrant along the transect line The RUA substrate categories assessed within each quadrant are listed below with the abbreviated name of the substrate used in field notes and data tables

- HC = Hard Corals all species of hard corals
- SC = Soft Corals fleshy soft corals, fans, octocorals

- RK = Rock reef pavement including limestone boulders, granite and volcanic rocks
- RB = Rubble Unconsolidated coral fragments
- RBC = Recent Broken Corals No sign of algal cover
- RDC = Recent Dead Coral unbroken coral, white or dirty white
- S = Sand all types
- TA = Turf Algae all species
- SP = Sponge all types

At each site, a number of general physical parameters were also recorded These included

- air and water temperature,
- wave height,
- qualitative magnitude of the water current,
- dive site rating (subjectively rated on a scale from 1 (not as popular) to 5 (very popular)),
- coral biodiversity (a subjective index which in retrospective oral histories had different criteria for rating depending on the observers, so should be discounted)
- the number of boats and divers present at the time of assessment,
- the major categories of coral genera present, and
- a sketch of the site and the quadrants

At some sites qualitative photographic documentation was taken of the quadrants However since there was no scale or site labels of any kind used, they are not adequate for either re-locating the quadrants nor verifying change or estimated coverage within the quadrants

The field surveyors for all the sites were Dr Stephen Jameson (EST consultant), Dr M Shoukry (EST staff scientist) and Essam Saadallah (EEAA Science Ranger) The fieldwork occurred in the last few months of 1996 and was compiled, graphed and reported in 1997 During 1997, Jameson trained additional rangers (A. Afifi and A. Eliwa) and the new PMG staff scientist (Dr H. Mansour) in the methodology The Coral Reef Index (described below) was not calculated from this data at this time Little quantitative analysis was done on this data and it was reported in graphical format in the EST 1997 Final Reports

<u>The Coral Reef Index</u>

The coral abundance data was collected in the format of a percentage of area within the quadrant covered by corals and other substrate Since there is significant variability in nature (e g , patchiness) and in observers (e g , the difference between 52% and 59% cover is frequently not significant) and since the relationship between ecosystem health and area covered is not necessarily linear, scientists (English et al, 1997) report the amount of area covered as a general index on a scale from 1 to 5, with the following conversion

Category 1	0-10% Cover	Category 4	51-75% Cover
Category 2	11-30% Cover	Category 5	76-100% Cover
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A **Coral Reef Index** (CRI) was used in this project to describe the relationship between the amount of area covered by the different reef substrates (hard corals, soft corals, dead and broken corals sands, etc) and is reported as the **Index or Category** (1-5) of

Cover of Hard Coral Cover of Soft Coral Cover of Other Substrates

Sites with the greatest amounts of hard corals (most preferred) and soft corals are considered to be the most desirable for tourism and ecosystem health Each dive site has its own Coral Reef Index that can be statistically averaged or combined to give a regional Index and variability among sites

Calculating the Index or Category to the precision of one decimal place (tenths) defeats the purpose of establishing only a few categories, but since a category can cover 35 percentage points, it is important to keep whatever precision is possible until the last calculation before rounding the final answer A test was made on the calculation process for averaging the data from the 8 quadrants and from the several sites within each region (Hurghada, Safaga) The test showed no significant effect on the final result if the percent-cover was converted to CRI before or after the averaging process as long as one decimal point in the CRI was kept throughout For this work, following the work of English et al (1997 p 19) we first compiled the percent-cover data for the 8 quadrants (i e , the area covered by rock, rubble, recently broken coral, recently dead coral, sand, turf algae and sponges were summed into "Other Substrate") Next the percentages of cover within the 8 quadrants were converted into Coral Reef Index units, then averaged for the site keeping one decimal point in the resulting CRI. Lastly, the average CRI for each region (Hurghada, Safaga) was calculated using the CRI values from the various sites, keeping the decimal tenths until the end Other scientists use an alternate method of keeping some resolution of an integer index. They add a plus or minus to the integer (i e 3 4 becomes 3+ 3 7 becomes 4-) to clarify that the decimal is not really significant (Dr Susan Clark, personal communications) An example of the resulting conversion is presented below

The 1998 Assessment for Hurghada shows that the average ratios of cover and Coral Reef Index (CRI) are

Parameter	Hard Coral Cover	Soft Coral Cover	Other Cover
% Cover	36%	11%	53%
Index of Cover	2 6 (+/-0 8)	1 5 (+/- 0 5)	3 4 (+/- 0 7)
Coral Reef Index	3 (or 3-)	2 (or 2-)	3 (or 3+)

Therefore the reported averaged Coral Reef Index for 1998 in Hurghada for eleven sites is **3 2.3** for Hard Soft Other The observed variability between individual quadrants and individual dive sites is about 14% cover or 0 7 CRI Category Units

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1998 Methodology

The 1998 plan to re-survey the 43 dive sites was constrained by limited time and resources Therefore, a simple analysis was done to determine the minimum number of sites necessary to obtain the best representation of coral abundance for Hurghada and Safaga Theoretically, averaging a number of replicates reduces the random variability in the data, so the greater number of sites averaged together should give the more representative answer with the smallest random variability Using 1996 data, we tested how many sites needed to be averaged together before the variability (standard deviation) stopped decreasing or changing As more sites were included in the average, the variability decreased until 6 sites were averaged together, after which the variability reached a plateau at approximately 0 7 Coral Reef Index units (about 14% area covered) This suggests that some combination of the ecological variability (e g , patchiness) and the precision of the methodology (sampling or calculations) make the reliability of the Coral Reef Index value to be +/- 0 7 Index Units or approximately 14% of the area covered

Therefore, we selected approximately 10 dive sites each in Hurghada and Safaga for re-sampling during the 1998 survey The sites surveyed represented a range of dive sites those heavily dived, those rarely dived, those used for snorkeling, and those included in other surveys (to ground-truth methods for future comparisons) The different types of sites were neither ranked nor tracked separately, although with more annual records at more sites there may be enough of a repeatable and significant difference between sites to consider this

During the 1998 survey, Dr S Tighe and Dr H. Mansour Mostafa of the PMG project completed the first full day of surveying to review, finalize and approve the methodology as described in the 1996 records The new surveys included the coral abundance and the general parameters of the dive site (described above) No fish counts or other parameters were studied Coral Diversity was not reported since

a) Coral Diversity has a strict quantitative value in the scientific literature and therefore it was determined that a different term needs to be used here or a more standard Coral Diversity Analysis done, and
b) It appears from oral history that the individual surveyors in 1996 used different subjective criteria to define this parameter, therefore the existing values are not comparable

A briefing was held with the rangers, and a field schedule and logistics defined After this, Mansour lead the field operation for the balance of the surveys A ranger (usually A. Afifi or Y Ibrahim) was present during every survey, primarily as the survey photographer, and occasionally to assist in the collection of data Data was recorded on underwater slates Overall, two sites were surveyed each day, with approximately 90 minutes duration per dive (1 dive per site) The EEAA Patrol Boats (Molly I or Molly 2) were used for some of the fieldwork, and day-boats were rented for the work in Safaga and for some of the day-work in Hurghada, as needed Whenever possible, the data was entered and analyzed by Dr Mansour within a day or two day of collection to minimize errors of omission or poor recollection when transcribing the data and executing the

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Coral Reef Index	3 (or 3-)	2 (or 2-)	3 (or 3+)

Therefore the reported averaged Coral Reef Index for 1998 in Hurghada for eleven sites is **3:2:3** for Hard Soft Other The observed variability between individual quadrants and individual dive sites is about 14% cover or 0 7 CRI Category Units

1998 Methodology

The 1998 plan to re-survey the 43 dive sites was constrained by limited time and resources Therefore, a simple analysis was done to determine the minimum number of sites necessary to obtain the best representation of coral abundance for Hurghada and Safaga Theoretically averaging a number of replicates reduces the random variability in the data, so the greater number of sites averaged together should give the more representative answer with the smallest random variability Using 1996 data, we tested how many sites needed to be averaged together before the variability (standard deviation) stopped decreasing or changing As more sites were included in the average, the variability decreased until 6 sites were averaged together, after which the variability reached a plateau at approximately 0 7 Coral Reef Index units (about 14% area covered) This suggests that some combination of the ecological variability (e g , patchiness) and the precision of the methodology (sampling or calculations) make the reliability of the Coral Reef Index value to be +/- 0 7 Index Units or approximately 14% of the area covered

Therefore, we selected approximately 10 dive sites each in Hurghada and Safaga for re-sampling during the 1998 survey The sites surveyed represented a range of dive sites those heavily dived, those rarely dived, those used for snorkeling, and those included in other surveys (to ground-truth methods for future comparisons) The different types of sites were neither ranked nor tracked separately, although with more annual records at more sites there may be enough of a repeatable and significant difference between sites to consider this

During the 1998 survey, Dr S Tighe and Dr H. Mansour Mostafa of the PMG project completed the first full day of surveying to review, finalize and approve the methodology as described in the 1996 records The new surveys included the coral abundance and the general parameters of the dive site (described above) No fish counts or other parameters were studied Coral Diversity was not reported since

a) Coral Diversity has a strict quantitative value in the scientific literature and therefore it was determined that a different term needs to be used here or a more standard Coral Diversity Analysis done, and
b) It appears from oral history that the individual surveyors in 1996 used different subjective criteria to define this parameter, therefore the existing values are not comparable

A briefing was held with the rangers, and a field schedule and logistics defined After this, Mansour lead the field operation for the balance of the surveys A ranger (usually A. Afifi or Y Ibrahim) was present during every survey, primarily as the survey photographer, and occasionally to assist in the collection of data Data was recorded on underwater slates Overall, two sites were surveyed each day, with approximately 90 minutes duration per dive (1 dive per site) The EEAA Patrol Boats (Molly I or Molly 2) were used for some of the fieldwork, and day-boats were rented for the work in Safaga and for some of the day-work in Hurghada, as needed Whenever possible, the data was entered and analyzed by Dr Mansour within a day or two day of collection to minimize errors of omission or poor recollection when transcribing the data and executing the

calculations For some of the fieldwork, Dr Kilada, who was completing an assessment of commercially valuable invertebrates (Trochus, Tridacna and sea cucumber), joined the team for the EEAA, the USAID/PMG program also supported the logistics of his work. The logs, tables and analysis were reviewed and revised by Dr Tighe, who authored the majority of this report

In total, 11 sites in Hurghada and 10 sites in Safaga were re-surveyed, their Coral Reef Index calculated, and then compared to the 1996 Coral Reef Index from that site (also calculated by the PMG team from the EST data of "percent-cover") At each site if possible, the quadrants from the 1996 survey were re-located Frequently the old quadrant-markers were not found, due partially to lost or removed tie-wrap markers, and partially to the lack of useful 1996 site maps for re-locating the area within the site where the original quads were placed When old quadrant markers were not found, new quadrants were defined and the distance between each quad (approximately 15-20m) was measured and recorded For each of the 1998 quads, the placement of the 2-meter frame was marked (or re-marked if the old quad was found) with 2 colored plastic tie-wraps placed around substrate at opposite corners of the quadrant The relative locations of both the quadrants and the tie-wraps were noted on the site log In addition, a slate was placed within the quad noting the site name and quad number, and the quadrant photographed multiple times for documentation Each dive site had a separate roll of photographic prints that was logged and archived at the EEAA Hurghada rangers' office after review and labeling by the PMG and EEAA staff. These additional steps were taken to help in re-locating and verifying the permanent quadrants for future survey follow-ups

RESULTS

1998 SURVEY RESULTS

The raw and processed data and graphs summarizing the 1998 data are presented in two attached files ANNEX 7C-2 *CRI Data and Graphs*, and Annex 7D *Site Logs*. Annex 7C-2 contains the following tables and graphs

a) 1998 Hurghada Data Table for 11 Sites Percent Cover and Coral Reef Index Values, Averages and Standard Deviations *(11 Pages)*
b) 1998 Hurghada Bar Chart Showing the Average CRI Index and Standard Deviations for 11 Sites and the Hurghada Mean *(1 Page)*
c) 1998 Safaga Data Table for 10 Sites Percent Cover and Coral Reef Index Values, Averages and Standard Deviations *(10 Pages)*
d) 1998 Safaga Bar Chart Showing the Average CRI Index and Standard Deviations for 10 Sites and the Safaga Mean *(1 Page)*
e) 1996-98 Bar Chart Comparing the Hard Coral Index for 11 Sites and the Mean in Hurghada *(1 Page)*
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Page 1 Site Log This records the date, the names of the surveyors, the boat used, the duration of the underwater survey, and the task objective This is followed by a description of the work completed, and a sketch of the quadrants sampled with the location(s) of the markers ("X") left to re-position the quadrants for future sampling This sheet is new to the 1998 survey, it was not included in the 1996 Survey Records In the raw field notes for each site, the quadrant locations were sketched on a copy of the HEPCA Dive Guide's site map and so should be referred to if these site logs are inadequate

Pages 2-3 Rapid Underwater Assessment Data Sheet This sheet has the same format as that used in 1996 for reporting the field data It includes the general data and conditions for the site, a map or sketch of the site, a table summarizing which old quadrants were re-located and re-surveyed vs which were newly re-located this year followed by the raw data collected

The General Data Section include the following parameters

- Date of the Survey
- Names of the Surveyors
- Air Temperature
- Water Temperature
- Strength of the Water Current
- Wave Height
- Reef Zone Surveyed (reef top, edge, slope, or base)
- Number of Diving or Snorkelling Boats at the site
- Number of Anchors in Use by Boats at the Site
- Approximate Number of Divers (and Snorkellers) in the Water at the Site
- Number of Mooring Buoys or Installations Available at the Site
- Dive Site Rating (A subjective estimate on a scale of 1-5, no criteria given)
- Coral Diversity Rating This subjective parameter was not used in 1998

The Site Map includes the reeftop (in green or darker shading) and the land (yellow or lighter shading), with the moorings and installations marked, the location of the sampling quadrants marked and any other distinct landmarks located (i e , lighthouses)

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The Site Map includes the reeftop (in green or darker shading) and the land (yellow or lighter shading), with the moorings and installations marked, the location of the sampling quadrants marked and any other distinct landmarks located (i.e , lighthouses)

DISCUSSION

REGIONAL CHANGES IN CRI

The comparison of the average CRI for Hurghada and for Safaga between 1996 and 1998 is summarized below and in the final figure of Annex 7C-2

REGION and YEAR of SURVEY	Category Value for Hard Coral Cover	Category Value for Soft Coral Cover	Category Value for Other Substrate Cover	Coral Reef Index
Hurghada 1996	2 3	1 3	3 6	**2 1 4**
Hurghada 1998	2 6 +/-08	1 5 +/-0 5	3 4 +/-0 7	**3 2 3**
Safaga 1996	3 0	1 3	3 2	**3 1 3**
Safaga 1998	3 0 +/-0 8	1 6 +/-0 7	3 1 +/0 8	**3 2.3**

When the sites within a region are averaged, these results indicate minor positive changes of the Coral Reef Index in Hurghada and Safaga over the 2 years The amount of hard coral increased in Hurghada, the amount of soft coral increased in both Hurghada and Safaga and the amount of other substrates decreased in Hurghada—all encouraging signs for the ecosystem.

The direction of the change at this scale is encouraging, but is not statistically significant i.e the changes are smaller than the variability of the measurements (+/- 0 7 Index Units) As mentioned, some of the variability is due to the ecological patchiness of the reef system and to the varying level of localized use (i.e at individual dive sites) by divers and boats For instance the difference in Hard Coral Cover between sites is greater than the difference in Hard Coral Cover between 1996 and 1998, as seen in comparing the two Hurghada sites Fanous 1 and Erg Sabina

Fanous 1 had a Hard Coral Index of 1 6 in 1996 and 1 3 in 1998, a loss of 0 3 Units Fanous 1 is a very heavily used site in Hurghada in all weather conditions and has a naturally "dead" lagoon within the site possibly due to lack of nutrients, so a lower level of hard coral cover due to prior anchoring and diver damage might be expected, in addition to any ecological reasons Erg Sabina, on the other hand, had a Hard Coral Index of 3 2 in 1996 and 3 3 in 1998, a gain of 0 1 Units Erg Sabina is a very small, less heavily-dived site but often with very strong currents It is more exposed to currents and nutrients, so the presence of more hard coral there than at Fanous is not surprising Note that the difference between the two sites is 1 6 CRI units in 1996 and 1 0 in 1998, far greater than the differences within either site over time, and greater than the sampling variability of +/-0 7 CRI Units Therefore it might be more meaningful for managers to track the changes in the Coral Reef Index at the individual sites This is discussed below

First, we take another approach for evaluating the regional change in the Coral Reef Index We compare the number of dive sites where the Coral Reef Index increases or decreases or has no change, and how many of these changes are significant The table below summarizes this simple comparison

Region (# of Sites Surveyed in 1998)	# of Dive Sites and Direction of Changes from 1996-98 in the Area Covered by Hard Corals	# of Dive Sites with Changes in the Area Covered by Soft Corals	# of Dive Sites with Changes in the Area Covered by Other Substrate
Hurghada (11)	8 Sites Increase (2 Significant) 3 Decrease (1 Significant)	5 Up (1 Significant) 6 Down (None Significant)	6 Up (None Significant) 5 Down (3 Significant)
Safaga (10)	6 Sites Increase (1 Significant) 3 Sites Decrease (2 Significant) 1 Site Shows No Change	7 Up (2 Significant) 2 Down (1 Significant) 1 No Change	2 Up (None Significant) 5 Down (1 Significant) 3 No Change

HURGHADA CHANGES IN CRI

In Hurghada, only 7 of the 33 site measurements (hard coral at 11 sites, soft coral at 11 sites, etc) have changes that are statistically significant We notice two trends in the changes between 1996 and 1998 First, that the hard coral is up at 8 out of 11 sites and second, that 6 of the 7 significant changes are in the direction of improved cover of living corals and decreased cover of other (often dead) substrate Carless Reef, the only site in Hurghada with a significant decrease in Hard Corals between 1996 and 1998, also showed a significant increase in Soft Corals This loss of hard coral-cover may be due to the negative impact of the Crown-of-Thorns Starfish herds that were observed and collected from Carless Reef, and the increase in soft corals may represent the successful new recruitment of *Xenia spp*, an early settler on disturbed areas Therefore, this negative change in the amount of hard coral could bias the average in Hurghada if coral growth was present elsewhere Even if the reported changes are not all statistically significant, it is very encouraging to note that in most of the 21 dive sites, living coral coverage has increased and other substrate has decreased As coral is very slow-growing, any positive change in this short time period is very promising

SAFAGA CHANGES IN CRI

There are fewer difference over time for the Safaga sites Again, the hard and soft coral coverage is greater in 1998 and the other substrate coverage is down relative to 1996 However, the changes are significant in only 7 out of 30 measurements and both the ecologically positive changes and negative changes have significance at the individual sites The study of more parameters over time would allow us to better analyze the causes and magnitude of these changes

CHANGES IN SOFT CORAL ABUNDANCE

Much of the soft coral increases are probably due to new recruitment of *Xenia*, an opportunistic settler on disturbed terrain This theory is based upon the significant numbers of small *Xenia* (2-3 cm diameter) seen on the reefs, which is indicative of first or second year recruits (personal observations) However, *Xenia* can die-off as quickly in the subsequent 1-3 years, so no permanent changes are guaranteed at this time Also there is no evidence that the new *Xenia* seen are linked to the end of anchoring, it could

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have just been a good year for *Xenia* recruitment in the Red Sea Further study is needed, as expected

CHANGES IN THE CRI RELATED TO THE MOORING PROGRAM

Neither are firm conclusions about the impact of the mooring program possible with these results First, the anchors usually were deployed on the reef-top, and the damage caused was reef-top damage and an actual erosion of the reef-edge when the anchors were pulled up, generating dead coral and rubble on the reef slope There were no survey-sites defined on the reef-top for the Rapid Assessment Rather, they were set at 4 meters depth along the slope for other monitoring reasons, these *could* include the indirect impacts of the anchors and changes related to moorings Also, most of the anchoring (now mooring) occurs on the leeward (downwind) side of the reef, whereas the best diving is usually on the windward side of the reef. Therefore, the placement of the quadrants could be monitoring the changed near the moorings, or the changes within the nicer parts of the diving site, or both, thereby introducing an undefined variable Another variable in the hypothesis being tested is the possible impact that the moorings might create at the reef-site by focussing diver impacts rather than having them distributed over broad areas of the reefs through drift diving, for instance There are too many uncontrolled variables in this study to directly link the CRI survey closely and solely to the mooring program, although the moorings are one change that could be partially responsible for changes in the condition of the reef.

CONCLUSION

This report represents a summary of the results from our two years of repeated coral reef assessments in Hurghada and Safaga, and an explanatory example of the types of inferences we may make from this survey work. The Rapid Assessment Coral Reef Index and coral abundance, although simple, show promise in tracking coral growth or loss over time, and indicate the trend for some significant coral growth in Hurghada and Safaga between 1996 and 1998, particularly if considered at the site level (e g , Carless Reef) and not the regional level (e g , Hurghada)

However the results are not significant in many cases, and the study period is too brief to document meaningful change, particularly in the slow-growing hard corals In addition, there are no direct links from the survey design to possible causes for the changes, from the installation of moorings to weather conditions to diver's behavior to global warming Therefore conclusions should be conservative

Nor does it report on all the changes on the reef For instance, a great deal of new soft coral was observed and noted by many divers in 1998, and those changes are not reflected in these figures In part, this may be explained by the difference in depth between where most of the coral damage by anchoring occurred and where the increase in soft corals was frequently seen (shallow reef-tops) versus the depth of our monitoring stations (4 meters)

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Other critical factors to determining ecosystem health, from coral species diversity to fish abundnace and diversity etc, are also necessary parameters to monitor for management A workshop that discusses a larger-scale monitoring effort to address specific management questions and related issues could be scheduled early under the new EEPP program. This would hopefully also serve as another move to more-closely link the Sinai and Red Sea marine park programs

RECOMMENDATIONS

1) Continue the existing Rapid Underwater Assessment to collect Coral Reef Index values at as many dive sites as practical to monitor this change in the reefs over time If nothing else, this could inform the managers when a site is degrading to a point where access needs to be limited

2) To better test the hypothesis that proper use of moorings would reduce coral damage, a Rapid Assessment or complete survey should be done at each site <u>before</u> it is moored, and then at regular intervals over time to chart the change at the individual site There have been several new mooring sites installed since the 1996 without such baseline Rapid Assessments, and the amount of human resources to complete such surveying would require a full-time science team (Science Officer and Science Technican with ad hoc ranger assistance for photography, etc) This is an appropriate time to install such a team in Hurghada In addition, other factors that could affect coral coverage (such as direct and indirect impact of the divers underwater, local environmental conditions (a development project, oil spill or flood), regional events (coral disease, Crown-of-Thorns Starfish predation on the corals, number of dive-days due to weather) or global events (El Nino, global warming)) should be eliminated if possible by establishing specific control sites and tests Additional control sites (reef-top where no moorings were installed) and recovery-sites not related to anchor-damage (i e, ship groundings) could be also compared to further strengthen the link between moorings and reef recovery

3) The loss and removal of quadrant markers is a classic and chronic difficulty in using fixed quadrants for repeated monitoring Either a major public education campaign with the diving centers, fishermen and the tourists needs to be implemented to reduce theft or well-intended removal of the markers, or more permanent markers need to be placed at the study sites We have the technology, materials and experience to place long-term stakes into the hard coral, but this should not be used until a) the method and sites of fixed quadrant monitoring are approved for long-term in the Red Sea, b) the human resources needed to spend at least two-dives per site to install the stakes is available, and c) a strategy for permanently marking unstable sites (rubble fields) is defined These unresolved factors prevented us from installing stakes in 1998

4) Photodocumentation can be vastly improved by using a photo frame or pole to get the scale correct and constant in the photos, or by using some newly standarized video monitoring techniques These help to reduce field time, and increase the repeatability of the observations as any questions can be clarified or verified in the

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However the results are not significant in many cases, and the study period is too brief to document meaningful change, particularly in the slow-growing hard corals In addition, there are no direct links from the survey design to possible causes for the changes, from the installation of moorings to weather conditions to diver's behavior to global warming Therefore conclusions should be conservative

Nor does it report on all the changes on the reef For instance, a great deal of new soft coral was observed and noted by many divers in 1998 and those changes are not reflected in these figures In part, this may be explained by the difference in depth between where most of the coral damage by anchoring occurred and where the increase in soft corals was frequently seen (shallow reef-tops) versus the depth of our monitoring stations (4 meters)

Other critical factors to determining ecosystem health, from coral species diversity to fish abundnace and diversity etc, are also necessary parameters to monitor for management A workshop that discusses a larger-scale monitoring effort to address specific management questions and related issues could be scheduled early under the new EEPP program. This would hopefully also serve as another move to more-closely link the Sinai and Red Sea marine park programs

RECOMMENDATIONS

1) Continue the existing Rapid Underwater Assessment to collect Coral Reef Index values at as many dive sites as practical to monitor this change in the reefs over time If nothing else, this could inform the managers when a site is degrading to a point where access needs to be limited

2) To better test the hypothesis that proper use of moorings would reduce coral damage, a Rapid Assessment or complete survey should be done at each site <u>before</u> it is moored, and then at regular intervals over time to chart the change at the individual site There have been several new mooring sites installed since the 1996 without such baseline Rapid Assessments, and the amount of human resources to complete such surveying would require a full-time science team (Science Officer and Science Technican with ad hoc ranger assistance for photography, etc) This is an appropriate time to install such a team in Hurghada In addition, other factors that could affect coral coverage (such as direct and indirect impact of the divers underwater, local environmental conditions (a development project, oil spill or flood), regional events (coral disease, Crown-of-Thorns Starfish predation on the corals, number of dive-days due to weather) or global events (El Nino, global warming)) should be eliminated if possible by establishing specific control sites and tests Additional control sites (reef-top where no moorings were installed) and recovery-sites not related to anchor-damage (i e , ship groundings) could be also compared to further strengthen the link between moorings and reef recovery

3) The loss and removal of quadrant markers is a classic and chronic difficulty in using fixed quadrants for repeated monitoring Either a major public education campaign with the diving centers, fishermen and the tourists needs to be implemented to reduce theft or well-intended removal of the markers, or more permanent markers need to be placed at the study sites We have the technology, materials and experience to place long-term stakes into the hard coral, but this should not be used until a) the method and sites of fixed quadrant monitoring are approved for long-term in the Red Sea, b) the human resources needed to spend at least two-dives per site to install the stakes is available, and c) a strategy for permanently marking unstable sites (rubble fields) is defined These unresolved factors prevented us from installing stakes in 1998

4) Photodocumentation can be vastly improved by using a photo frame or pole to get the scale correct and constant in the photos, or by using some newly standarized video monitoring techniques These help to reduce field time, and increase the repeatability of the observations as any questions can be clarified or verified in the

lab by referring to the video Photodocumentation topics could be included in the Monitoring Workshop, see Tighe, Kramer or others about the various options, including one in development in Australia

5) The rangers and any science technicians involved in collecting field data should participate in a rigorous field-training program. The skills to transfer include a) diving skills to work without damaging the corals or other fauna, b) identifying of the flora and fauna b) learning the methodology, c) standarizing the criteria (What does 15% coral cover look like?) and the observers repeatability, and d) practicing the transcription, analysis and interpretation of the data It should be required for all diving Rangers, even if they will be assisting infrequently or only entering data A "boot camp" that trains new technicans and annually re-qualifies the field teams before the monitoring program can greatly reduce experimental errors and variability in the data Dr Susan Clark's team in the Sinai and Tighe have spoken at length about this approach, and Clark has begun some training of the Sinai rangers

6) The monitoring program needs to expand geographically and in substance The southern sites and far islands are of great importance for the completion of the picture of the Egyptian Red Sea, particularly as these sites are more pristine and are the focus of new developement activity More parameters strategically linked to studies that can test management hypotheses are needed - from coral, fish and other diversity factors to water quality and abundances The need for more training for the data gatherers is critical This expansion of the monitoring program could involve the diving centers (which could lead to better stewardship), NGOs, academic and governmental researchers and volunteer programs with EEAA scientists in the lead Protocols such as ReefBase Aquanaut or even the Coral Reef Index as executed here can be taught to experienced non-scientific divers in a couple of days by local scientists trained to do so Then the rangers and their science technicans could deepen their knowledge to the genus level of the flora and fauna, adding more criticial information for scientists to evaluate change in the ecosystem (e g , biodiversity) and to monitor specific development components (outflows, mangroves, etc)

REFERENCES

English, S , C Wilkinson and V Baker, 1997 *Survey Manual for Tropical Marine Resources*, 2nd Edition Australian Institute of Marine Science, Townsville 389 pages

1998 Data Hurgada Monitoring of 11 Sites for Percent Cover and Coral Reef Index in Quadrants

Abu Ramada W	04-Nov-98	Site #	10								
(Hurghada)											
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Substrate	Average	STDEV
% Cover, All Substrates											
Hard Corals	20	20	55	35	15	75	95	35	HC	43 8	28 9
Soft Corals	15	30	15	15	0	0	0	0	SC	9 4	11 2
Sponge	0	0	0	0	0	0	0	0	SP	0 0	0 0
Rock	60	50	30	50	75	25	5	65	RK	45 0	23 3
Rubble	0	0	0	0	10	0	0	0	RB	1 3	3 5
Dead Corals	0	0	0	0	0	0	0	0	DC	0 0	0 0
Sand	0	0	0	0	0	0	0	0	S	0 0	0 0
Algae > 1 cm height	0	0	0	0	0	0	0	0	TA	0 0	0 0
Total (100%)	95	100	100	100	100	100	100	100		99 4	
% Cover, CRI Substrates											
Hard Corals	20	20	55	35	15	75	95	35	HC	43 8	28 9
Soft Corals	15	30	15	15	0	0	0	0	SC	9 4	11 2
Other	65	50	30	50	85	25	5	65	OT	46 9	25 8
CRI Value											
Hard Corals	2	2	4	3	2	4	5	3	Hard Corals	3 1	1 1
Soft Corals	2	2	2	2	1	1	1	1	Soft Corals	1 5	0 5
Other	4	3	2	3	5	2	1	4	Other	3 0	1 3

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lab by referring to the video Photodocumentation topics could be included in the Monitoring Workshop, see Tighe, Kramer or others about the various options, including one in development in Australia

5) The rangers and any science technicians involved in collecting field data should participate in a rigorous field-training program. The skills to transfer include a) diving skills to work without damaging the corals or other fauna, b) identifying of the flora and fauna b) learning the methodology, c) standarizing the criteria (What does 15% coral cover look like?) and the observers repeatability, and d) practicing the transcription, analysis and interpretation of the data It should be required for all diving Rangers, even if they will be assisting infrequently or only entering data A "boot camp" that trains new technicans and annually re-qualifies the field teams before the monitoring program can greatly reduce experimental errors and variability in the data Dr Susan Clark's team in the Sinai and Tighe have spoken at length about this approach, and Clark has begun some training of the Sinai rangers

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REFERENCES

English, S , C Wilkinson and V Baker, 1997 *Survey Manual for Tropical Marine Resources*, 2nd Edition Australian Institute of Marine Science, Townsville 389 pages

1998 Data Hurgada Monitoring of 11 Sites for Percent Cover and Coral Reef Index in Quadrants

Abu Ramada W	04-Nov-98	Site #	10								
(Hurghada)											
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Substrate	Average	STDEV
% Cover, All Substrates											
Hard Corals	20	20	55	35	15	75	95	35	HC	43 8	28 9
Soft Corals	15	30	15	15	0	0	0	0	SC	9 4	11 2
Sponge	0	0	0	0	0	0	0	0	SP	0 0	0 0
Rock	60	50	30	50	75	25	5	65	RK	45 0	23 3
Rubble	0	0	0	0	10	0	0	0	RB	1 3	3 5
Dead Corals	0	0	0	0	0	0	0	0	DC	0 0	0 0
Sand	0	0	0	0	0	0	0	0	S	0 0	0 0
Algae > 1 cm height	0	0	0	0	0	0	0	0	TA	0 0	0 0
Total (100%)	95	100	100	100	100	100	100	100		99 4	
% Cover, CRI Substrates											
Hard Corals	20	20	55	35	15	75	95	35	HC	43 8	28 9
Soft Corals	15	30	15	15	0	0	0	0	SC	9 4	11 2
Other	65	50	30	50	85	25	5	65	OT	46 9	25 8
CRI Value											
Hard Corals	2	2	4	3	2	4	5	3	Hard Corals	3 1	1 1
Soft Corals	2	2	2	2	1	1	1	1	Soft Corals	1 5	0 5
Other	4	3	2	3	5	2	1	4	Other	3 0	1 3

1998 Data Hurgada Monitoring of 11 Sites for Percent Cover and Coral Reef Index in Quadrants

Carless Reef	28-Oct-98	Site #	7								
(Hurghada)											
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Substrate	Average	STDEV
% Cover, All Substrates											
Hard Corals	20	25	50	35	10	15	10	10	HC	21 9	14 4
Soft Corals	25	20	25	50	75	20	40	50	SC	38 1	19 4
Sponge	0	0	0	0	0	0	0	0	SP	0 0	0 0
Rock	55	55	25	15	15	65	50	40	RK	40 0	19 5
Rubble	0	0	0	0	0	0	0	0	RB	0 0	0 0
Dead Corals	0	0	0	0	0	0	0	0	DC	0 0	0 0
Sand	0	0	0	0	0	0	0	0	S	0 0	0 0
Algae > 1 cm height	0	0	0	0	0	0	0	0	TA	0 0	0 0
Total (100%)	100	100	100	100	100	100	100	100		100 0	
% Cover, CRI Substrates											
Hard Corals	20	25	50	35	10	15	10	10	HC	21 9	14 4
Soft Corals	25	20	25	50	75	20	40	50	SC	38 1	19 4
Other	55	55	25	15	15	65	50	40	OT	40 0	19 5
CRI Value											
Hard Corals	2	2	3	3	1	2	1	1	HC	1 9	0 8
Soft Corals	2	2	2	3	4	2	3	3	SC	2 6	0 7
Other	4	4	2	2	2	4	3	3	OT	3 0	0 9

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1998 Data Hurgada Monitoring of 11 Sites for Percent Cover and Coral Reef Index in Quadrants

El Fanous 1 (E)	19-Oct-98	Site #	3								
(Hurghada)											
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Substrate	Average	STDEV
% Cover, All Substrates											
Hard Corals	5	5	3	5	5	15	8	20	HC	8 3	6 0
Soft Corals	5	5	2	0	0	10	0	0	SC	2 8	3 7
Sponge	0	0	0	0	0	0	0	0	SP	0 0	0 0
Rock	80	15	0	5	95	35	35	25	RK	36 3	34 3
Rubble	5	75	95	90	0	5	12	30	RB	39 0	40 8
Dead Corals	0	0	0	0	0	0	5	10	DC	1 9	3 7
Sand	5	0	0	0	0	30	40	15	S	11 3	15 8
Algae > 1 cm height	0	0	0	0	0	0	0	0	TA	0 0	0 0
Total (100%)	100	100	100	100	100	95	100	100		99 4	
% Cover, CRI Substrates											
Hard Corals	5	5	3	5	5	15	8	20	HC	8 3	6 0
Soft Corals	5	5	2	0	0	10	0	0	SC	2 8	3 7
Other	90	90	95	95	95	75	92	80	OT	89 0	7 5
CRI Value											
Hard Corals	1	1	1	1	1	2	1	2	HC	1 3	0 5
Soft Corals	1	1	1	1	1	1	1	1	SC	1 0	0 0
Other	5	5	5	5	5	4	5	5	OT	4 9	0 4

1998 Data Hurgada Monitoring of 11 Sites for Percent Cover and Coral Reef Index in Quadrants

Carless Reef	28-Oct-98	Site #	7								
(Hurghada)											
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Substrate	Average	STDEV
% Cover, All Substrates											
Hard Corals	20	25	50	35	10	15	10	10	HC	21 9	14 4
Soft Corals	25	20	25	50	75	20	40	50	SC	38 1	19 4
Sponge	0	0	0	0	0	0	0	0	SP	0 0	0 0
Rock	55	55	25	15	15	65	50	40	RK	40 0	19 5
Rubble	0	0	0	0	0	0	0	0	RB	0 0	0 0
Dead Corals	0	0	0	0	0	0	0	0	DC	0 0	0 0
Sand	0	0	0	0	0	0	0	0	S	0 0	0 0
Algae > 1 cm height	0	0	0	0	0	0	0	0	TA	0 0	0 0
Total (100%)	100	100	100	100	100	100	100	100		100 0	
% Cover, CRI Substrates											
Hard Corals	20	25	50	35	10	15	10	10	HC	21 9	14 4
Soft Corals	25	20	25	50	75	20	40	50	SC	38 1	19 4
Other	55	55	25	15	15	65	50	40	OT	40 0	19 5
CRI Value											
Hard Corals	2	2	3	3	1	2	1	1	HC	1 9	0 8
Soft Corals	2	2	2	3	4	2	3	3	SC	2 6	0 7
Other	4	4	2	2	2	4	3	3	OT	3 0	0 9

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1998 Data Hurgada Monitoring of 11 Sites for Percent Cover and Coral Reef Index in Quadrants

El Fanous 1 (E)	19-Oct-98	Site #	3								
(Hurghada)											
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Substrate	Average	STDEV
% Cover, All Substrates											
Hard Corals	5	5	3	5	5	15	8	20	HC	8 3	6 0
Soft Corals	5	5	2	0	0	10	0	0	SC	2 8	3 7
Sponge	0	0	0	0	0	0	0	0	SP	0 0	0 0
Rock	80	15	0	5	95	35	35	25	RK	36 3	34 3
Rubble	5	75	95	90	0	5	12	30	RB	39 0	40 8
Dead Corals	0	0	0	0	0	0	5	10	DC	1 9	3 7
Sand	5	0	0	0	0	30	40	15	S	11 3	15 8
Algae > 1 cm height	0	0	0	0	0	0	0	0	TA	0 0	0 0
Total (100%)	100	100	100	100	100	95	100	100		99 4	
% Cover, CRI Substrates											
Hard Corals	5	5	3	5	5	15	8	20	HC	8 3	6 0
Soft Corals	5	5	2	0	0	10	0	0	SC	2 8	3 7
Other	90	90	95	95	95	75	92	80	OT	89 0	7 5
CRI Value											
Hard Corals	1	1	1	1	1	2	1	2	HC	1 3	0 5
Soft Corals	1	1	1	1	1	1	1	1	SC	1 0	0 0
Other	5	5	5	5	5	4	5	5	OT	4 9	0 4

1998 Data Hurgada Monitoring of 11 Sites for Percent Cover and Coral Reef Index in Quadrants

El Fanous 2 (W)	19-Oct-98	Site #	2								
(Hurghada)											
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Substrate	Average	STDEV
% Cover, All Substrates											
Hard Corals	8	5	10	40	65	30	40	25	HC	27 9	20 4
Soft Corals	2	3	0	10	8	10	20	25	SC	9 8	8 8
Sponge	0	0	0	0	0	0	0	0	SP	0 0	0 0
Rock	0	0	8	5	4	10	20	30	RK	9 6	10 4
Rubble	80	78	46	40	5	20	15	15	RB	37 4	29 0
Dead Corals	0	0	0	5	10	20	5	5	DC	5 6	6 8
Sand	5	10	35	0	8	10	0	0	S	8 5	11 6
Algae > 1 cm height	5	4	1	0	0	0	0	0	TA	1 3	2 1
Total (100%)	100	100	100	100	100	100	100	100		101 0	
% Cover, CRI Substrates											
Hard Corals	8	5	10	40	65	30	40	25	HC	27 9	20 4
Soft Corals	2	3	0	10	8	10	20	25	SC	9 8	8 8
Other	90	92	90	50	27	60	40	50	OT	62 4	25 3
CRI Value											
Hard Corals	1	1	1	3	4	2	3	2	HC	2 1	1 1
Soft Corals	1	1	1	1	1	1	2	2	SC	1 3	0 5
Other	5	5	5	3	2	4	3	3	OT	3 8	1 2

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1998 Data Hurgada Monitoring of 11 Sites for Percent Cover and Coral Reef Index in Quadrants

Erg Sabina	21-Oct-98	Site #	5								
(Hurghada)											
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Substrate	Average	STDEV
% Cover, All Substrates											
Hard Corals	15	15	15	100	85	70	70	20	HC	48 8	36 0
Soft Corals	0	0	0	0	0	0	0	0	SC	0 0	0 0
Sponge	0	0	0	0	0	0	0	0	SP	0 0	0 0
Rock	80	85	85	0	15	30	30	80	RK	50 6	35 4
Rubble	5	0	0	0	0	0	0	0	RB	0 6	1 8
Dead Corals	0	0	0	0	0	0	0	0	DC	0 0	0 0
Sand	0	0	0	0	0	0	0	0	S	0 0	0 0
Algae > 1 cm height	0	0	0	0	0	0	0	0	TA	0 0	0 0
Total (100%)	100	100	100	100	100	100	100	100		100 0	
% Cover, CRI Substrates											
Hard Corals	15	15	15	100	85	70	70	20	HC	48 8	36 0
Soft Corals	0	0	0	0	0	0	0	0	SC	0 0	0 0
Other	85	85	85	0	15	30	30	80	OT	51 3	36 0
CRI Value											
Hard Corals	2	2	2	5	5	4	4	2	HC	3 3	1 4
Soft Corals	1	1	1	1	1	1	1	1	SC	1 0	0 0
Other	5	5	5	1	2	2	2	5	OT	3 4	1 8

1998 Data Hurgada Monitoring of 11 Sites for Percent Cover and Coral Reef Index in Quadrants

El Fanous 2 (W)	19-Oct-98	Site #	2								
(Hurghada)											
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Substrate	Average	STDEV
% Cover, All Substrates											
Hard Corals	8	5	10	40	65	30	40	25	HC	27 9	20 4
Soft Corals	2	3	0	10	8	10	20	25	SC	9 8	8 8
Sponge	0	0	0	0	0	0	0	0	SP	0 0	0 0
Rock	0	0	8	5	4	10	20	30	RK	9 6	10 4
Rubble	80	78	46	40	5	20	15	15	RB	37 4	29 0
Dead Corals	0	0	0	5	10	20	5	5	DC	5 6	6 8
Sand	5	10	35	0	8	10	0	0	S	8 5	11 6
Algae > 1 cm height	5	4	1	0	0	0	0	0	TA	1 3	2 1
Total (100%)	100	100	100	100	100	100	100	100		101 0	
% Cover, CRI Substrates											
Hard Corals	8	5	10	40	65	30	40	25	HC	27 9	20 4
Soft Corals	2	3	0	10	8	10	20	25	SC	9 8	8 8
Other	90	92	90	50	27	60	40	50	OT	62 4	25 3
CRI Value											
Hard Corals	1	1	1	3	4	2	3	2	HC	2 1	1 1
Soft Corals	1	1	1	1	1	1	2	2	SC	1 3	0 5
Other	5	5	5	3	2	4	3	3	OT	3 8	1 2

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1998 Data Hurgada Monitoring of 11 Sites for Percent Cover and Coral Reef Index in Quadrants

Erg Sabina	21-Oct-98	Site #	5								
(Hurghada)											
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Substrate	Average	STDEV
% Cover, All Substrates											
Hard Corals	15	15	15	100	85	70	70	20	HC	48 8	36 0
Soft Corals	0	0	0	0	0	0	0	0	SC	0 0	0 0
Sponge	0	0	0	0	0	0	0	0	SP	0 0	0 0
Rock	80	85	85	0	15	30	30	80	RK	50 6	35 4
Rubble	5	0	0	0	0	0	0	0	RB	0 6	1 8
Dead Corals	0	0	0	0	0	0	0	0	DC	0 0	0 0
Sand	0	0	0	0	0	0	0	0	S	0 0	0 0
Algae > 1 cm height	0	0	0	0	0	0	0	0	TA	0 0	0 0
Total (100%)	100	100	100	100	100	100	100	100		100 0	
% Cover, CRI Substrates											
Hard Corals	15	15	15	100	85	70	70	20	HC	48 8	36 0
Soft Corals	0	0	0	0	0	0	0	0	SC	0 0	0 0
Other	85	85	85	0	15	30	30	80	OT	51 3	36 0
CRI Value											
Hard Corals	2	2	2	5	5	4	4	2	HC	3 3	1 4
Soft Corals	1	1	1	1	1	1	1	1	SC	1 0	0 0
Other	5	5	5	1	2	2	2	5	OT	3 4	1 8

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1998 Data Hurgada Monitoring of 11 Sites for Percent Cover and Coral Reef Index in Quadrants

Gota Torfa	1-Nov-98	Site #	9								
(Hurghada)											
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Substrate	Average	STDEV
% Cover, All Substrates											
Hard Corals	15	0	10	35	80	90	85	80	HC	49 4	38 1
Soft Corals	30	5	2	15	0	0	0	0	SC	6 5	10 8
Sponge	0	0	0	0	0	0	0	0	SP	0 0	0 0
Rock	55	0	38	60	20	10	10	5	RK	24 8	23 3
Rubble	0	95	50	0	0	0	5	15	RB	20 6	34 6
Dead Corals	0	0	0	0	0	0	0	0	DC	0 0	0 0
Sand	0	0	0	0	0	0	0	0	S	0 0	0 0
Algae > 1 cm height	0	0	0	0	0	0	0	0	TA	0 0	0 0
Total (100%)	100	100	100	110	100	100	100	100		108 9	
% Cover, CRI Substrates											
Hard Corals	15	0	10	35	80	90	85	80	HC	49 4	38 1
Soft Corals	30	5	2	15	0	0	0	0	SC	6 5	10 8
Other	55	95	88	50	20	10	15	20	OT	44 1	33 5
CRI Value											
Hard Corals	2	1	1	3	5	5	5	5	HC	3 4	1 8
Soft Corals	3	1	1	2	1	1	1	1	SC	1 4	0 7
Other	4	5	5	3	2	1	2	2	OT	3 0	1 5

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1998 Data Hurgada Monitoring of 11 Sites for Percent Cover and Coral Reef Index in Quadrants

Shaab Eshta	4-Nov-98	Site #	11								
(Hurghada)											
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Substrate	Average	STDEV
% Cover, All Substrates											
Hard Corals	35	65	45	30	10	20	55	60	HC	40 0	19 6
Soft Corals	5	2	15	25	25	0	0	2	SC	9 3	10 8
Sponge	0	0	0	0	0	0	0	0	SP	0 0	0 0
Rock	60	33	30	40	55	80	45	38	RK	47 6	16 6
Rubble	0	0	0	0	10	0	0	0	RB	1 3	3 5
Dead Corals	0	0	0	5	0	0	0	0	DC	0 6	1 8
Sand	0	0	0	0	0	0	0	0	S	0 0	0 0
Algae > 1 cm height	0	0	0	0	0	0	0	0	TA	0 0	0 0
Total (100%)	100	100	90	100	100	100	100	100		98 8	
% Cover, CRI Substrates											
Hard Corals	35	65	45	30	10	20	55	60	HC	40 0	19 6
Soft Corals	5	2	15	25	25	0	0	2	SC	9 3	10 8
Other	60	33	40	45	65	80	45	38	OT	50 8	16 1
CRI Value											
Hard Corals	3	4	3	2	1	2	4	4	HC	2 9	1 1
Soft Corals	1	1	2	2	2	1	1	1	SC	1 4	0 5
Other	4	3	3	3	4	5	3	3	OT	3 5	0 8

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1998 Data Hurgada Monitoring of 11 Sites for Percent Cover and Coral Reef Index in Quadrants

Gota Torfa	1-Nov-98	Site #	9								
(Hurghada)											
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Substrate	Average	STDEV
% Cover, All Substrates											
Hard Corals	15	0	10	35	80	90	85	80	HC	49 4	38 1
Soft Corals	30	5	2	15	0	0	0	0	SC	6 5	10 8
Sponge	0	0	0	0	0	0	0	0	SP	0 0	0 0
Rock	55	0	38	60	20	10	10	5	RK	24 8	23 3
Rubble	0	95	50	0	0	0	5	15	RB	20 6	34 6
Dead Corals	0	0	0	0	0	0	0	0	DC	0 0	0 0
Sand	0	0	0	0	0	0	0	0	S	0 0	0 0
Algae > 1 cm height	0	0	0	0	0	0	0	0	TA	0 0	0 0
Total (100%)	100	100	100	110	100	100	100	100		108 9	
% Cover, CRI Substrates											
Hard Corals	15	0	10	35	80	90	85	80	HC	49 4	38 1
Soft Corals	30	5	2	15	0	0	0	0	SC	6 5	10 8
Other	55	95	88	50	20	10	15	20	OT	44 1	33 5
CRI Value											
Hard Corals	2	1	1	3	5	5	5	5	HC	3 4	1 8
Soft Corals	3	1	1	2	1	1	1	1	SC	1 4	0 7
Other	4	5	5	3	2	1	2	2	OT	3 0	1 5

1998 Data Hurgada Monitoring of 11 Sites for Percent Cover and Coral Reef Index in Quadrants

Shaab Eshta	4-Nov-98	Site #	11								
(Hurghada)											
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Substrate	Average	STDEV
% Cover, All Substrates											
Hard Corals	35	65	45	30	10	20	55	60	HC	40 0	19 6
Soft Corals	5	2	15	25	25	0	0	2	SC	9 3	10 8
Sponge	0	0	0	0	0	0	0	0	SP	0 0	0 0
Rock	60	33	30	40	55	80	45	38	RK	47 6	16 6
Rubble	0	0	0	0	10	0	0	0	RB	1 3	3 5
Dead Corals	0	0	0	5	0	0	0	0	DC	0 6	1 8
Sand	0	0	0	0	0	0	0	0	S	0 0	0 0
Algae > 1 cm height	0	0	0	0	0	0	0	0	TA	0 0	0 0
Total (100%)	100	100	90	100	100	100	100	100		98 8	
% Cover, CRI Substrates											
Hard Corals	35	65	45	30	10	20	55	60	HC	40 0	19 6
Soft Corals	5	2	15	25	25	0	0	2	SC	9 3	10 8
Other	60	33	40	45	65	80	45	38	OT	50 8	16 1
CRI Value											
Hard Corals	3	4	3	2	1	2	4	4	HC	2 9	1 1
Soft Corals	1	1	2	2	2	1	1	1	SC	1 4	0 5
Other	4	3	3	3	4	5	3	3	OT	3 5	0 8

1998 Data Hurgada Monitoring of 11 Sites for Percent Cover and Coral Reef Index in Quadrants

Shaab Sabina	21-Oct-98	Site #	4								
(Hurghada)											
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Substrate	Average	STDEV
% Cover, All Substrates											
Hard Corals	5	5	25	90	75	60	85	85	HC	53 8	36 5
Soft Corals	0	0	25	0	15	20	0	0	SC	7 5	10 7
Sponge	0	0	0	0	0	0	0	0	SP	0 0	0 0
Rock	95	80	40	10	10	20	15	15	RK	35 6	33 6
Rubble	0	15	10	0	0	0	0	0	RB	3 1	5 9
Dead Corals	0	0	0	0	0	0	0	0	DC	0 0	0 0
Sand	0	0	0	0	0	0	0	0	S	0 0	0 0
Algae > 1 cm height	0	0	0	0	0	0	0	0	TA	0 0	0 0
Total (100%)	100	100	100	100	100	100	100	100		100 0	
% Cover, CRI Substrates											
Hard Corals	5	5	25	90	75	60	85	85	HC	53 8	36 5
Soft Corals	0	0	25	0	15	20	0	0	SC	7 5	10 7
Other	95	95	50	10	10	20	15	15	OT	38 8	37 0
CRI Value											
Hard Corals	1	1	2	5	4	4	5	5	HC	3 4	1 8
Soft Corals	1	1	2	1	2	2	1	1	SC	1 4	0 5
Other	5	5	3	1	1	2	2	2	OT	2 6	1 6

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1998 Data Hurgada Monitoring of 11 Sites for Percent Cover and Coral Reef Index in Quadrants

Shaab Torfa	1-Nov-98	Site #	8								
(Hurghada)											
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Substrate	Average	STDEV
% Cover, All Substrates											
Hard Corals	40	10	40	25	25	25	45	65	HC	34 4	16 8
Soft Corals	0	3	1	1	2	0	0	0	SC	0 9	1 1
Sponge	0	0	0	0	0	0	0	0	SP	0 0	0 0
Rock	20	62	35	50	13	60	35	15	RK	36 3	19 6
Rubble	5	10	0	0	10	0	0	5	RB	3 8	4 4
Dead Corals	0	0	0	0	0	0	0	0	DC	0 0	0 0
Sand	35	15	24	24	50	15	20	15	S	24 8	12 3
Algae > 1 cm height	0	0	0	0	0	0	0	0	TA	0 0	0 0
Total (100%)	100	100	100	100	100	100	100	100		100 0	
% Cover, CRI Substrates											
Hard Corals	40	10	40	25	25	25	45	65	HC	34 4	16 8
Soft Corals	0	3	1	1	2	0	0	0	SC	0 9	1 1
Other	60	87	59	74	73	75	55	35	OT	64 8	16 0
CRI Value											
Hard Corals	3	1	3	2	2	2	3	4	HC	2 5	0 9
Soft Corals	1	1	1	1	1	1	1	1	SC	1 0	0 0
Other	4	5	4	4	4	4	4	3	OT	4 0	0 5

1998 Data Hurgada Monitoring of 11 Sites for Percent Cover and Coral Reef Index in Quadrants

Shaab Sabina	21-Oct-98	Site #	4								
(Hurghada)											
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Substrate	Average	STDEV
% Cover, All Substrates											
Hard Corals	5	5	25	90	75	60	85	85	HC	53 8	36 5
Soft Corals	0	0	25	0	15	20	0	0	SC	7 5	10 7
Sponge	0	0	0	0	0	0	0	0	SP	0 0	0 0
Rock	95	80	40	10	10	20	15	15	RK	35 6	33 6
Rubble	0	15	10	0	0	0	0	0	RB	3 1	5 9
Dead Corals	0	0	0	0	0	0	0	0	DC	0 0	0 0
Sand	0	0	0	0	0	0	0	0	S	0 0	0 0
Algae > 1 cm height	0	0	0	0	0	0	0	0	TA	0 0	0 0
Total (100%)	100	100	100	100	100	100	100	100		100 0	
% Cover, CRI Substrates											
Hard Corals	5	5	25	90	75	60	85	85	HC	53 8	36 5
Soft Corals	0	0	25	0	15	20	0	0	SC	7 5	10 7
Other	95	95	50	10	10	20	15	15	OT	38 8	37 0
CRI Value											
Hard Corals	1	1	2	5	4	4	5	5	HC	3 4	1 8
Soft Corals	1	1	2	1	2	2	1	1	SC	1 4	0 5
Other	5	5	3	1	1	2	2	2	OT	2 6	1 6

1998 Data Hurgada Monitoring of 11 Sites for Percent Cover and Coral Reef Index in Quadrants

Shaab Torfa	1-Nov-98	Site #	8								
(Hurghada)											
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Substrate	Average	STDEV
% Cover, All Substrates											
Hard Corals	40	10	40	25	25	25	45	65	HC	34 4	16 8
Soft Corals	0	3	1	1	2	0	0	0	SC	0 9	1 1
Sponge	0	0	0	0	0	0	0	0	SP	0 0	0 0
Rock	20	62	35	50	13	60	35	15	RK	36 3	19 6
Rubble	5	10	0	0	10	0	0	5	RB	3 8	4 4
Dead Corals	0	0	0	0	0	0	0	0	DC	0 0	0 0
Sand	35	15	24	24	50	15	20	15	S	24 8	12 3
Algae > 1 cm height	0	0	0	0	0	0	0	0	TA	0 0	0 0
Total (100%)	100	100	100	100	100	100	100	100		100 0	
% Cover, CRI Substrates											
Hard Corals	40	10	40	25	25	25	45	65	HC	34 4	16 8
Soft Corals	0	3	1	1	2	0	0	0	SC	0 9	1 1
Other	60	87	59	74	73	75	55	35	OT	64 8	16 0
CRI Value											
Hard Corals	3	1	3	2	2	2	3	4	HC	2 5	0 9
Soft Corals	1	1	1	1	1	1	1	1	SC	1 0	0 0
Other	4	5	4	4	4	4	4	3	OT	4 0	0 5

1998 Data Hurgada Monitoring of 11 Sites for Percent Cover and Coral Reef Index in Quadrants

Shabrour Um Gamar	28-Oct-98	Site #	6								
(Hurghada)											
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Substrate	Average	STDEV
% Cover, All Substrates											
Hard Corals	25	5	60	70	30	60	45	25	HC	40 0	22 4
Soft Corals	20	50	0	5	20	0	15	5	SC	14 4	16 6
Sponge	5	0	0	0	0	0	0	0	SP	0 6	1 8
Rock	35	45	40	25	50	40	40	70	RK	43 1	13 1
Rubble	0	0	0	0	0	0	0	0	RB	0 0	0 0
Dead Corals	15	0	0	0	0	0	0	0	DC	1 9	5 3
Sand	0	0	0	0	0	0	0	0	S	0 0	0 0
Algae > 1 cm height	0	0	0	0	0	0	0	0	TA	0 0	0 0
Total (100%)	100	100	100	100	100	100	100	100		100 0	
% Cover, CRI Substrates											
Hard Corals	25	5	60	70	30	60	45	25	HC	40 0	22 4
Soft Corals	20	50	0	5	20	0	15	5	SC	14 4	16 6
Other	55	45	40	25	50	40	40	70	OT	45 6	13 2
CRI Value											
Hard Corals	2	1	4	4	2	4	3	2	HC	2 8	1 2
Soft Corals	2	3	1	1	2	1	2	1	SC	1 6	0 7
Other	4	3	3	2	3	3	3	4	OT	3 1	0 6

1998 Data Hurgada Monitoring of 11 Sites for Percent Cover and Coral Reef Index in Quadrants

Umm Gamar (W)	14-Oct-98	Site #	1								
(Hurghada)											
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Substrate	Average	STDEV
% Cover, All Categories											
Hard Corals	Not Found	25	15	15	35	60	25	25	HC	28 6	15 5
Soft Corals	Not Found	5	48	8	25	0	20	50	SC	22 3	20 2
Sponge	Not Found	10	2	0	0	0	0	0	SP	1 7	3 7
Rock	Not Found	48	25	67	12	18	35	20	RK	32 1	19 5
Dead Corals	Not Found	10	10	10	13	20	15	5	RB	11 9	4 7
Rubble	Not Found	0	0	0	15	2	5	0	DC	3 1	5 6
Sand	Not Found	0	0	0	0	0	0	0	S	0 0	0 0
Algae > 1 cm height	Not Found	2	0	0	0	0	0	0	TA	0 3	0 8
Total (100%)		100	100	100	100	100	100	100	Total	100 0	
% Cover, CRI Categories											
Hard Corals		25	15	15	35	60	25	25	HC	28 6	15 5
Soft Corals		5	48	8	25	0	20	50	SC	22 3	20 2
Other		70	37	77	40	40	50	25	OT	48 4	18 7
CRI Value											
Hard Corals		2	2	2	3	4	2	2	Hard Corals	2 4	0 8
Soft Corals		1	3	1	2	1	2	3	Soft Corals	1 9	0 9
Other		4	3	5	3	3	3	2	Other	3 3	1 0

NOTE Minor errors are noted in the % cover in 2 quadrants, one at Abu Ramada West (Q1) and one at Shaab Eshta (Q3) It is possible that these errors were introduced in creating this table and that the raw handwritten data from the field is correct In any case, these have less than 10% cover errors, and therefore will not alter the average % cover or the Coral Reef Index at the survey site (s tighe)

1998 Data Hurgada Monitoring of 11 Sites for Percent Cover and Coral Reef Index in Quadrants

Shabrour Um Gamar	28-Oct-98	Site #	6								
(Hurghada)											
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Substrate	Average	STDEV
% Cover, All Substrates											
Hard Corals	25	5	60	70	30	60	45	25	HC	40 0	22 4
Soft Corals	20	50	0	5	20	0	15	5	SC	14 4	16 6
Sponge	5	0	0	0	0	0	0	0	SP	0 6	1 8
Rock	35	45	40	25	50	40	40	70	RK	43 1	13 1
Rubble	0	0	0	0	0	0	0	0	RB	0 0	0 0
Dead Corals	15	0	0	0	0	0	0	0	DC	1 9	5 3
Sand	0	0	0	0	0	0	0	0	S	0 0	0 0
Algae > 1 cm height	0	0	0	0	0	0	0	0	TA	0 0	0 0
Total (100%)	100	100	100	100	100	100	100	100		100 0	
% Cover, CRI Substrates											
Hard Corals	25	5	60	70	30	60	45	25	HC	40 0	22 4
Soft Corals	20	50	0	5	20	0	15	5	SC	14 4	16 6
Other	55	45	40	25	50	40	40	70	OT	45 6	13 2
CRI Value											
Hard Corals	2	1	4	4	2	4	3	2	HC	2 8	1 2
Soft Corals	2	3	1	1	2	1	2	1	SC	1 6	0 7
Other	4	3	3	2	3	3	3	4	OT	3 1	0 6

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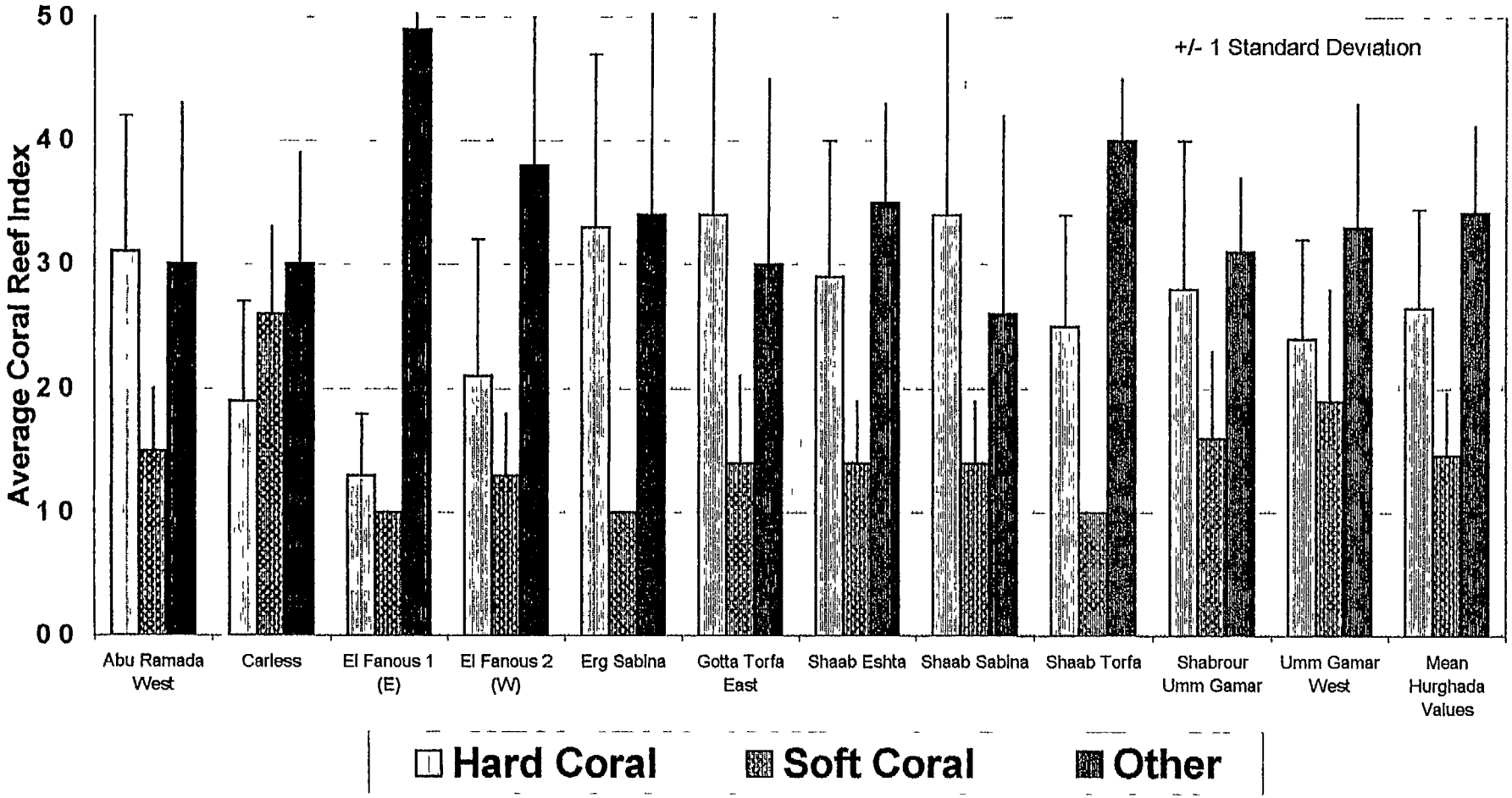
1998 Data Hurgada Monitoring of 11 Sites for Percent Cover and Coral Reef Index in Quadrants

Umm Gamar (W)	14-Oct-98	Site #	1								
(Hurghada)											
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Substrate	Average	STDEV
% Cover, All Categories											
Hard Corals	Not Found	25	15	15	35	60	25	25	HC	28 6	15 5
Soft Corals	Not Found	5	48	8	25	0	20	50	SC	22 3	20 2
Sponge	Not Found	10	2	0	0	0	0	0	SP	1 7	3 7
Rock	Not Found	48	25	67	12	18	35	20	RK	32 1	19 5
Dead Corals	Not Found	10	10	10	13	20	15	5	RB	11 9	4 7
Rubble	Not Found	0	0	0	15	2	5	0	DC	3 1	5 6
Sand	Not Found	0	0	0	0	0	0	0	S	0 0	0 0
Algae > 1 cm height	Not Found	2	0	0	0	0	0	0	TA	0 3	0 8
Total (100%)		100	100	100	100	100	100	100	Total	100 0	
% Cover, CRI Categories											
Hard Corals		25	15	15	35	60	25	25	HC	28 6	15 5
Soft Corals		5	48	8	25	0	20	50	SC	22 3	20 2
Other		70	37	77	40	40	50	25	OT	48 4	18 7
CRI Value											
Hard Corals		2	2	2	3	4	2	2	Hard Corals	2 4	0 8
Soft Corals		1	3	1	2	1	2	3	Soft Corals	1 9	0 9
Other		4	3	5	3	3	3	2	Other	3 3	1 0

NOTE Minor errors are noted in the % cover in 2 quadrants, one at Abu Ramada West (Q1) and one at Shaab Eshta (Q3) It is possible that these errors were introduced in creating this table and that the raw handwritten data from the field is correct In any case, these have less than 10% cover errors, and therefore will not alter the average % cover or the Coral Reef Index at the survey site (s tighe)

1998 Coral Reef Index Values for 11 Hurghada Monitoring Sites



PMG st/Oct 99

FIGURE 1

CRI Data and Graphs-96-98 98HurghadaCRI-11Sites

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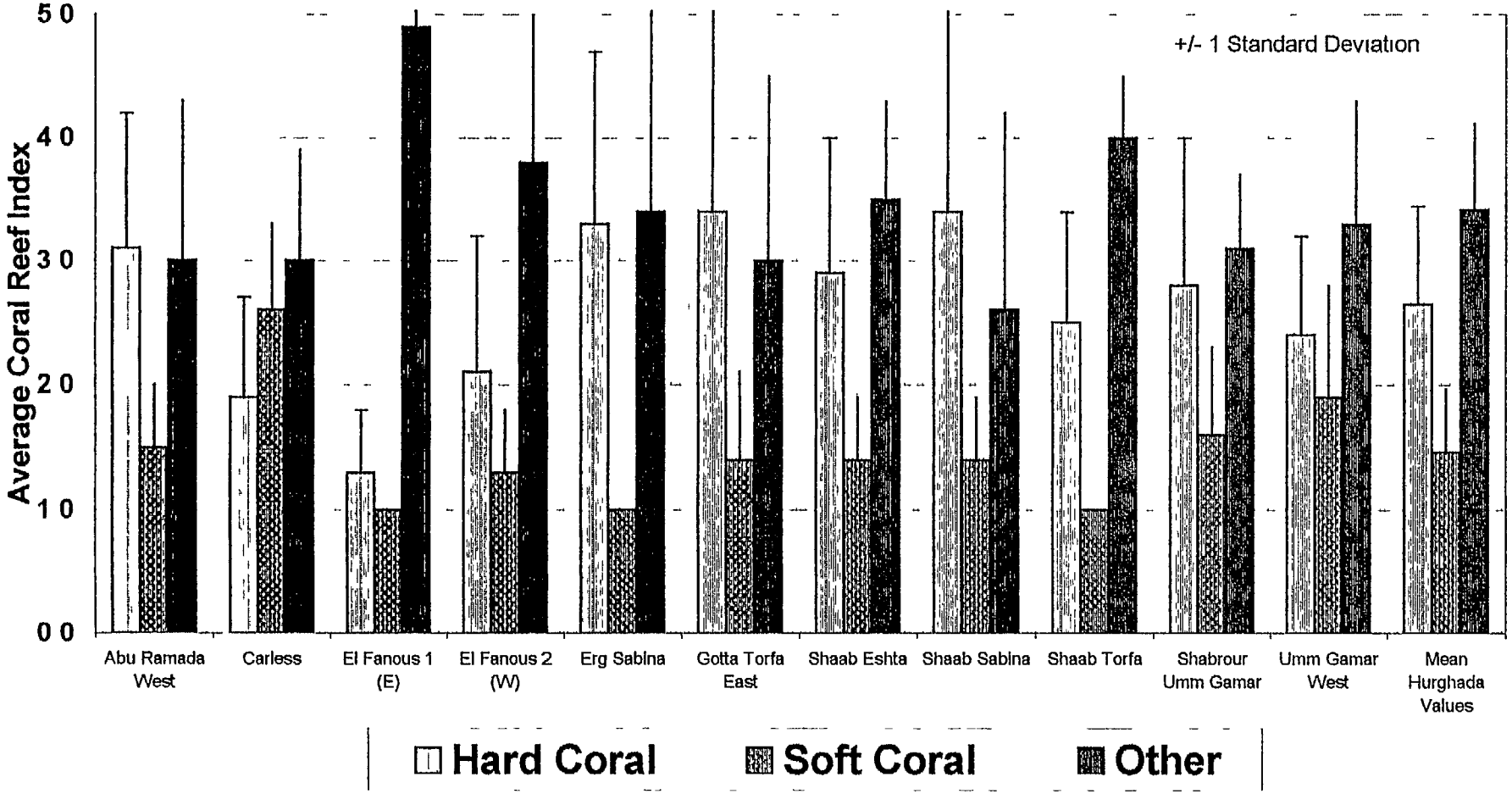
1998 Data Safaga Monitoring of 10 Sites for Percent Cover and Coral Reef Index in Quadrants

Abu Kefan East	7-Nov-98	Site #	1								
(Safaga)											
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Substrate	Average	STDEV
% Cover, All Categories											
Hard Corals	25	65	65	25	25	15	45	55	HC	40 0	20 0
Soft Corals	30	5	0	0	25	15	0	20	SC	11 9	12 2
Sponge	0	0	0	0	0	0	0	0	SP	0 0	0 0
Rock	45	30	35	75	50	70	55	25	RK	48 1	18 1
Rubbles	0	0	0	0	0	0	0	0	RB	0 0	0 0
Dead Corals	0	0	0	0	0	0	0	0	DC	0 0	0 0
Sand	0	0	0	0	0	0	0	0	S	0 0	0 0
Algae > 1 cm height	0	0	0	0	0	0	0	0	TA	0 0	0 0
Total (100%)	100	100	100	100	100	100	100	100	Total	100 0	
% Cover, CRI Substrates											
Hard Corals	25	65	65	25	25	15	45	55	HC	40 0	20 0
Soft Corals	30	5	0	0	25	15	0	20	SC	11 9	12 2
Other	45	30	35	75	50	70	55	25	OT	48 1	18 1
CRI Value											
Hard Corals	2	4	4	2	2	2	3	4	Hard Corals	2 9	1 0
Soft Corals	2	1	1	1	2	2	1	2	Soft Corals	1 5	0 5
Other	3	2	3	4	3	4	4	2	Other	3 1	0 8

1998 Coral Reef Index Values for 11 Hurghada Monitoring Sites



1998 Data Safaga Monitoring of 10 Sites for Percent Cover and Coral Reef Index in Quadrants

Abu Kefan East	7-Nov-98	Site #	1								
(Safaga)											
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Substrate	Average	STDEV
% Cover, All Categories											
Hard Corals	25	65	65	25	25	15	45	55	HC	40 0	20 0
Soft Corals	30	5	0	0	25	15	0	20	SC	11 9	12 2
Sponge	0	0	0	0	0	0	0	0	SP	0 0	0 0
Rock	45	30	35	75	50	70	55	25	RK	48 1	18 1
Rubbles	0	0	0	0	0	0	0	0	RB	0 0	0 0
Dead Corals	0	0	0	0	0	0	0	0	DC	0 0	0 0
Sand	0	0	0	0	0	0	0	0	S	0 0	0 0
Algae > 1 cm height	0	0	0	0	0	0	0	0	TA	0 0	0 0
Total (100%)	100	100	100	100	100	100	100	100	Total	100 0	
% Cover, CRI Substrates											
Hard Corals	25	65	65	25	25	15	45	55	HC	40 0	20 0
Soft Corals	30	5	0	0	25	15	0	20	SC	11 9	12 2
Other	45	30	35	75	50	70	55	25	OT	48 1	18 1
CRI Value											
Hard Corals	2	4	4	2	2	2	3	4	Hard Corals	2 9	1 0
Soft Corals	2	1	1	1	2	2	1	2	Soft Corals	1 5	0 5
Other	3	2	3	4	3	4	4	2	Other	3 1	0 8

1998 Data Safaga Monitoring of 10 Sites for Percent Cover and Coral Reef Index in Quadrants

Abu Kefan West	11/7/98	Site #	2								
(Safaga)											
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Substrate	Average	STDEV
% Cover, All Categories											
Hard Corals	20	65	40	25	5	30	30	50	HC	33 1	18 5
Soft Corals	0	0	0	25	20	30	10	10	SC	11 9	11 9
Sponge	0	0	0	0	0	0	0	0	SP	0 0	0 0
Rock	80	35	60	20	75	40	30	40	RK	47 5	21 7
Rubbles	0	0	0	20	0	0	30	0	RB	6 3	11 9
Dead Corals	0	0	0	0	0	0	0	0	DC	0 0	0 0
Sand	0	0	0	10	0	0	0	0	S	1 3	3 5
Algae > 1 cm height	0	0	0	0	0	0	0	0	TA	0 0	0 0
Total (100%)	100	100	100	100	100	100	100	100		100	
% Cover, CRI Substrates											
Hard Corals	20	65	40	25	5	30	30	50	HC	33 1	18 5
Soft Corals	0	0	0	25	20	30	10	10	SO	11 9	11 9
Other	80	35	60	50	75	40	60	40	OT	55 0	16 7
CRI Value											
Hard Corals	2	4	3	2	1	2	2	3	Hard Corals	2 4	0 9
Soft Corals	1	1	1	2	2	2	1	1	Soft Corals	1 4	0 5
Other	5	3	4	3	4	3	4	3	Other	3 6	0 7

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1998 Data Safaga Monitoring of 10 Sites for Percent Cover and Coral Reef Index in Quadrants

Gamul Kabir	11/9/98	Site #:	5								
(Safaga)											
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Substrate	Average	STDEV
% Cover, All Categories											
Hard Corals	75	55	35	15	20	40	45	40	HC	40 6	19 0
Soft Corals	5	0	15	5	5	0	0	0	SC	3 8	5 2
Sponge	0	0	0	0	0	0	0	0	SP	0 0	0 0
Rock	20	45	50	15	25	25	25	35	RK	30 0	12 2
Rubbles	0	0	0	15	10	15	20	5	RB	8 1	8 0
Dead Corals	0	0	0	10	0	0	0	20	DC	3 8	7 4
Sand	0	0	0	40	40	20	10	5	S	14 4	17 2
Algae > 1 cm height	0	0	0	0	0	0	0	0	TA	0 0	0 0
Total (100%)	100	100	100	100	100	100	100	105		100 6	
% Cover, CRI Substrates											
Hard Corals	75	55	35	15	20	40	45	40	HC	40 6	19 0
Soft Corals	5	0	15	5	5	0	0	0	SC	3 8	5 2
Other	20	45	50	80	75	60	55	65	OT	56 3	18 9
CRI Value											
Hard Corals	4	4	3	2	2	3	3	3	Hard Coral	3 0	0 8
Soft Corals	1	1	2	1	1	1	1	1	Soft Coral	1 1	0 4
Other	2	3	3	5	4	4	4	4	Other	3 6	0 9

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1998 Data Safaga Monitoring of 10 Sites for Percent Cover and Coral Reef Index in Quadrants

Abu Kefan West	11/7/98	Site #	2							
(Safaga)										
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Substrate	Average	STDEV
% Cover, All Categories											
Hard Corals	20	65	40	25	5	30	30	50	HC	33 1	18 5
Soft Corals	0	0	0	25	20	30	10	10	SC	11 9	11 9
Sponge	0	0	0	0	0	0	0	0	SP	0 0	0 0
Rock	80	35	60	20	75	40	30	40	RK	47 5	21 7
Rubbles	0	0	0	20	0	0	30	0	RB	6 3	11 9
Dead Corals	0	0	0	0	0	0	0	0	DC	0 0	0 0
Sand	0	0	0	10	0	0	0	0	S	1 3	3 5
Algae > 1 cm height	0	0	0	0	0	0	0	0	TA	0 0	0 0
Total (100%)	100	100	100	100	100	100	100	100		100	
% Cover, CRI Substrates											
Hard Corals	20	65	40	25	5	30	30	50	HC	33 1	18 5
Soft Corals	0	0	0	25	20	30	10	10	SO	11 9	11 9
Other	80	35	60	50	75	40	60	40	OT	55 0	16 7
CRI Value											
Hard Corals	2	4	3	2	1	2	2	3	Hard Corals	2 4	0 9
Soft Corals	1	1	1	2	2	2	1	1	Soft Corals	1 4	0 5
Other	5	3	4	3	4	3	4	3	Other	3 6	0 7

1998 Data Safaga Monitoring of 10 Sites for Percent Cover and Coral Reef Index in Quadrants

Gamul Kabir	11/9/98	Site #	5								
(Safaga)											
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Substrate	Average	STDEV
% Cover, All Categories											
Hard Corals	75	55	35	15	20	40	45	40	HC	40 6	19 0
Soft Corals	5	0	15	5	5	0	0	0	SC	3 8	5 2
Sponge	0	0	0	0	0	0	0	0	SP	0 0	0 0
Rock	20	45	50	15	25	25	25	35	RK	30 0	12 2
Rubbles	0	0	0	15	10	15	20	5	RB	8 1	8 0
Dead Corals	0	0	0	10	0	0	0	20	DC	3 8	7 4
Sand	0	0	0	40	40	20	10	5	S	14 4	17 2
Algae > 1 cm height	0	0	0	0	0	0	0	0	TA	0 0	0 0
Total (100%)	100	100	100	100	100	100	100	105		100 6	
% Cover, CRI Substrates											
Hard Corals	75	55	35	15	20	40	45	40	HC	40 6	19 0
Soft Corals	5	0	15	5	5	0	0	0	SC	3 8	5 2
Other	20	45	50	80	75	60	55	65	OT	56 3	18 9
CRI Value											
Hard Corals	4	4	3	2	2	3	3	3	Hard Coral	3 0	0 8
Soft Corals	1	1	2	1	1	1	1	1	Soft Coral	1 1	0 4
Other	2	3	3	5	4	4	4	4	Other	3 6	0 9

1998 Data Safaga Monitoring of 10 Sites for Percent Cover and Coral Reef Index in Quadrants

Gamul Sagir	11/9/98	Site #	6								
(Safaga)											
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Substrate	Average	STDEV
% Cover, All Categories											
Hard Corals	40	25	30	20	25	35	10	40	HC	28 1	10 3
Soft Corals	15	35	40	0	5	0	0	0	SC	11 9	16 7
Sponge	0	0	0	0	0	0	5	0	SP	0 6	1 8
Rock	45	40	30	30	20	65	75	35	RK	42 5	18 7
Rubbles	0	0	0	50	30	0	0	0	RB	10 0	19 3
Dead Corals	0	0	0	0	20	0	10	25	DC	6 9	10 3
Sand	0	0	0	0	0	0	0	0	S	0 0	0 0
Algae > 1 cm height	0	0	0	0	0	0	0	0	TA	0 0	0 0
Total (100%)	100	100	100	100	100	100	100	100		100	
% Cover, CRI Substrates											
Hard Corals	40	25	30	20	25	35	10	40	HC	28 1	10 3
Soft Corals	15	35	40	0	5	0	0	0	SC	11 9	16 7
Other	45	40	30	80	70	65	90	60	OT	60 0	20 5
CRI Value											
Hard Corals	3	2	2	2	2	3	1	3	Hard Coral	2 3	0 7
Soft Corals	2	3	3	1	1	1	1	1	Soft Coral	1 6	0 9
Other	3	3	2	5	4	4	5	4	Other	3 8	1 0

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1998 Data Safaga Monitoring of 10 Sites for Percent Cover and Coral Reef Index in Quadrants

Panorama Reef East	11/10/98	Site #	7								
(Safaga)											
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Substrate	Average	STDEV
% Cover, All Categories											
Hard Corals	70	70	60	55	75	55	60	20	HC	58 1	17 1
Soft Corals	10	10	10	15	10	15	20	40	SC	16 3	10 3
Sponge	0	0	0	0	0	0	0	0	SP	0 0	0 0
Rock	15	20	30	20	10	30	20	40	RK	23 1	9 6
Rubbles	5	0	0	10	5	0	0	0	RB	2 5	3 8
Dead Corals	0	0	0	0	0	0	0	0	DC	0 0	0 0
Sand	0	0	0	0	0	0	0	0	S	0 0	0 0
Algae > 1 cm height	0	0	0	0	0	0	0	0	TA	0 0	0 0
Total (100%)	100	100	100	100	100	100	100	100		100	
% Cover, CRI Substrates											
Hard Corals	70	70	60	55	75	55	60	20	HC	58 1	17 1
Soft Corals	10	10	10	15	10	15	20	40	SC	16 3	10 3
Other	20	20	30	30	15	30	20	40	OT	25 6	8 2
CRI Value											
Hard Corals	4	4	4	4	4	4	4	2	Hard Coral	3 8	0 7
Soft Corals	1	1	1	2	1	2	2	3	Soft Coral	1 6	0 7
Other	2	2	2	2	2	2	2	3	Other	2 1	0 4

1998 Data Safaga Monitoring of 10 Sites for Percent Cover and Coral Reef Index in Quadrants

Gamul Sagir	11/9/98	Site #	6								
(Safaga)											
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Substrate	Average	STDEV
% Cover, All Categories											
Hard Corals	40	25	30	20	25	35	10	40	HC	28 1	10 3
Soft Corals	15	35	40	0	5	0	0	0	SC	11 9	16 7
Sponge	0	0	0	0	0	0	5	0	SP	0 6	1 8
Rock	45	40	30	30	20	65	75	35	RK	42 5	18 7
Rubbles	0	0	0	50	30	0	0	0	RB	10 0	19 3
Dead Corals	0	0	0	0	20	0	10	25	DC	6 9	10 3
Sand	0	0	0	0	0	0	0	0	S	0 0	0 0
Algae > 1 cm height	0	0	0	0	0	0	0	0	TA	0 0	0 0
Total (100%)	100	100	100	100	100	100	100	100		100	
% Cover, CRI Substrates											
Hard Corals	40	25	30	20	25	35	10	40	HC	28 1	10 3
Soft Corals	15	35	40	0	5	0	0	0	SC	11 9	16 7
Other	45	40	30	80	70	65	90	60	OT	60 0	20 5
CRI Value											
Hard Corals	3	2	2	2	2	3	1	3	Hard Coral	2 3	0 7
Soft Corals	2	3	3	1	1	1	1	1	Soft Coral	1 6	0 9
Other	3	3	2	5	4	4	5	4	Other	3 8	1 0

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1998 Data Safaga Monitoring of 10 Sites for Percent Cover and Coral Reef Index in Quadrants

Panorama Reef East	11/10/98	Site #	7								
(Safaga)											
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Substrate	Average	STDEV
% Cover, All Categories											
Hard Corals	70	70	60	55	75	55	60	20	HC	58 1	17 1
Soft Corals	10	10	10	15	10	15	20	40	SC	16 3	10 3
Sponge	0	0	0	0	0	0	0	0	SP	0 0	0 0
Rock	15	20	30	20	10	30	20	40	RK	23 1	9 6
Rubbles	5	0	0	10	5	0	0	0	RB	2 5	3 8
Dead Corals	0	0	0	0	0	0	0	0	DC	0 0	0 0
Sand	0	0	0	0	0	0	0	0	S	0 0	0 0
Algae > 1 cm height	0	0	0	0	0	0	0	0	TA	0 0	0 0
Total (100%)	100	100	100	100	100	100	100	100		100	
% Cover, CRI Substrates											
Hard Corals	70	70	60	55	75	55	60	20	HC	58 1	17 1
Soft Corals	10	10	10	15	10	15	20	40	SC	16 3	10 3
Other	20	20	30	30	15	30	20	40	OT	25 6	8 2
CRI Value											
Hard Corals	4	4	4	4	4	4	4	2	Hard Coral	3 8	0 7
Soft Corals	1	1	1	2	1	2	2	3	Soft Coral	1 6	0 7
Other	2	2	2	2	2	2	2	3	Other	2 1	0 4

1998 Data Safaga Monitoring of 10 Sites for Percent Cover and Coral Reef Index in Quadrants

Panorama Reef West	11/0/98	Site #	8								
(Safaga)											
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Substrate	Average	STDEV
% Cover, All Categories											
Hard Corals	30	40	30	40	30	25	20	70	HC	35 6	15 5
Soft Corals	35	24	40	20	25	45	10	5	SC	25 5	14 0
Sponge	5	1	0	1	0	0	1	0	SP	1 0	1 7
Rock	25	25	25	39	35	25	45	10	RK	28 6	10 8
Rubbles	0	0	0	0	10	5	25	15	RB	6 9	9 2
Dead Corals	10	10	5	0	0	0	0	0	DC	3 1	4 6
Sand	0	0	0	0	0	0	0	0	S	0 0	0 0
Algae > 1 cm height	0	0	0	0	0	0	0	0	TA	0 0	
Total (100%)	105	100	100	100	100	100	101	100			
% Cover, CRI Substrates											
Hard Corals	30	40	30	40	30	25	20	70	HC	35 6	15 5
Soft Corals	35	25	40	20	25	45	10	5	SC	25 6	14 0
Other	40	35	30	40	45	30	70	25	OT	39 4	14 0
CRI Value											
Hard Corals	2	3	2	3	2	2	2	4	Hard Coral	2 5	0 8
Soft Corals	3	2	3	2	2	3	1	1	Soft Coral	2 1	0 8
Other	3	3	2	3	3	2	4	2	Other	2 8	0 7

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1998 Data Safaga Monitoring of 10 Sites for Percent Cover and Coral Reef Index in Quadrants

Tobia Arba	11/11/98	Site#	9								
(Safaga)											
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Substrate	Average	STDEV
% Cover, All Categories											
Hard Corals	25	30	40	25	10	30	55	40	HC	31 9	13 3
Soft Corals	10	15	25	45	40	45	30	40	SC	31 3	13 6
Sponge	0	0	0	0	0	0	0	0	SP	0 0	0 0
Rock	65	55	20	30	45	25	20	15	RK	34 4	18 4
Rubbles	0	0	0	0	0	0	0	0	RB	0 0	0 0
Dead Corals	0	0	15	0	5	0	5	0	DC	3 1	5 3
Sand	0	0	0	0	0	0	0	0	S	0 0	0 0
Algae > 1 cm height	0	0	0	0	0	0	0	0	TA	0 0	0 0
Total (100%)	100	100	100	100	100	100	110	95		100 6	
% Cover, CRI Substrates											
Hard Corals	25	30	40	25	10	30	55	40	HC	31 9	13 3
Soft Corals	10	15	25	45	40	45	30	40	SC	31 3	13 6
Other	65	55	35	30	50	25	15	20	OT	36 9	17 9
CRI Value											
Hard Corals	2	2	3	2	1	2	4	3	Hard Coral	2 4	0 9
Soft Corals	1	2	2	3	3	3	2	3	Soft Coral	2 4	0 7
Other	4	4	3	2	3	2	2	2	Other	2 8	0 9

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1998 Data Safaga Monitoring of 10 Sites for Percent Cover and Coral Reef Index in Quadrants

Panorama Reef West	11/0/98	Site #	8								
(Safaga)											
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Substrate	Average	STDEV
% Cover, All Categories											
Hard Corals	30	40	30	40	30	25	20	70	HC	35 6	15 5
Soft Corals	35	24	40	20	25	45	10	5	SC	25 5	14 0
Sponge	5	1	0	1	0	0	1	0	SP	1 0	1 7
Rock	25	25	25	39	35	25	45	10	RK	28 6	10 8
Rubbles	0	0	0	0	10	5	25	15	RB	6 9	9 2
Dead Corals	10	10	5	0	0	0	0	0	DC	3 1	4 6
Sand	0	0	0	0	0	0	0	0	S	0 0	0 0
Algae > 1 cm height	0	0	0	0	0	0	0	0	TA	0 0	
Total (100%)	105	100	100	100	100	100	101	100			
% Cover, CRI Substrates											
Hard Corals	30	40	30	40	30	25	20	70	HC	35 6	15 5
Soft Corals	35	25	40	20	25	45	10	5	SC	25 6	14 0
Other	40	35	30	40	45	30	70	25	OT	39 4	14 0
CRI Value											
Hard Corals	2	3	2	3	2	2	2	4	Hard Coral	2 5	0 8
Soft Corals	3	2	3	2	2	3	1	1	Soft Coral	2 1	0 8
Other	3	3	2	3	3	2	4	2	Other	2 8	0 7

1998 Data Safaga Monitoring of 10 Sites for Percent Cover and Coral Reef Index in Quadrants

Tobia Arba	11/11/98	Site#	9								
(Safaga)											
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Substrate	Average	STDEV
% Cover, All Categories											
Hard Corals	25	30	40	25	10	30	55	40	HC	31 9	13 3
Soft Corals	10	15	25	45	40	45	30	40	SC	31 3	13 6
Sponge	0	0	0	0	0	0	0	0	SP	0 0	0 0
Rock	65	55	20	30	45	25	20	15	RK	34 4	18 4
Rubbles	0	0	0	0	0	0	0	0	RB	0 0	0 0
Dead Corals	0	0	15	0	5	0	5	0	DC	3 1	5 3
Sand	0	0	0	0	0	0	0	0	S	0 0	0 0
Algae > 1 cm height	0	0	0	0	0	0	0	0	TA	0 0	0 0
Total (100%)	100	100	100	100	100	100	110	95		100 6	
% Cover, CRI Substrates											
Hard Corals	25	30	40	25	10	30	55	40	HC	31 9	13 3
Soft Corals	10	15	25	45	40	45	30	40	SC	31 3	13 6
Other	65	55	35	30	50	25	15	20	OT	36 9	17 9
CRI Value											
Hard Corals	2	2	3	2	1	2	4	3	Hard Coral	2 4	0 9
Soft Corals	1	2	2	3	3	3	2	3	Soft Coral	2 4	0 7
Other	4	4	3	2	3	2	2	2	Other	2 8	0 9

1998 Data Safaga Monitoring of 10 Sites for Percent Cover and Coral Reef Index in Quadrants

Tobia Hamra	11/11/98	Site #	10								
(Safaga)											
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Substrate	Average	STDEV
% Cover, All Categories											
Hard Corals	65	35	60	58	40	65	60	45	HC	53 5	11 7
Soft Corals	0	35	35	2	2	0	5	0	SC	9 9	15 6
Sponge	0	0	0	0	0	0	0	0	SP	0 0	0 0
Rock	35	10	5	40	58	35	35	35	RK	31 6	16 9
Rubbles	0	0	0	0	0	0	0	0	RB	0 0	0 0
Dead Corals	0	20	0	0	0	0	0	0	DC	2 5	7 1
Sand	0	0	0	0	0	0	0	0	S	0 0	0 0
Algae > 1 cm height	0	0	0	0	0	0	0	0	TA	0 0	0 0
Total (100%)	100	100	100	100	100	100	100	80		97 5	
% Cover, CRI Substrates											
Hard Corals	65	35	60	58	40	65	60	45	HC	53 5	11 7
Soft Corals	0	35	35	2	2	0	5	0	SC	9 9	15 6
Other	35	30	5	40	58	35	35	35	OT	34 1	14 5
CRI Value											
Hard Corals	4	3	4	4	3	4	4	3	Hard Coral	3 6	0 5
Soft Corals	1	3	3	1	1	1	1	1	Soft Coral	1 5	0 9
Other	3	2	1	3	4	3	3	4	Other	2 9	1 0

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1998 Data Safaga Monitoring of 10 Sites for Percent Cover and Coral Reef Index in Quadrants

Tobia Kebir	11/8/98	Site #	4								
(Safaga)											
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Substrate	Average	STDEV
% Cover, All Categories											
Hard Corals	30	65	60	70	60	85	45	45	HC	57 5	17 1
Soft Corals	0	0	0	0	5	0	35	0	SC	5 0	12 2
Sponge	0	0	0	0	0	0	0	0	SP	0 0	0 0
Rock	70	25	40	30	35	10	20	55	RK	35 6	19 4
Rubbles	0	0	0	0	0	0	0	0	RB	0 0	0 0
Dead Corals	0	0	0	0	0	0	5	0	DC	0 6	1 8
Sand	0	0	0	0	0	0	0	0	S	0 0	0 0
Algae > 1 cm height	0	0	0	0	0	0	0	0	TA	0 0	0 0
Total (100%)	100	90	100	100	100	95	105	100		98 75	
% Cover, CRI Substrates											
Hard Corals	30	65	60	70	60	85	45	45	HC	57 5	17 1
Soft Corals	0	0	0	0	5	0	35	0	SC	5 0	12 2
Other	70	25	40	30	35	10	25	55	OT	36 3	18 9
CRI Value											
Hard Corals	2	4	4	4	4	5	3	3	Hard Coral	3 6	0 9
Soft Corals	1	1	1	1	1	1	3	1	Soft Coral	1 3	0 7
Other	4	3	3	2	3	2	2	4	Other	2 9	0 8

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Tobia Hamra (Safaga)	11/11/98	Site #	10								
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Substrate	Average	STDEV
% Cover, All Categories											
Hard Corals	65	35	60	58	40	65	60	45	HC	53 5	11 7
Soft Corals	0	35	35	2	2	0	5	0	SC	9 9	15 6
Sponge	0	0	0	0	0	0	0	0	SP	0 0	0 0
Rock	35	10	5	40	58	35	35	35	RK	31 6	16 9
Rubbles	0	0	0	0	0	0	0	0	RB	0 0	0 0
Dead Corals	0	20	0	0	0	0	0	0	DC	2 5	7 1
Sand	0	0	0	0	0	0	0	0	S	0 0	0 0
Algae > 1 cm height	0	0	0	0	0	0	0	0	TA	0 0	0 0
Total (100%)	100	100	100	100	100	100	100	80		97 5	
% Cover, CRI Substrates											
Hard Corals	65	35	60	58	40	65	60	45	HC	53 5	11 7
Soft Corals	0	35	35	2	2	0	5	0	SC	9 9	15 6
Other	35	30	5	40	58	35	35	35	OT	34 1	14 5
CRI Value											
Hard Corals	4	3	4	4	3	4	4	3	Hard Coral	3 6	0 5
Soft Corals	1	3	3	1	1	1	1	1	Soft Coral	1 5	0 9
Other	3	2	1	3	4	3	3	4	Other	2 9	1 0

1998 Data Safaga Monitoring of 10 Sites for Percent Cover and Coral Reef Index in Quadrants

Tobia Kebir	11/8/98	Site #	4								
(Safaga)											
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Substrate	Average	STDEV
% Cover, All Categories											
Hard Corals	30	65	60	70	60	85	45	45	HC	57 5	17 1
Soft Corals	0	0	0	0	5	0	35	0	SC	5 0	12 2
Sponge	0	0	0	0	0	0	0	0	SP	0 0	0 0
Rock	70	25	40	30	35	10	20	55	RK	35 6	19 4
Rubbles	0	0	0	0	0	0	0	0	RB	0 0	0 0
Dead Corals	0	0	0	0	0	0	5	0	DC	0 6	1 8
Sand	0	0	0	0	0	0	0	0	S	0 0	0 0
Algae > 1 cm height	0	0	0	0	0	0	0	0	TA	0 0	0 0
Total (100%)	100	90	100	100	100	95	105	100		98 75	
% Cover, CRI Substrates											
Hard Corals	30	65	60	70	60	85	45	45	HC	57 5	17 1
Soft Corals	0	0	0	0	5	0	35	0	SC	5 0	12 2
Other	70	25	40	30	35	10	25	55	OT	36 3	18 9
CRI Value											
Hard Corals	2	4	4	4	4	5	3	3	Hard Coral	3 6	0 9
Soft Corals	1	1	1	1	1	1	3	1	Soft Coral	1 3	0 7
Other	4	3	3	2	3	2	2	4	Other	2 9	0 8

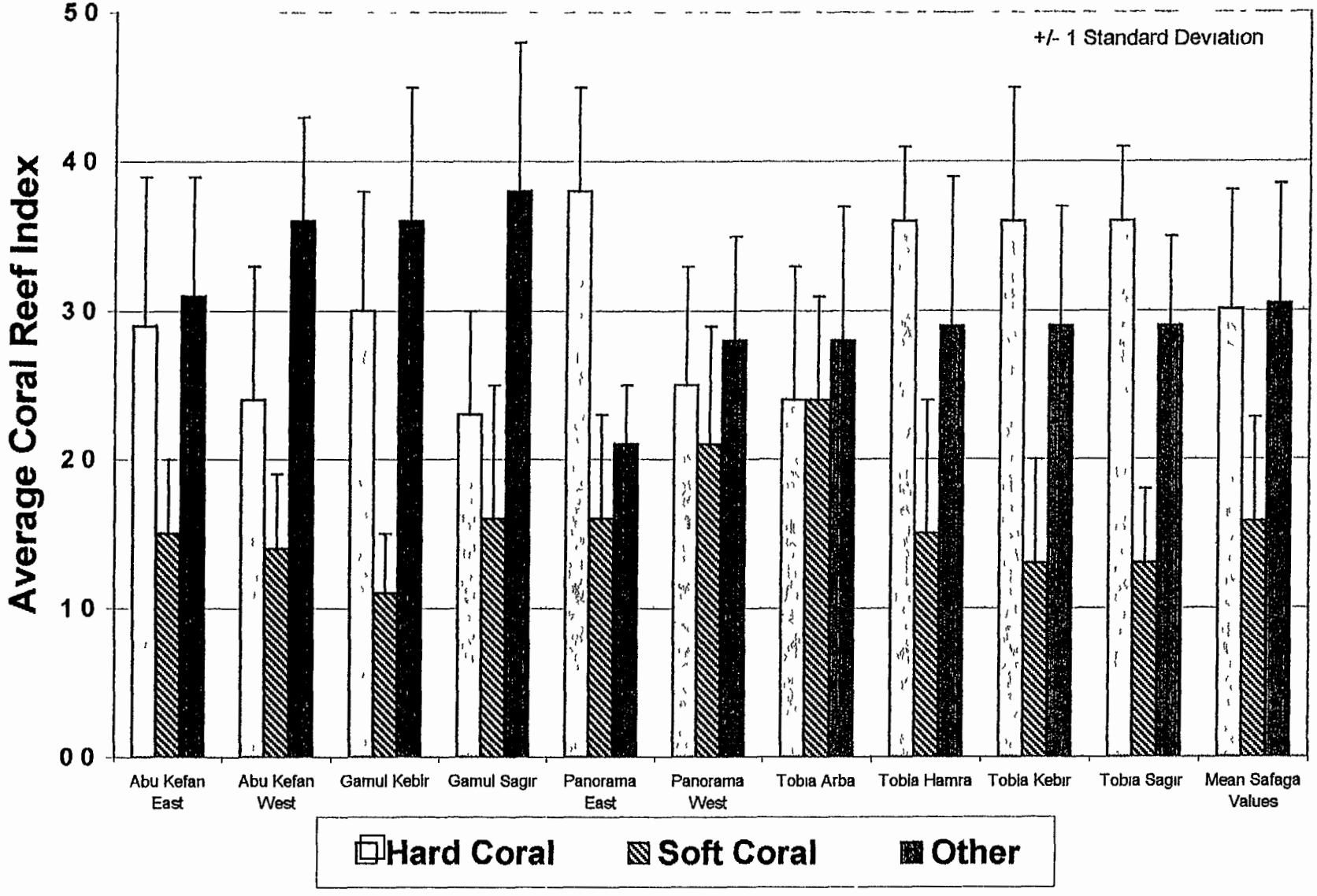
1998 Data Safaga Monitoring of 10 Sites for Percent Cover and Coral Reef Index in Quadrants

Tobia Seguir	11/8/98	Site #	3								
(Safaga)											
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Substrate	Average	STDEV
% Cover, All Categories											
Hard Corals	65	40	65	35	45	55	75	55	HC	54 4	13 7
Soft Corals	15	0	0	20	10	10	5	10	SC	8 8	6 9
Sponge	0	0	0	0	0	0	0	0	SP	0 0	0 0
Rock	10	45	25	35	45	30	15	25	RK	28 8	12 7
Rubbles	5	5	0	0	0	0	5	0	RB	1 9	2 6
Dead Corals	10	10	10	10	0	5	5	10	DC	7 5	3 8
Sand	0	0	0	0	0	0	0	0	S	0 0	0 0
Algae > 1 cm height	0	0	0	0	0	0	0	0	TA	0 0	0 0
Total (100%)	105	100	100	100	100	100	105	100		101 25	
% Cover, CRI Substrates											
Hard Corals	65	40	65	35	45	55	75	55	HC	54 4	13 7
Soft Corals	15	0	0	20	10	10	5	10	SC	8 8	6 9
Other	25	60	35	45	45	35	25	35	OT	38 1	11 6
CRI Value											
Hard Corals	4	3	4	3	3	4	4	4	Hard Coral	3 6	0 5
Soft Corals	2	1	1	2	1	1	1	1	Soft Coral	1 3	0 5
Other	2	4	3	3	3	3	2	3	Other	2 9	0 6

NOTE Minor errors are noted in the % cover in 10 quadrants, one at Gamul Kebir (Q8), Panorama Reef West (Q1 and Q7), Tobia Arba (Q8), Tobia Hamra (Q8), Tobia Kebire (Q2,Q6 Q7), Tobia Seguir (Q1 Q7) It is possible that these errors were introduced in creating this table and that the raw handwritten data from the field is correct In any case, these have less than 10% cover errors, and therefore will not alter the average % cover or the Coral Reef Index at the survey site (s

262

1998 Coral Reef Index Values for 10 Safaga Monitoring Sites

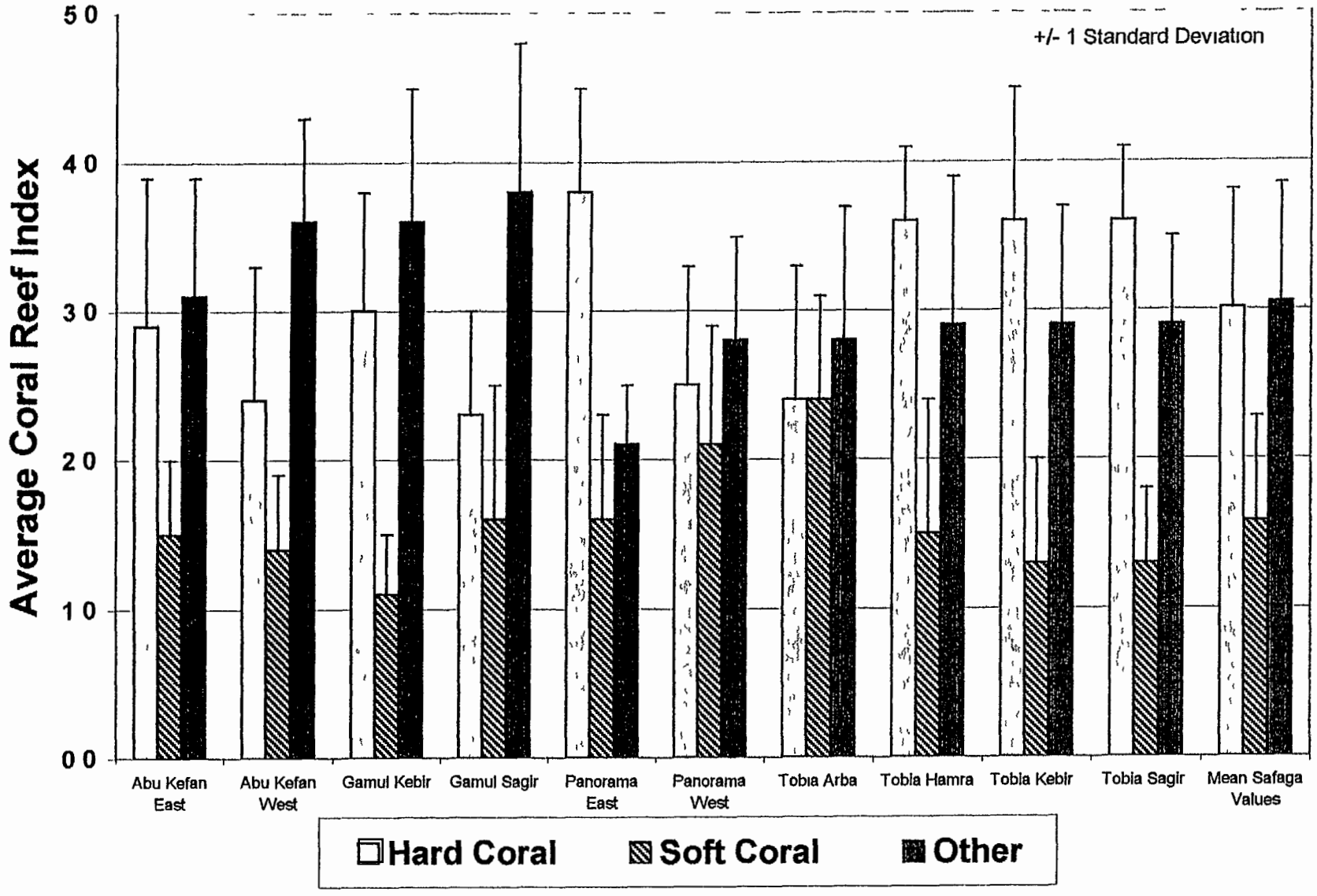


1998 Data Safaga Monitoring of 10 Sites for Percent Cover and Coral Reef Index in Quadrants

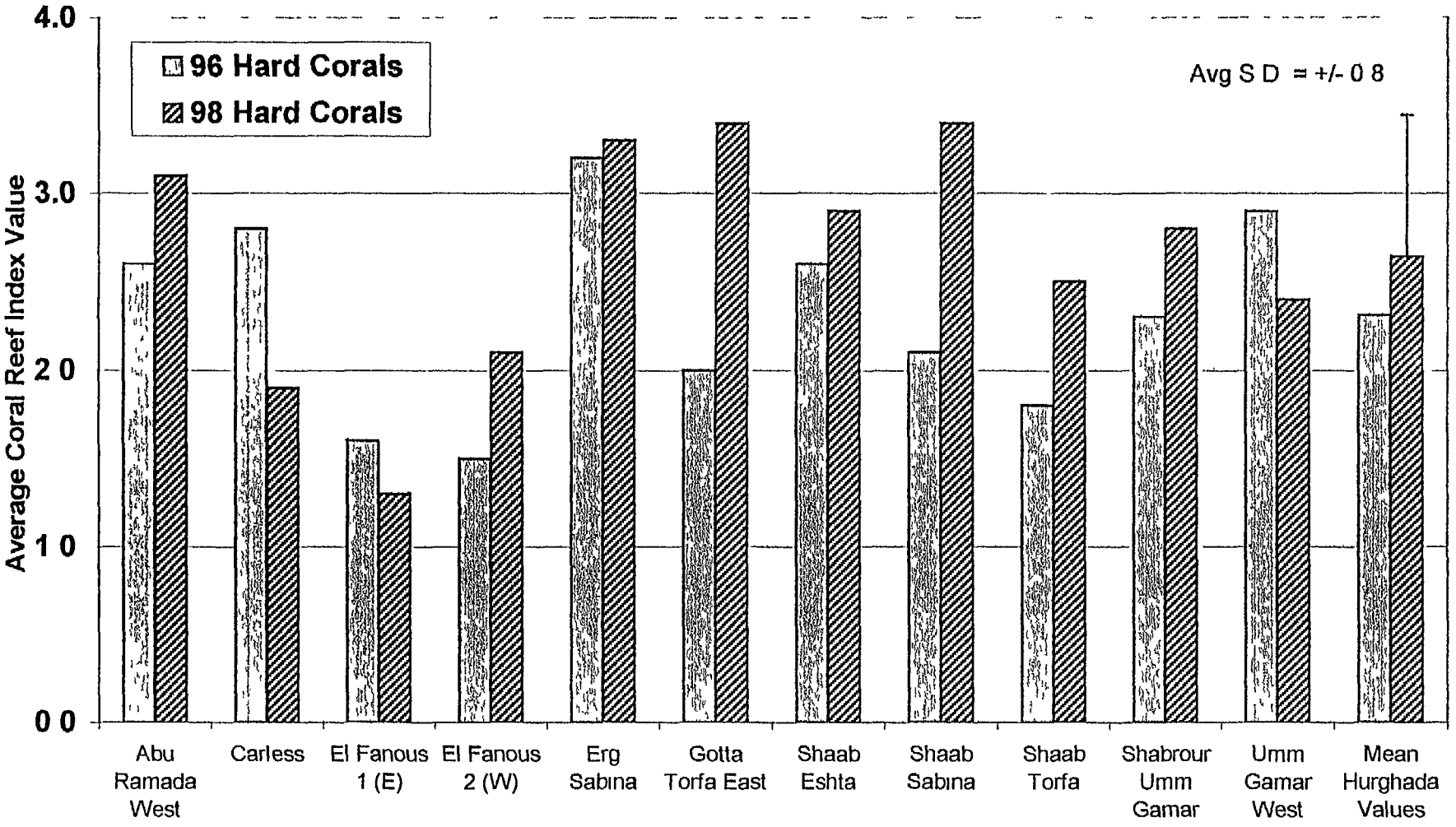
Tobia Seguir	11/8/98	Site #	3								
(Safaga)											
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Substrate	Average	STDEV
% Cover, All Categories											
Hard Corals	65	40	65	35	45	55	75	55	HC	54 4	13 7
Soft Corals	15	0	0	20	10	10	5	10	SC	8 8	6 9
Sponge	0	0	0	0	0	0	0	0	SP	0 0	0 0
Rock	10	45	25	35	45	30	15	25	RK	28 8	12 7
Rubbles	5	5	0	0	0	0	5	0	RB	1 9	2 6
Dead Corals	10	10	10	10	0	5	5	10	DC	7 5	3 8
Sand	0	0	0	0	0	0	0	0	S	0 0	0 0
Algae > 1 cm height	0	0	0	0	0	0	0	0	TA	0 0	0 0
Total (100%)	105	100	100	100	100	100	105	100		101 25	
% Cover, CRI Substrates											
Hard Corals	65	40	65	35	45	55	75	55	HC	54 4	13 7
Soft Corals	15	0	0	20	10	10	5	10	SC	8 8	6 9
Other	25	60	35	45	45	35	25	35	OT	38 1	11 6
CRI Value											
Hard Corals	4	3	4	3	3	4	4	4	Hard Coral	3 6	0 5
Soft Corals	2	1	1	2	1	1	1	1	Soft Coral	1 3	0 5
Other	2	4	3	3	3	3	2	3	Other	2 9	0 6

NOTE Minor errors are noted in the % cover in 10 quadrants, one at Gamul Kebir (Q8), Panorama Reef West (Q1 and Q7), Tobia Arba (Q8), Tobia Hamra (Q8), Tobia Kebire (Q2 Q6,Q7), Tobia Seguir (Q1,Q7) It is possible that these errors were introduced in creating this table and that the raw handwritten data from the field is correct In any case, these have less than 10% cover errors, and therefore will not alter the average % cover or the Coral Reef Index at the survey site (s

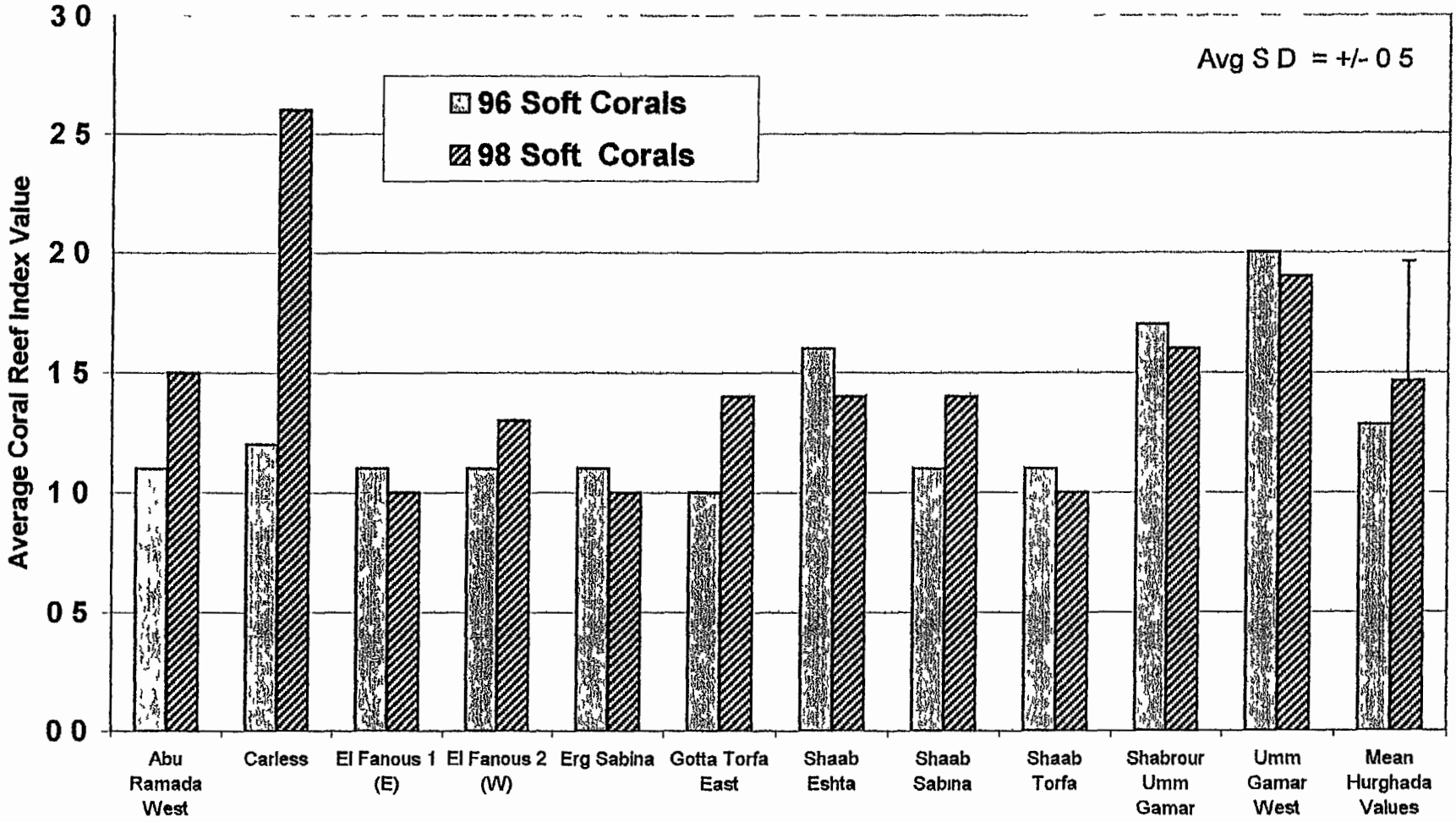
1998 Coral Reef Index Values for 10 Safaga Monitoring Sites



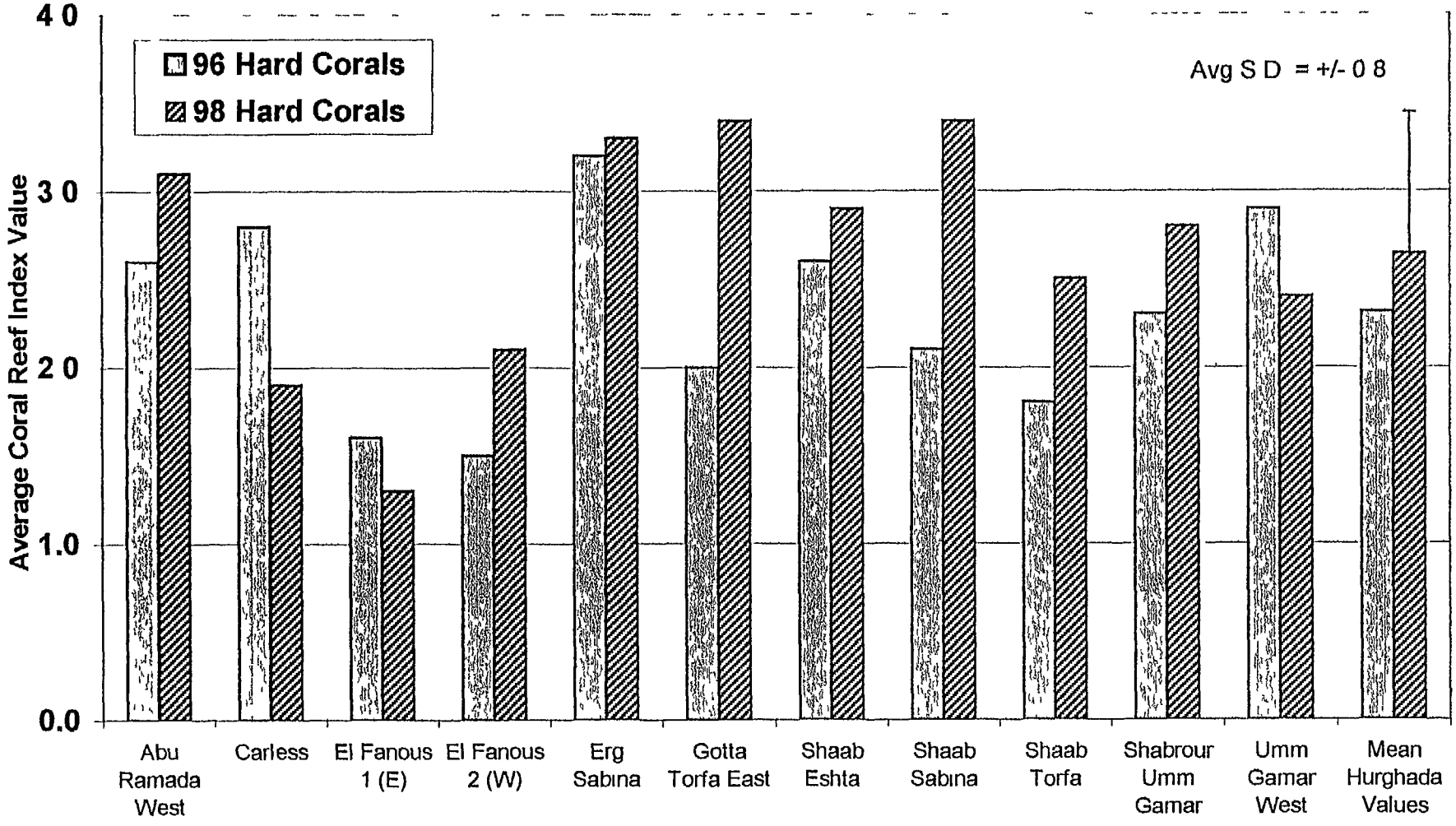
1996-98 Comparison of CRI for Hard Corals in Hurghada



1996-98 Comparison of CRI for Soft Corals in Hurghada

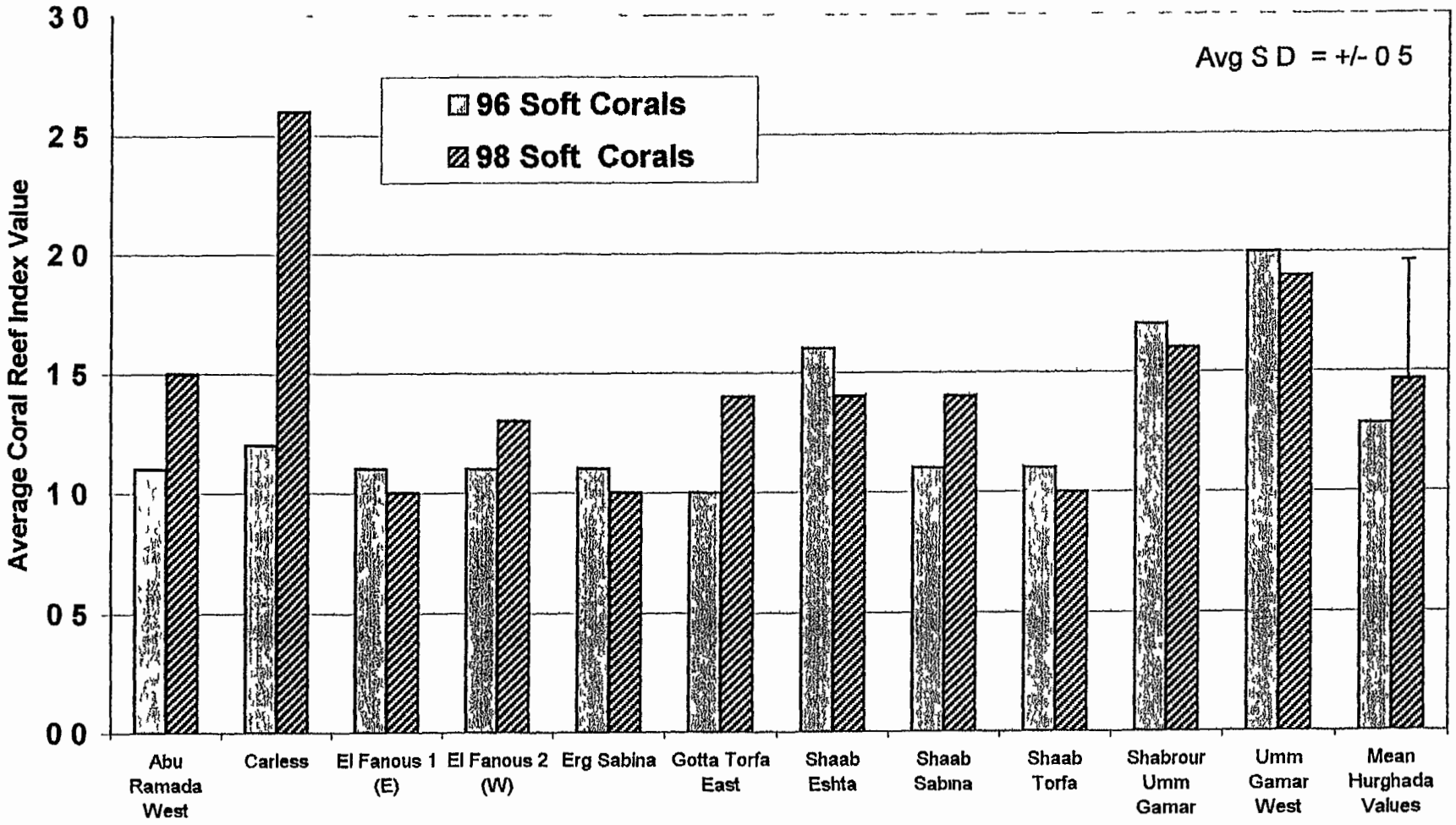


1996-98 Comparison of CRI for Hard Corals in Hurghada



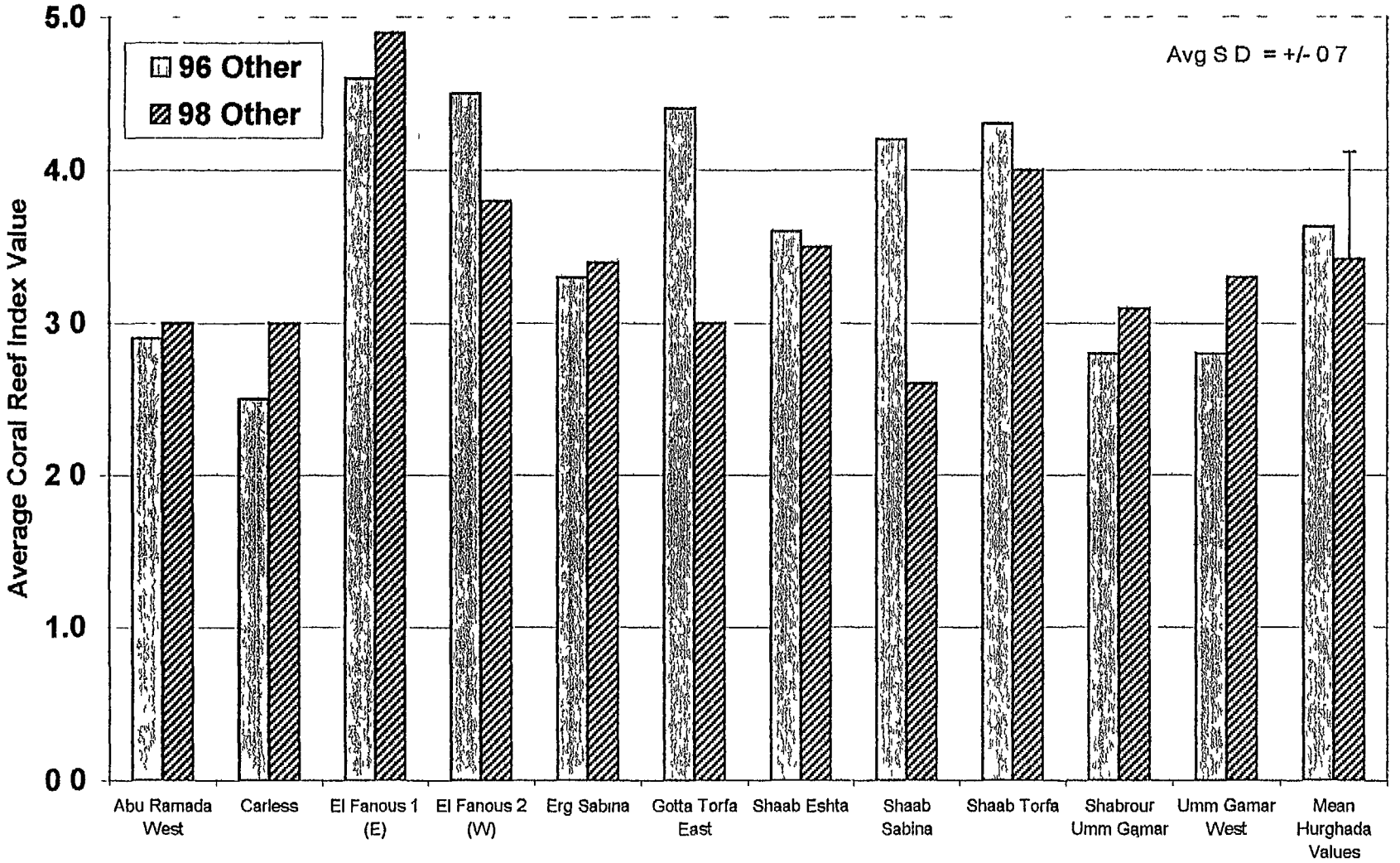
PMG st/Oct99 FIGURE 3 CRI Data and Graphs-96-98 96-98HurghadaHardChart

1996-98 Comparison of CRI for Soft Corals in Hurghada

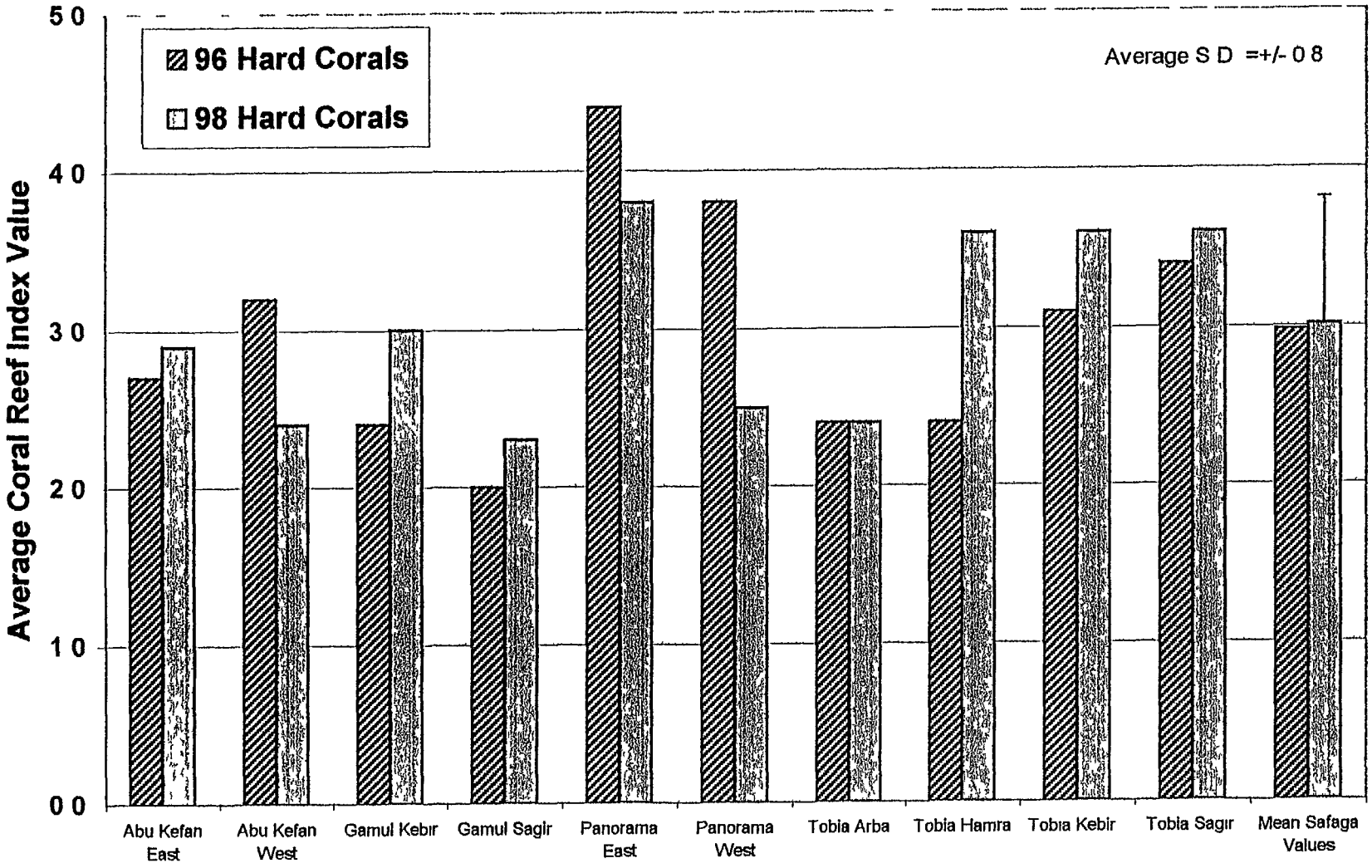


269

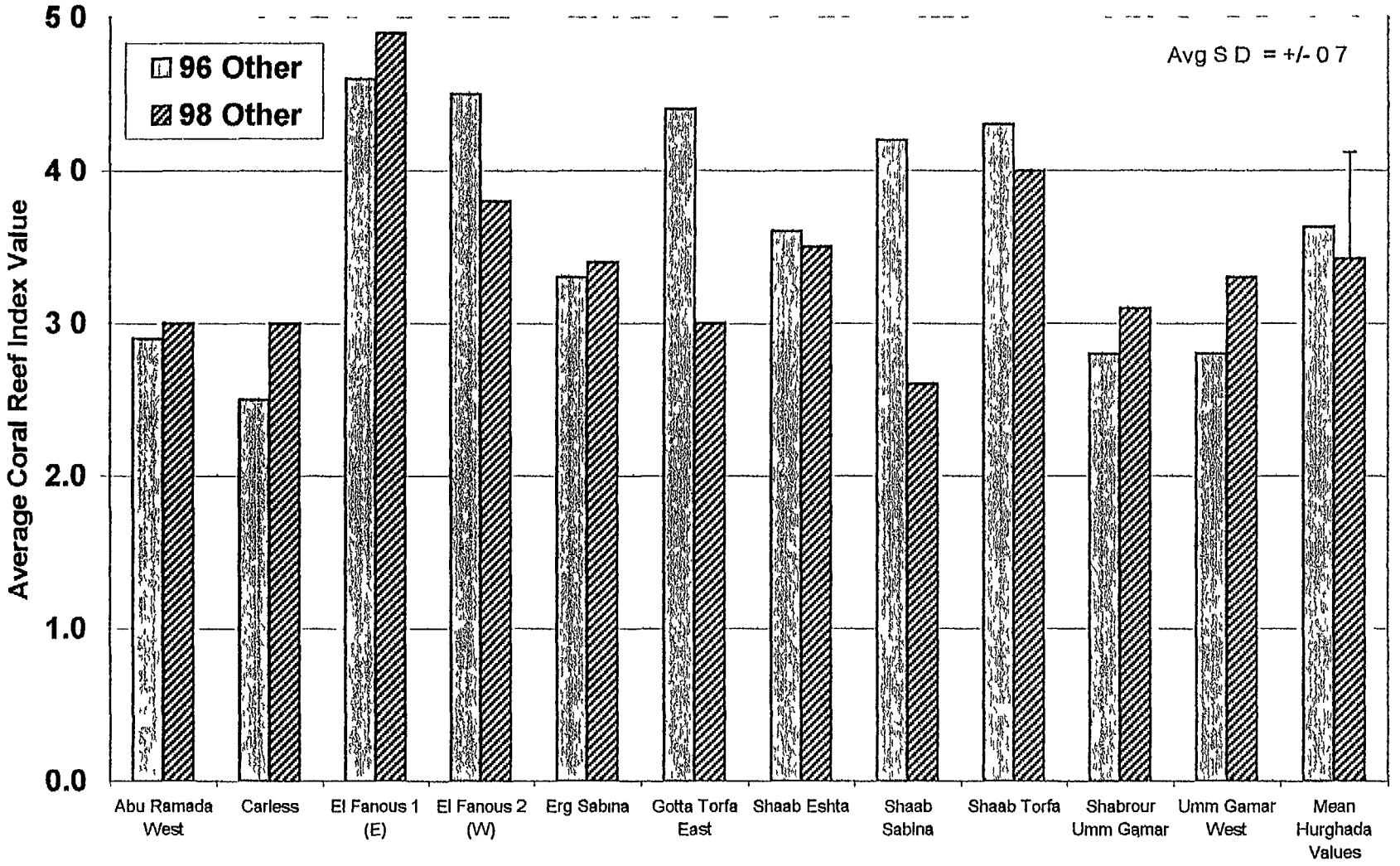
1996-98 Comparison of CRI for Other Substrate in Hurghada



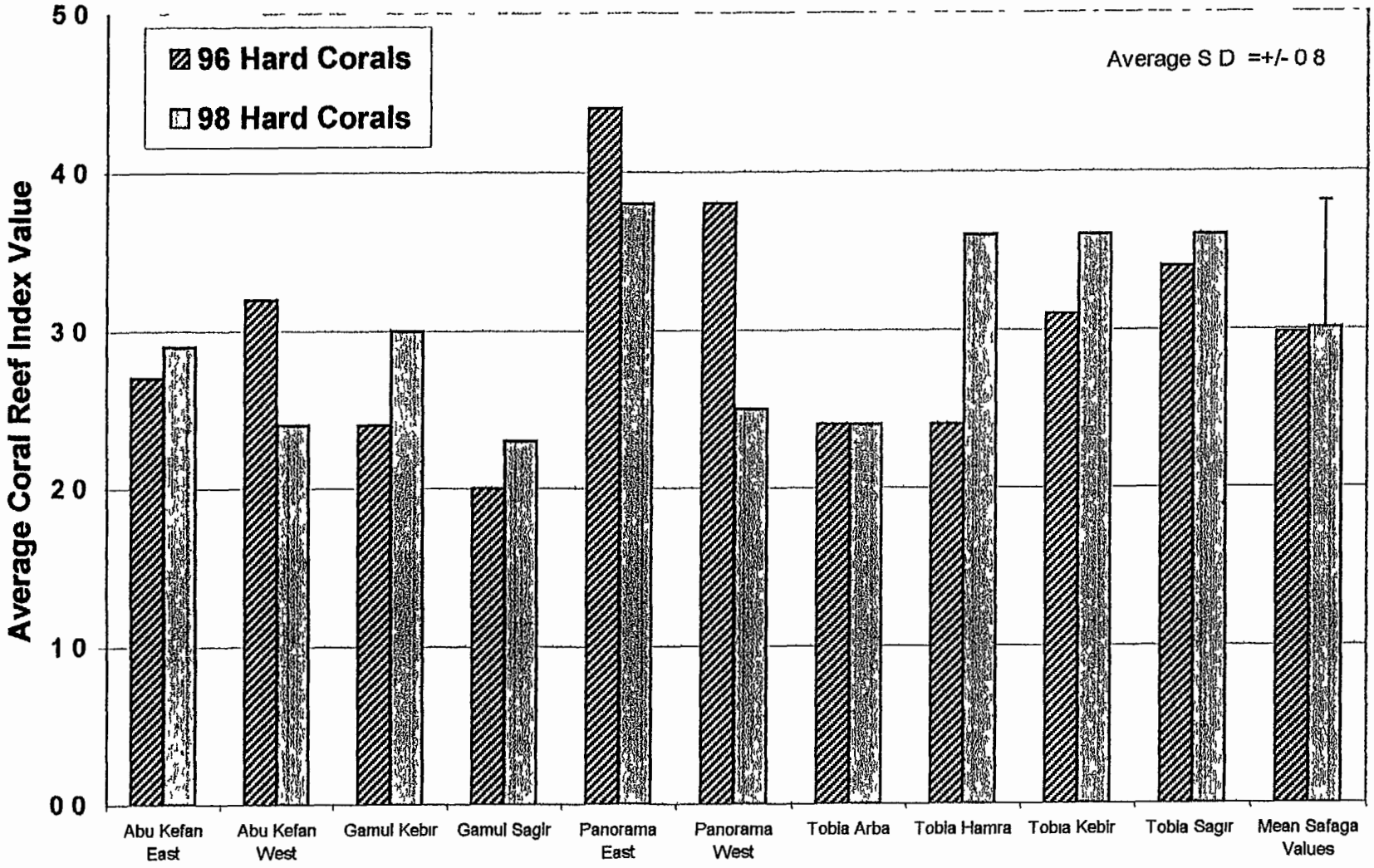
1996-98 Comparison of CRI for Hard Corals in Safaga



1996-98 Comparison of CRI for Other Substrate in Hurghada



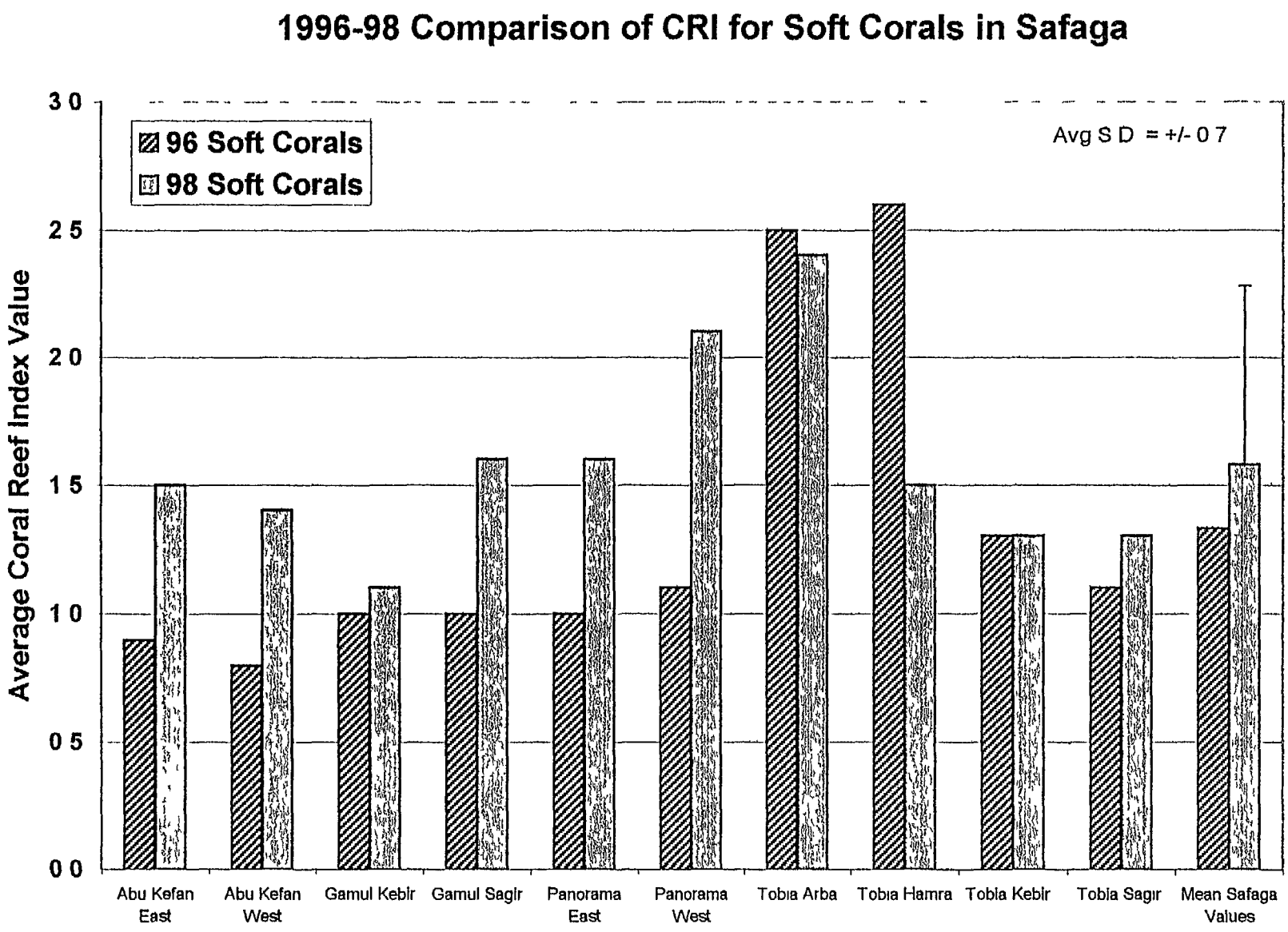
1996-98 Comparison of CRI for Hard Corals in Safaga



PMG/st Oct99

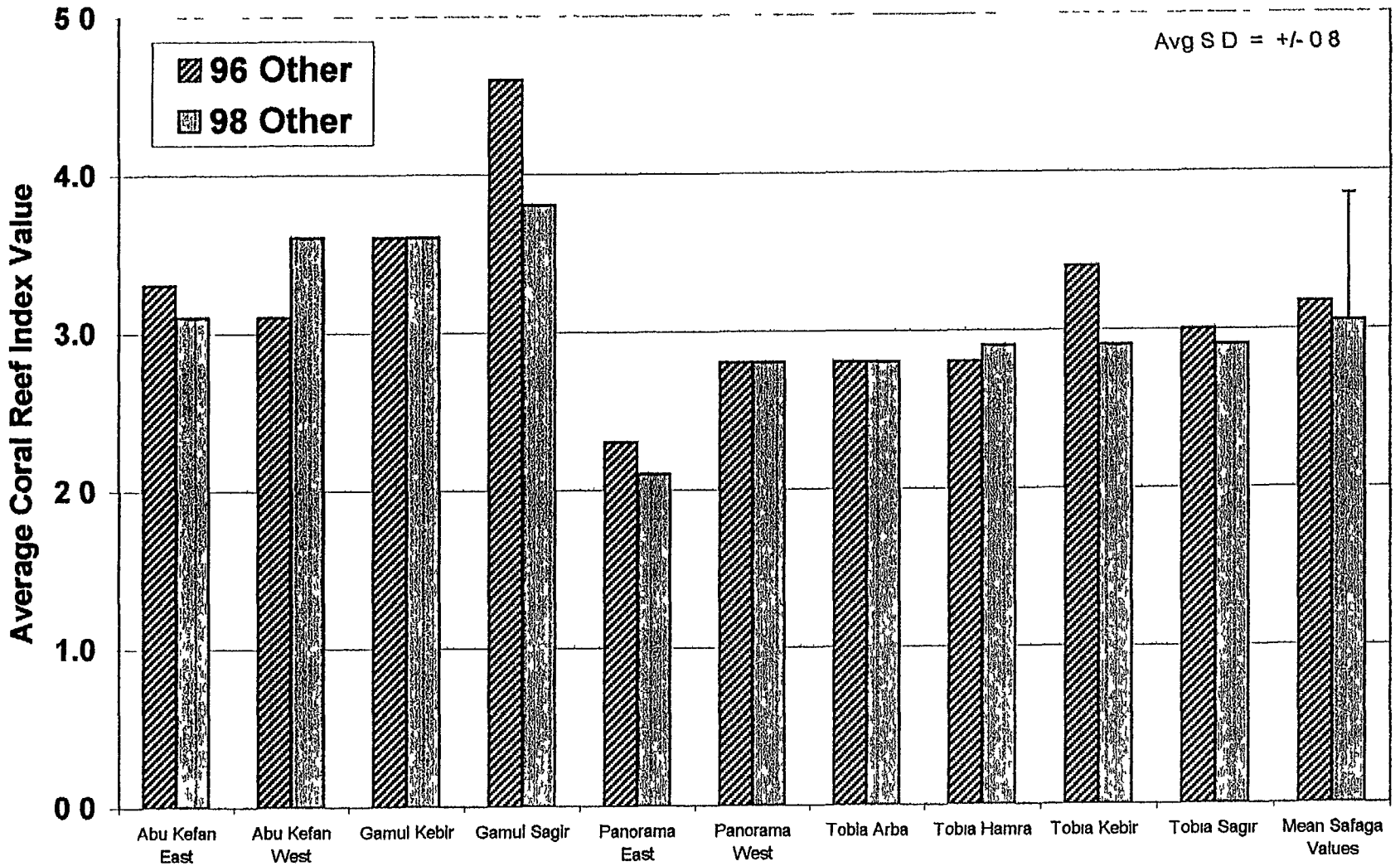
FIGURE 6

CRI Data and Graphs-96-98 96-98SafagaHardChart

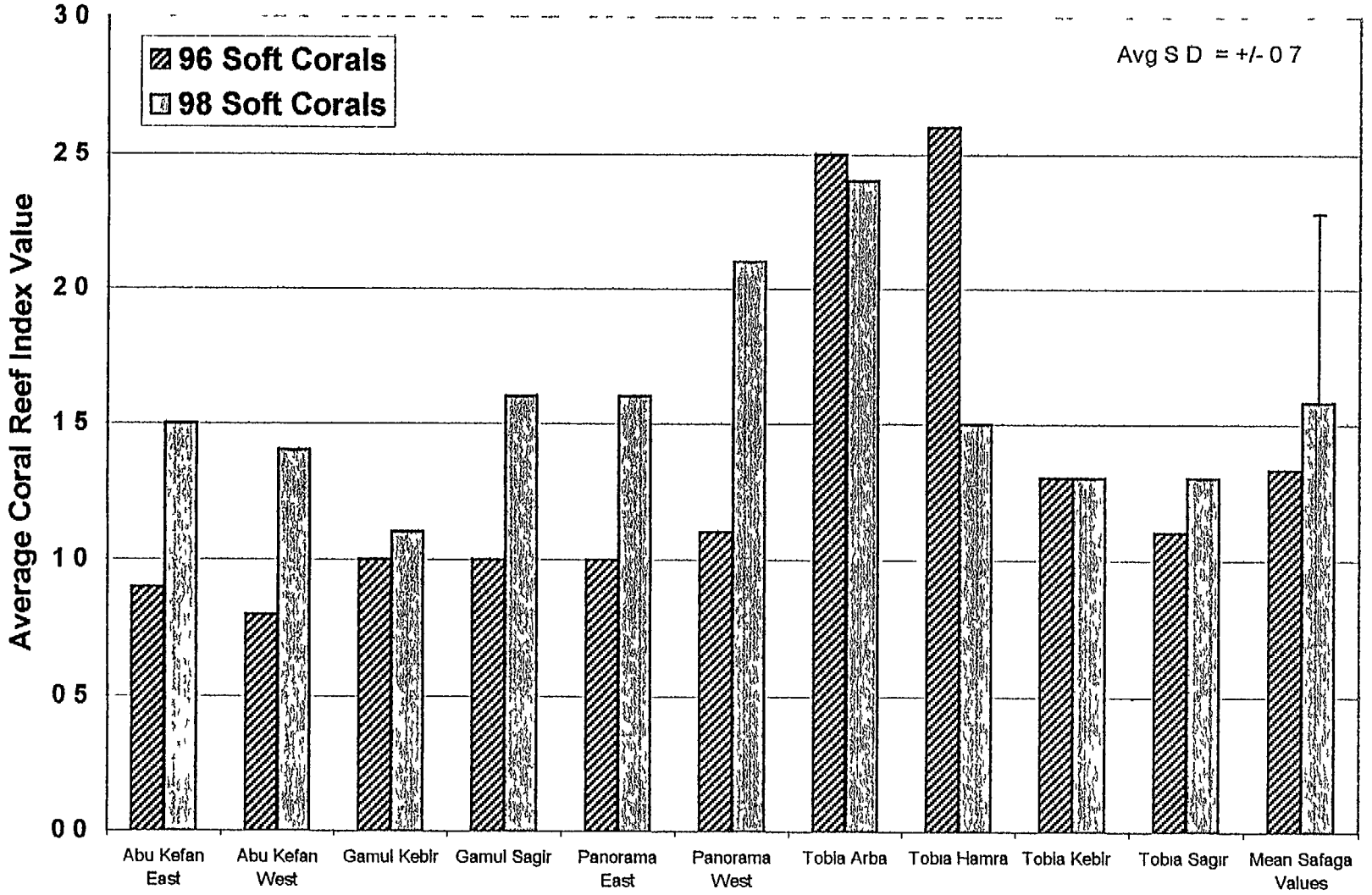

1996-98 Comparison of CRI for Soft Corals in Safaga
96 Soft Corals
98 Soft Corals
Avg S D = +/- 0 7
Average Coral Reef Index Value
30
25
20
15
10
05
00
Abu Kefan East
Abu Kefan West
Gamul Kebir
Gamul Sagir
Panorama East
Panorama West
Tobia Arba
Tobia Hamra
Tobia Kebir
Tobia Sagir
Mean Safaga Values

274

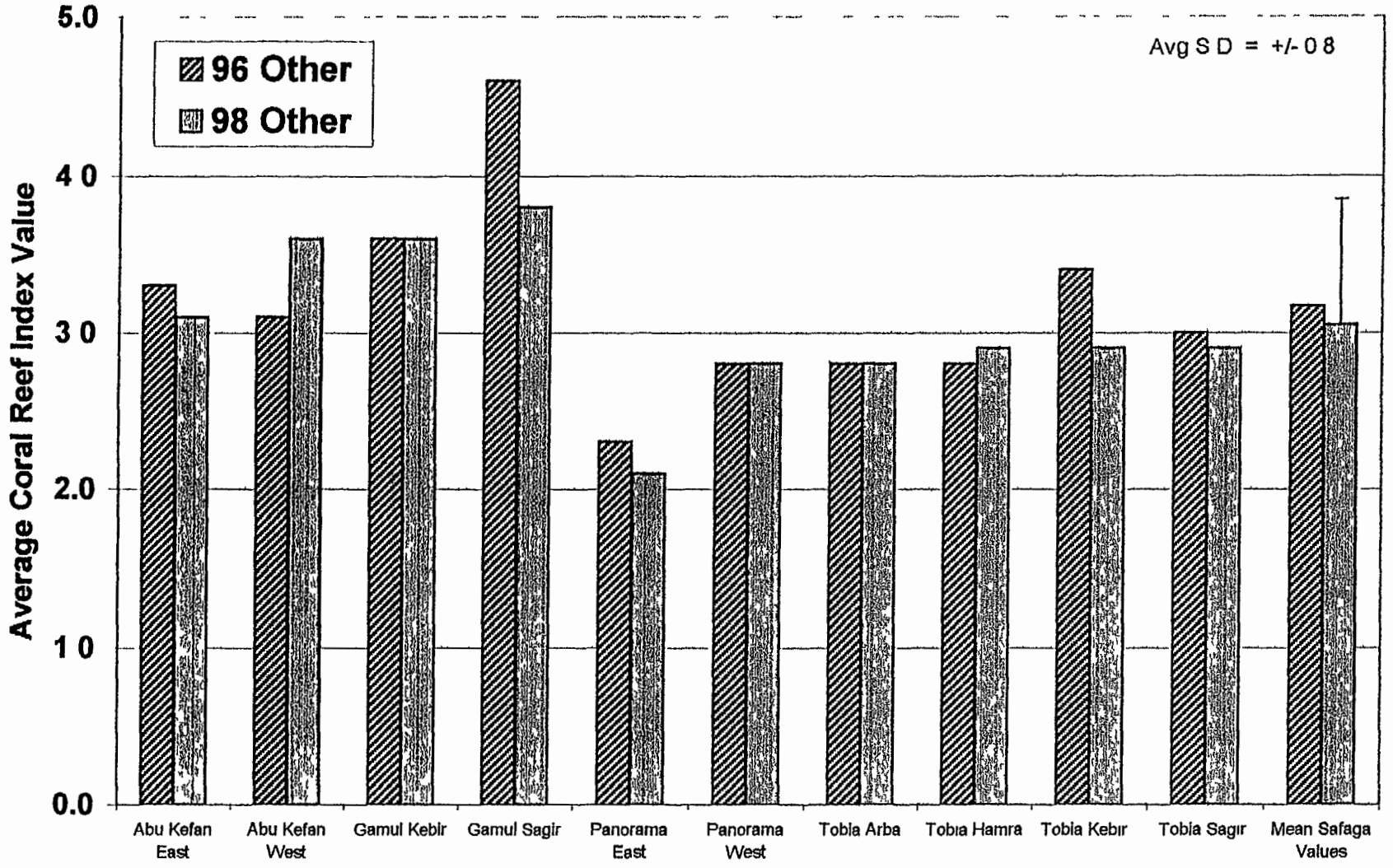
1996-98 Comparison of CRI for Other Substrate in Safaga



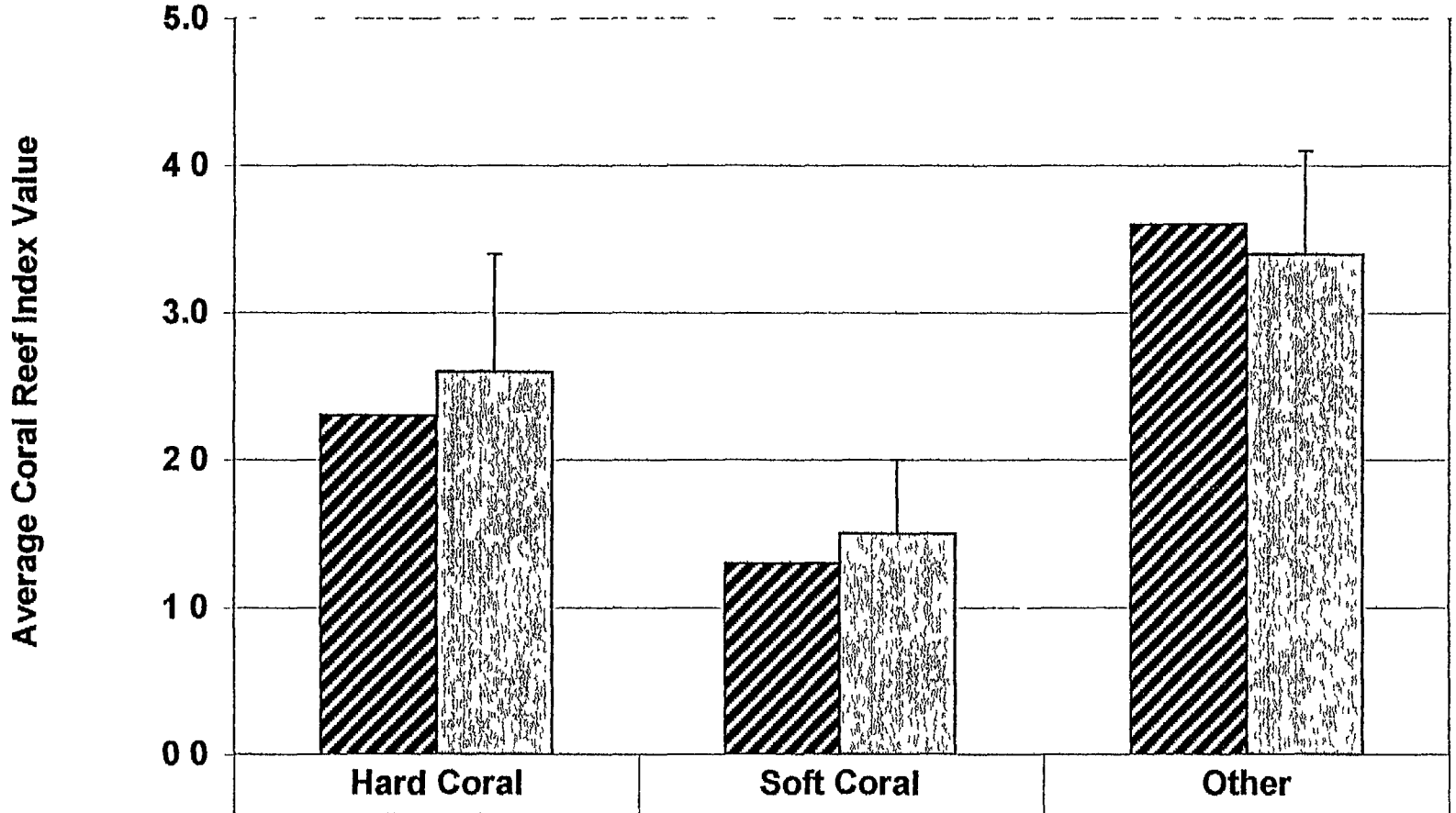
1996-98 Comparison of CRI for Soft Corals in Safaga



1996-98 Comparison of CRI for Other Substrate in Safaga



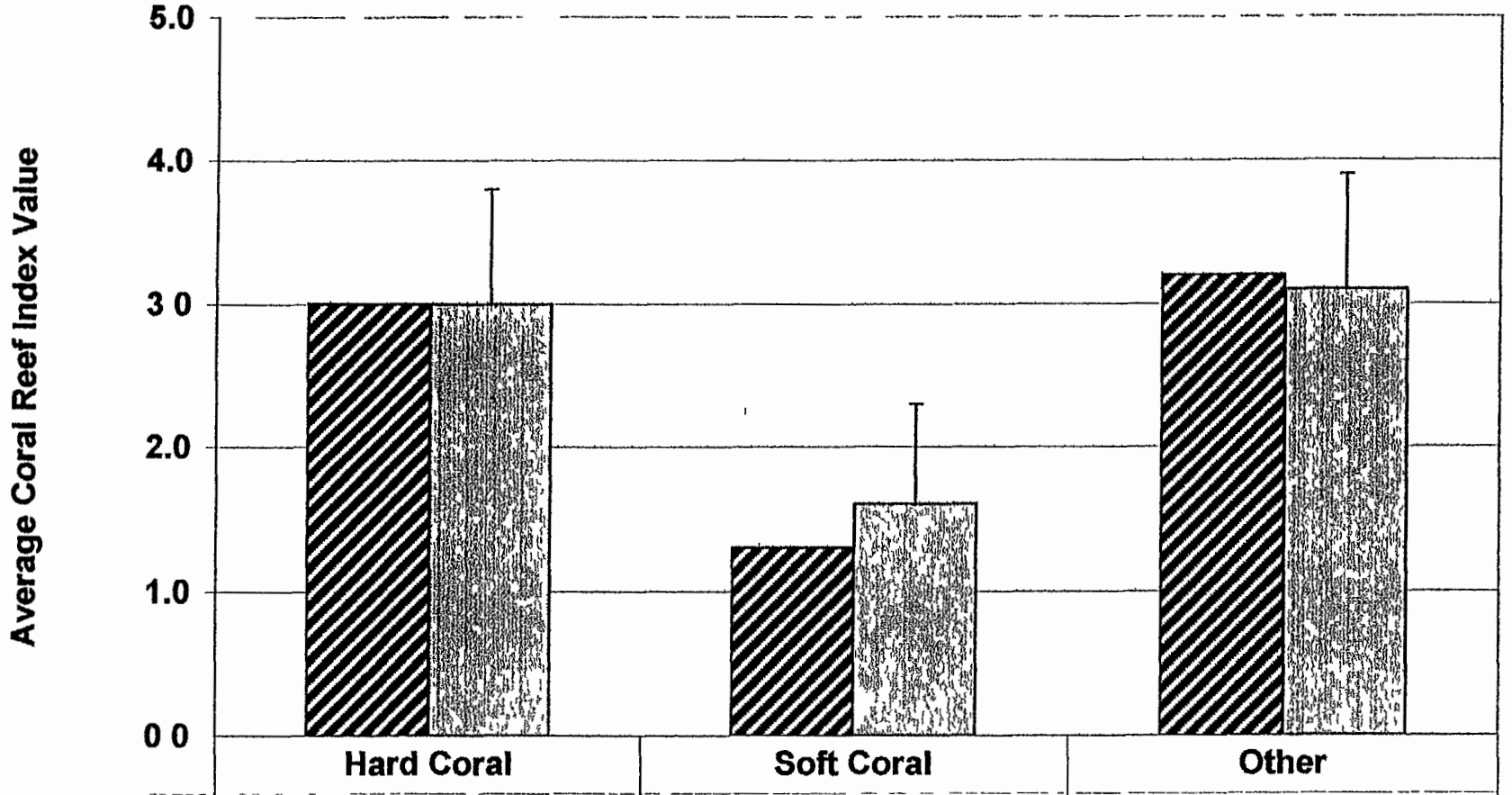
COMPARISON OF 1996 and 1998 AVERAGED CORAL REEF INDEX FOR HURGHADA



	Hard Coral	Soft Coral	Other
Hurghada 1996	2.3	1.3	3.6
Hurghada 1998	2 6	1 5	3 4

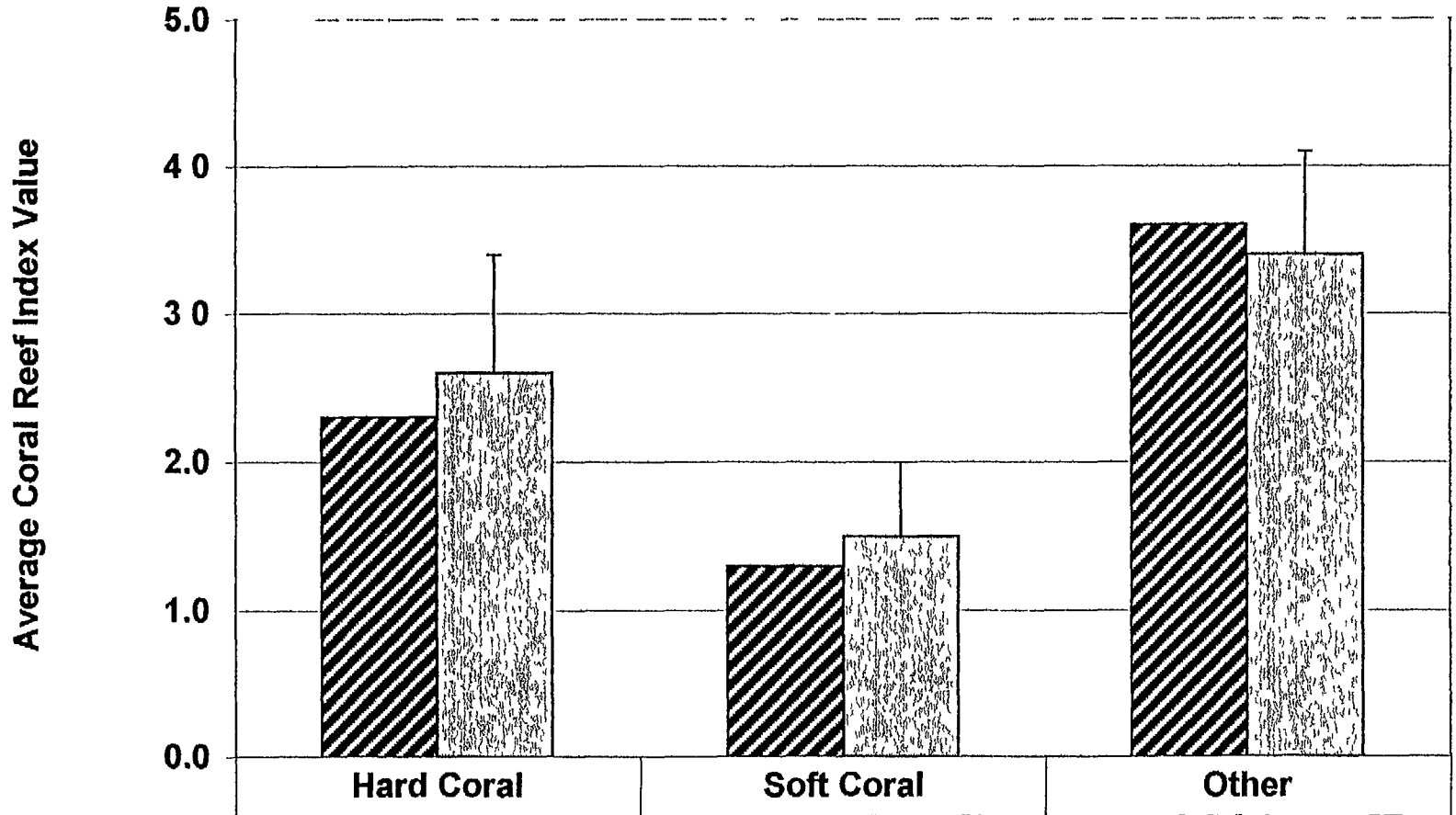
PMG/st Oct 99 FIGURE 9 CRI Data and Graphs-96-98 96-98HurCRISumBars

COMPARISION OF 1996 and 1998 AVERAGED CORAL REEF INDEX FOR SAFAGA



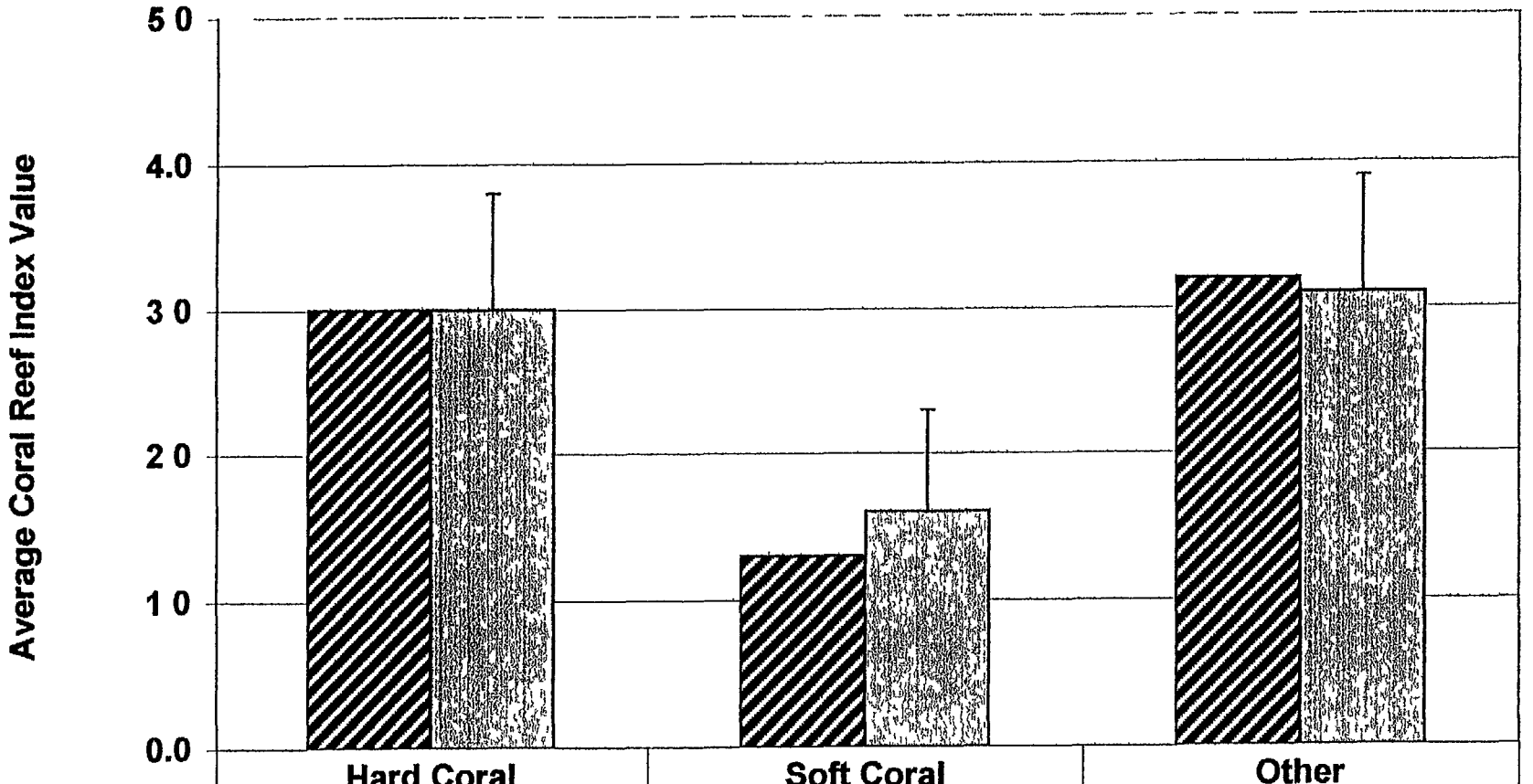
	Hard Coral	Soft Coral	Other
Safaga 1996	3.0	1.3	3.2
Safaga 1998	3.0	1.6	3.1

COMPARISON OF 1996 and 1998 AVERAGED CORAL REEF INDEX FOR HURGHADA



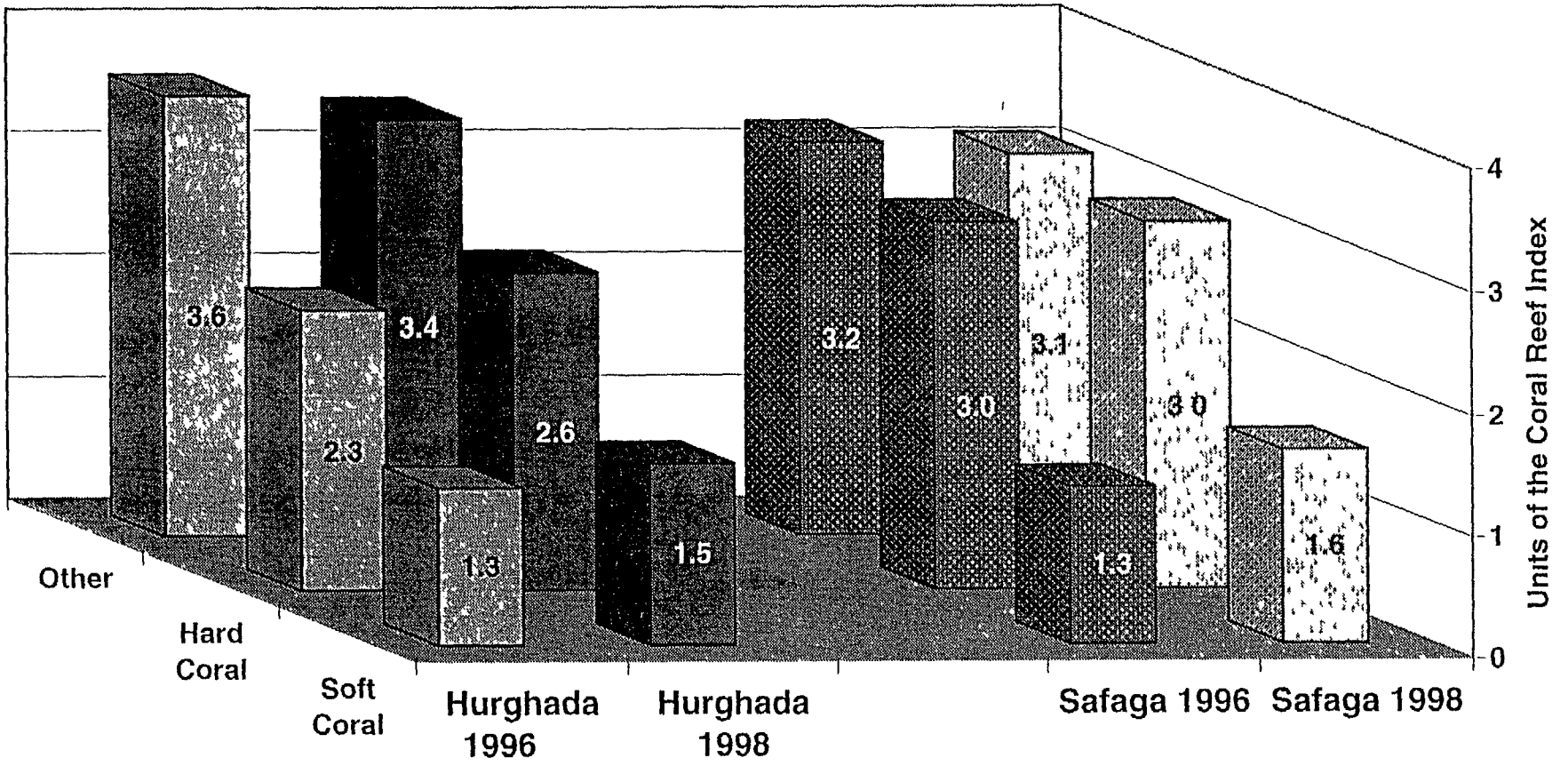
	Hard Coral	Soft Coral	Other
Hurghada 1996	2 3	1.3	3.6
Hurghada 1998	2 6	1.5	3 4

COMPARISION OF 1996 and 1998 AVERAGED CORAL REEF INDEX FOR SAFAGA



	Hard Coral	Soft Coral	Other
Safaga 1996	3 0	1 3	3.2
Safaga 1998	3.0	1.6	3 1

FIGURE 5 Coral Reef Index for Hurghada and Safaga (1996-1998) This shows that the average amount of area covered by hard corals and soft corals (Coral Reef Index) in 11 Hurghada sites and 10 Safaga sites either increased slightly or remained the same between 1996 and 1998 The average area covered by other substrate either decreased slightly in both locations, which is desireable since other substrates often includes dead coral or rubble When the sites from each region are averaged together, the differences are not statistically significant, however the trends are highly encouraging



INTRODUCTION to APPENDIX

The following pages are the record of the site data and the details of the work done for the collection of the coral reef monitoring survey for the Egyptian Red Sea by the USAID and EEAA programs for the year of 1998 This year and this activity were an interim between two larger sustainable tourism-related projects supported by USAID during the start-up of the EEAA Red Sea Protectorates Program. Twenty-one sites total in Hurghada and in Safaga were re-surveyed in 1998 The data recorded from each site are presented here in alphabetical order by site, first for the 11 Hurghada sites, followed by the 10 Safaga sites Each site has a 3-page record, with the following information recorded

Page 1 Site Log This records the date, the names of the surveyors, the boat used, the duration of the underwater survey, and the task objective This is followed by a description of the work completed, and a sketch of the quadrants sampled with the location(s) of the markers ("X") left to re-position the quadrants for future sampling This sheet is new to the 1998 survey, it was not included in the 1996 Survey Records

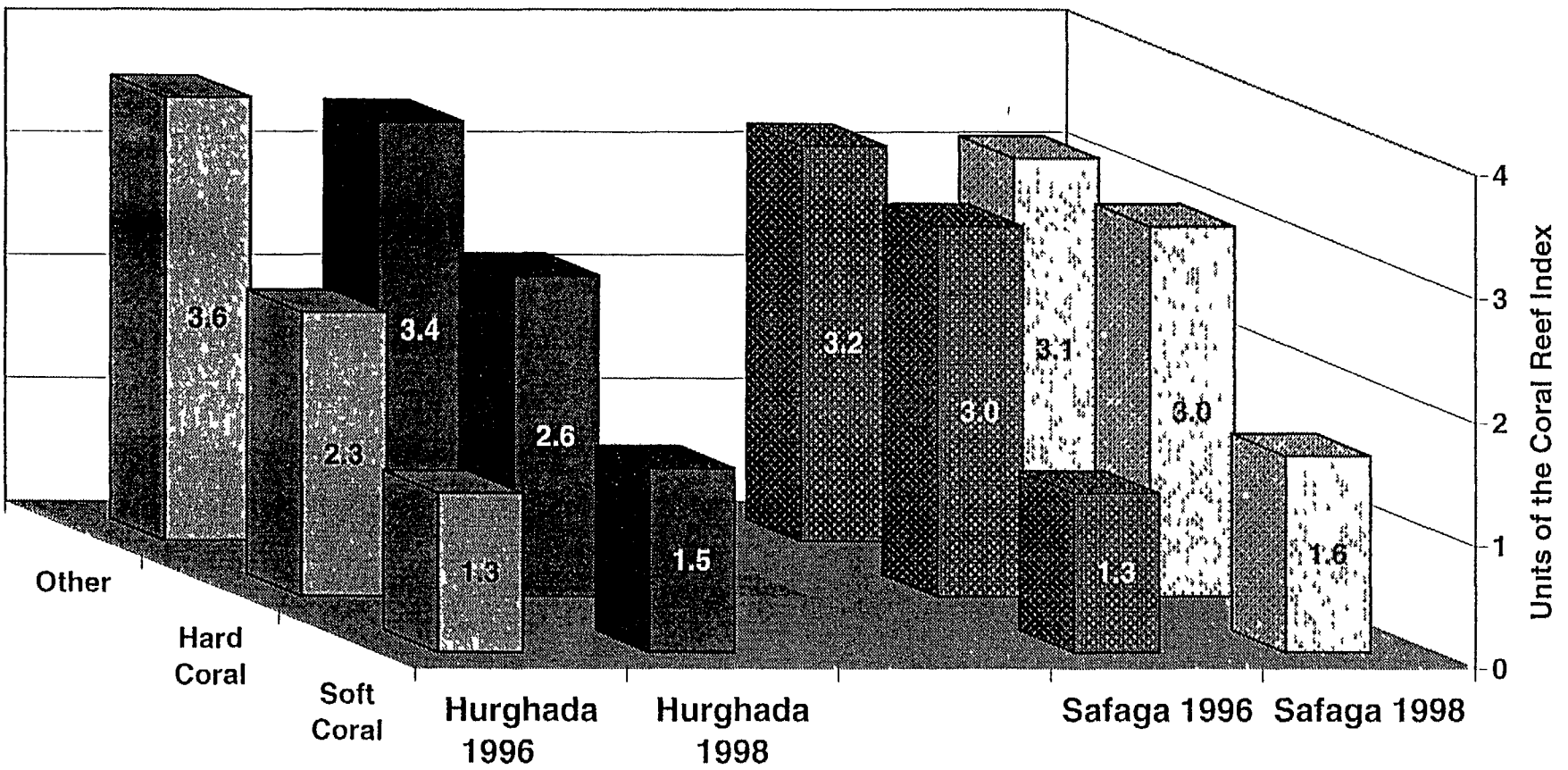
Pages 2-3 Rapid Underwater Assessment Data Sheet This sheet has the same format as that used in 1996 for reporting the field data It includes the general data and conditions for the site, a map or sketch of the site, a table summarizing which old quadrants were re-located and re-surveyed vs which were newly re-located this year, followed by the raw data collected

The General Data Section include the following parameters

- Date of the Survey
- Names of the Surveyors
- Air Temperature
- Water Temperature
- Current Strength
- Wave Height
- Reef Zone Surveyed (reef top, edge, slope, or base)
- Number of Diving or Snorkelling Boats at the site
- Number of Anchors in Use by Boats at the Site
- Approximate Number of Divers (and Snorkellers) in the Water at the Site,
- Number of Mooring Buoys or Installations Available at the Site
- Dive Site Rating (A subjective estimate on a scale of 1-5, no criteria given)
- Coral Diversity Rating This subjective parameter was not used in 1998 due to the facts that
  a) Coral Diversity has a strict quantitative value in the scientific literature and therefore it was determined that a different term needs to be used here or a more standard Coral Diversity Analysis done, and
  b) It appears from oral history that the individual surveyors in 1996 used different subjective criteria to define this parameter therefore the existing values are not comparable

The Site Map includes the reeftop (in green or darker shading) and the land (yellow or lighter shading), with the moorings and installations marked, the location of the sampling quadrants marked, and any other distinct landmarks located (i.e , lighthouses)

FIGURE 5 Coral Reef Index for Hurghada and Safaga (1996-1998) This shows that the average amount of area covered by hard corals and soft corals (Coral Reef Index) in 11 Hurghada sites and 10 Safaga sites either increased slightly or remained the same between 1996 and 1998 The average area covered by other substrate either decreased slightly in both locations, which is desireable since other substrates often includes dead coral or rubble When the sites from each region are averaged together, the differences are not statistically significant, however the trends are highly encouraging



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The General Data Section include the following parameters

- Date of the Survey
- Names of the Surveyors
- Air Temperature
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- Wave Height
- Reef Zone Surveyed (reef top, edge, slope, or base)
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- Approximate Number of Divers (and Snorkellers) in the Water at the Site,
- Number of Mooring Buoys or Installations Available at the Site
- Dive Site Rating (A subjective estimate on a scale of 1-5, no criteria given)
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  a) Coral Diversity has a strict quantitative value in the scientific literature and therefore it was determined that a different term needs to be used here or a more standard Coral Diversity Analysis done, and
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The Site Map includes the reeftop (in green or darker shading) and the land (yellow or lighter shading), with the moorings and installations marked, the location of the sampling quadrants marked, and any other distinct landmarks located (i.e , lighthouses)

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HURGHADA
SITE LOG **ABU RAMADA WEST**

1998

DATE 4 Nov 98 Morning dive (10 10 depart, return 5 00 pm)

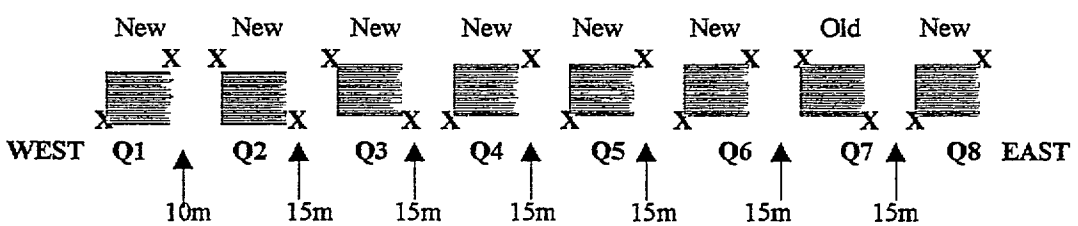
DIVERS H.Mansour, & Y Ibrahim

BOAT

DIVE TIME 60 minutes

TASK Seek old sites, locate 8 quads and place two corner markers (with a small yellow tie wrap as this year's indicator), and acquire the coral cover and minimal RUA data

The team work consisted from H. Mansour, & Y Ibrahim, The first diver was locating the old marks of the old quads and assessing the quads, the 2nd diver was photographing the quads The area between each of the located old quads was about 10-15 m (per old logs?) The site is a small island surrounded by a large reef flat We have tried to locate the old quads and we have located only one old mark The rest of the eight quads were newly located after a survey of the area for locating the old marks The dive time was 60 minutes The new plastic ties were inserted at the opposite corners of all the new quads We have located, marked, assessed and photographed 8 quads along the western part of the island of Abu Ramada (7 new) The first quad was located out side the western edge of the island at a distance of about 25 m west of the first buoy We started working from the northern end of the reef edge and moving east with the weak current at almost equidistant of 10-15 m apart from each quad. We saw a big napoleon fish and large moray eel



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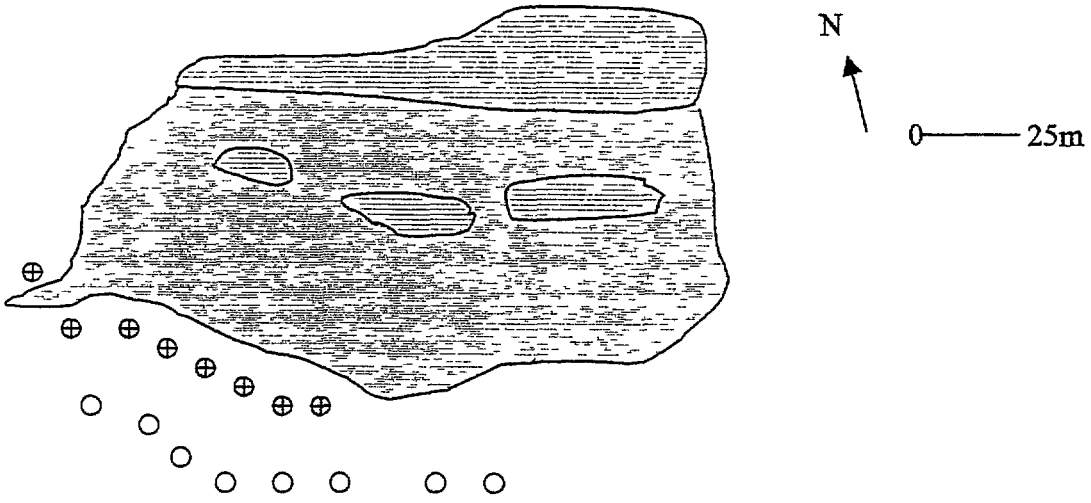
RAPID UNDERWATER ASSESSMENT DATA SHEET

GENERAL DATA

Site	**Abu Ramada (W)**	**Date**	04/11/98
Coordinates	27° 09 319` N 33° 53 709 `E	**Dive Site Rating**	4
Air Temp	26 C	**Coral Diversity**	
Water Temp	23 C	**Number of Boats**	14
Current	Weak	**Number of Anch.**	0
Wave height	25 CM	**Number of Divers**	100+40
Reef Zone	Edge	**Number of Buoys**	8

AERIAL VIEW (Showing location of Quadrants numbered and mooring buoys)

⊕ = **Quadrant** ○ = **Mooring Buoy**



LOCATION OF QUADRANTS

Quadrant #	1996 monitoring date	1998 monitoring Date	Remarks
1	19/9/98	4/11/98	New quad # 1?
2	19/9/98	4/11/98	New quad # 2?
3	19/9/98	4/11/98	New quad # 3?
4	19/9/98	4/11/98	New quad # 4?
5	19/9/98	4/11/98	New quad # 5?
6	19/9/98	4/11/98	New quad # 6?
7	19/9/98	4/11/98	Original quad # 7?
8	19/9/98	4/11/98	New quad # 8?
9	---	---	---
10	---	---	---

HURGHADA
SITE LOG **ABU RAMADA WEST**

1998

DATE 4 Nov 98 Morning dive (10 10 depart, return 5 00 pm)

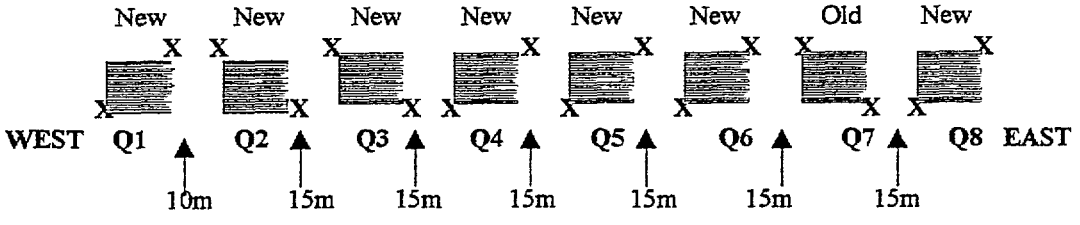
DIVERS H.Mansour, & Y Ibrahim

BOAT

DIVE TIME 60 minutes

TASK Seek old sites, locate 8 quads and place two corner markers (with a small yellow tie wrap as this year's indicator), and acquire the coral cover and minimal RUA data

The team work consisted from H. Mansour, & Y Ibrahim, The first diver was locating the old marks of the old quads and assessing the quads, the 2nd diver was photographing the quads The area between each of the located old quads was about 10-15 m (per old logs?) The site is a small island surrounded by a large reef flat We have tried to locate the old quads and we have located only one old mark The rest of the eight quads were newly located after a survey of the area for locating the old marks The dive time was 60 minutes The new plastic ties were inserted at the opposite corners of all the new quads We have located, marked, assessed and photographed 8 quads along the western part of the island of Abu Ramada (7 new) The first quad was located out side the western edge of the island at a distance of about 25 m west of the first buoy We started working from the northern end of the reef edge and moving east with the weak current at almost equidistant of 10-15 m apart from each quad We saw a big napoleon fish and large moray eel.



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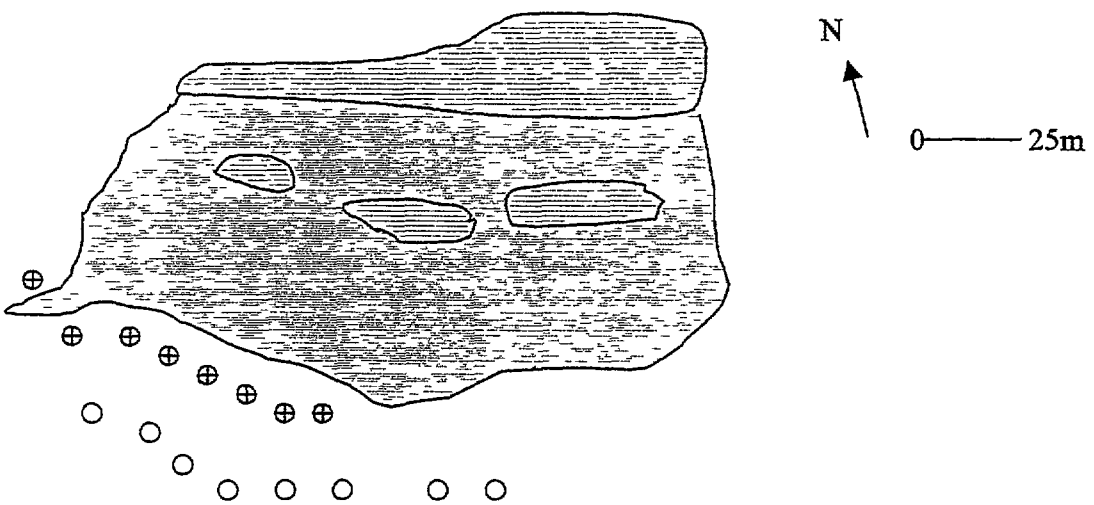
RAPID UNDERWATER ASSESSMENT DATA SHEET

GENERAL DATA

Site	**Abu Ramada (W)**	**Date**	04/11/98
Coordinates	27° 09 319``N 33° 53 709``E	**Dive Site Rating**	4
Air Temp	26 C	**Coral Diversity**	
Water Temp	23 C	**Number of Boats**	14
Current	Weak	**Number of Anch.**	0
Wave height	25 CM	**Number of Divers**	100+40
Reef Zone	Edge	**Number of Buoys**	8

AERIAL VIEW (Showing location of Quadrants numbered and mooring buoys)

⊕ = **Quadrant** ○ = **Mooring Buoy**



LOCATION OF QUADRANTS

Quadrant #	1996 monitoring date	1998 monitoring Date	Remarks
1	19/9/98	4/11/98	New quad # 1?
2	19/9/98	4/11/98	New quad # 2?
3	19/9/98	4/11/98	New quad # 3?
4	19/9/98	4/11/98	New quad # 4?
5	19/9/98	4/11/98	New quad # 5?
6	19/9/98	4/11/98	New quad # 6?
7	19/9/98	4/11/98	Original quad # 7?
8	19/9/98	4/11/98	New quad # 8?
9	---	---	---
10	---	---	---

ABU RAMADA WEST - 1998

ABUNDANT GENERA (In order of Abundance)

	Hard Corals		Soft Corals
1	Acropora	1	*Sinularia*
2	*Millipora*	2	*Sarcophytum*
3	*Porites*	3	*Xenia*
4	*Pocillipora*	4	*Dendronephthea*
5	*Turbinaria*	5	
6	*Goniopora*	6	
7	*Favites*	7	
8	*Fungia*	8	
9	*c f Galaxea*	9	
10			

SUBSTRATE % COVER (2mX2m quadrant at 4 m depth)

Category/Quadrants	1	2	3	4	5	6	7	8	9
Hard Corals	20	20	55	35	15	75	95	35	--
Soft Corals	15	30	15	15	0	0	0	0	--
Sponge	0	0	0	0	0	0	0	0	--
Rock	60	50	30	50	75	25	5	65	--
Rubbles	0	0	0	0	10	0	0	0	--
Dead Corals	0	0	0	0	0	0	0	0	--
Sand	0	0	0	0	0	0	0	0	--
Algae > 1 cm height	0	0	0	0	0	0	0	0	--
Total (≈ 100%)									
Hard Corals w/Disease	0	0	0	0	0	0	0	0	--
Hard Corals W/Bleaching	0	0	0	0	0	0	0	0	--

(S Tighe s Note There is a minor error in the data for the first quad 5% cover is missing This is too minor to make a difference in any calculations, but is so noted Perhaps the raw data record from the field has a record of the missing data (Oct 99))

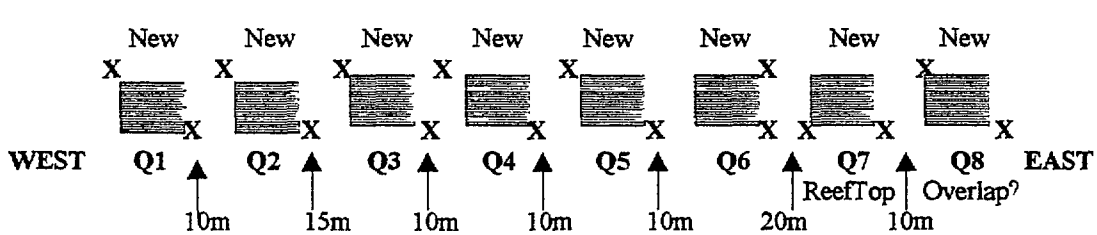
Other groups
Echinodermata
Echinus (*Echinothrix diadema*)
Mollusca
Bivalvia (*Tridacna sp*)

HURGHADA
SITE LOG **CARLESS REEF**

1998.

DATE	28 Oct 98 Noon dive (09 55 depart, return 5 00 pm)
DIVERS	H.Mansour, Y Ibrahim & H. harb
BOAT	Sandina
DIVE TIME	60 minutes
TASK	Seek old sites, locate 8 quads and place two corner markers (with a small yellow tie wrap as this year's indicator), and acquire the coral cover and minimal RUA data

The teamwork consisted from H. Mansour, Y Ibrahim, and H harb The first diver was assessing the quads, the 2nd diver was photographing the quads The third diver was helping in between the quads work The area between each of the located old quads was about 10 m. The site is a more or less rounded underwater erg There were no old marks The whole eight quads were newly located after a survey of the area for locating the old marks The dive time was 60 minutes The new plastic ties were inserted at the opposite corners of the all new quads We have located, marked, assessed and photographed 8 quads along the rounded edge of Carless Reef (8 new) The first quad was in front of the buoy # 3 from the eastern side of the big erg and then we started working to the east at almost equidistant of 10 m apart from each quad There was room only for 6 quads and we did # 7 in the middle of the erg, i.e on the reef top The quad # 8 was located between quad # 1&2



ABU RAMADA WEST - 1998

ABUNDANT GENERA (In order of Abundance)

	Hard Corals		Soft Corals
1	Acropora	1	*Sinularia*
2	*Millipora*	2	*Sarcophytum*
3	*Porites*	3	*Xenia*
4	*Pocillipora*	4	*Dendronephthea*
5	*Turbinaria*	5	
6	*Goniopora*	6	
7	*Favites*	7	
8	*Fungia*	8	
9	*c f Galaxea*	9	
10			

SUBSTRATE % COVER (2mX2m quadrant at 4 m depth)

Category/Quadrants	1	2	3	4	5	6	7	8	9
Hard Corals	20	20	55	35	15	75	95	35	--
Soft Corals	15	30	15	15	0	0	0	0	--
Sponge	0	0	0	0	0	0	0	0	--
Rock	60	50	30	50	75	25	5	65	--
Rubbles	0	0	0	0	10	0	0	0	--
Dead Corals	0	0	0	0	0	0	0	0	--
Sand	0	0	0	0	0	0	0	0	--
Algae > 1 cm height	0	0	0	0	0	0	0	0	--
Total (≈ 100%)									
Hard Corals w/Disease	0	0	0	0	0	0	0	0	--
Hard Corals W/Bleaching	0	0	0	0	0	0	0	0	--

(S Tighe s Note There is a minor error in the data for the first quad 5% cover is missing This is too minor to make a difference in any calculations, but is so noted Perhaps the raw data record from the field has a record of the missing data (Oct 99))

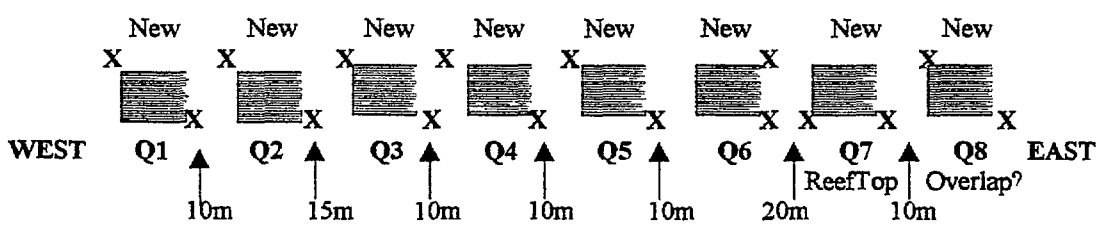
Other groups
Echinodermata
Echinus (*Echinothrix diadema*)
Mollusca
Bivalvia (*Tridacna sp*)

HURGHADA
SITE LOG **CARLESS REEF**

1998:

DATE	28 Oct 98 Noon drve (09 55 depart, return 5 00 pm)
DIVERS	H.Mansour, Y Ibrahim & H. harb
BOAT	Sandina
DIVE TIME	60 minutes
TASK	Seek old sites, locate 8 quads and place two corner markers (with a small yellow tie wrap as this year's indicator), and acquire the coral cover and minimal RUA data

The teamwork consisted from H. Mansour, Y Ibrahim, and H harb The first diver was assessing the quads, the 2nd diver was photographing the quads The third diver was helping in between the quads work The area between each of the located old quads was about 10 m. The site is a more or less rounded underwater erg There were no old marks The whole eight quads were newly located after a survey of the area for locating the old marks The dive time was 60 minutes The new plastic ties were inserted at the opposite corners of the all new quads We have located, marked, assessed and photographed 8 quads along the rounded edge of Carless Reef (8 new) The first quad was in front of the buoy # 3 from the eastern side of the big erg and then we started working to the east at almost equidistant of 10 m apart from each quad There was room only for 6 quads and we did # 7 in the middle of the erg, i.e on the reef top The quad # 8 was located between quad # 1&2



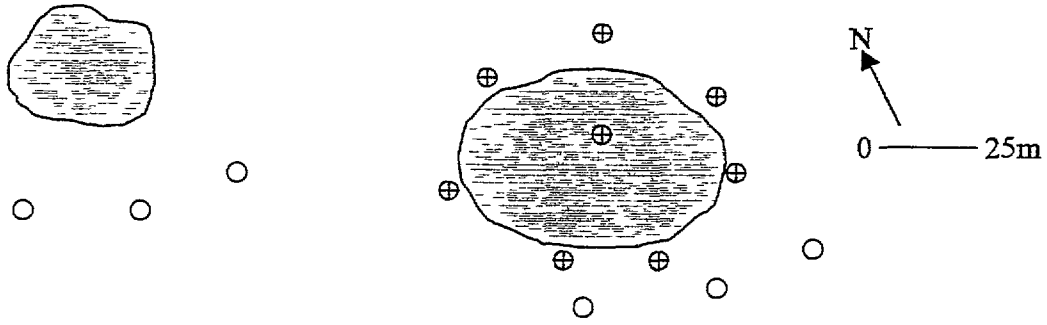
RAPID UNDERWATER ASSESSMENT DATA SHEET

GENERAL DATA

Site	**Carless Reef**	**Date**	28/10/98
Coordinates	27° 18 670 N 33° 56 416 `E	**Dive Site Rating**	3 5
Air Temp	24 C	**Coral Diversity**	
Water Temp	23 C	**Number of Boats**	7
Current	Moderate	**Number of Anch**	0
Wave height	25-50 CM	**Number of Divers**	56+18
Reef Zone	SLOPE	**Number of Buoys**	6

AERIAL VIEW (Showing location of Quadrants numbered and mooring buoys)

⊕ **= Quadrant** ○ **= Mooring Buoy**



LOCATION OF QUADRANTS

Quadrant #	1996 monitoring date	1998 monitoring Date	Remarks
1	1/10/98	28/10/98	New quad # 1?
2	1/10/98	28/10/98	New quad # 2?
3	1/10/98	28/10/98	New quad # 3?
4	1/10/98	28/10/98	New quad # 4?
5	1/10/98	28/10/98	New quad # 5?
6	1/10/98	28/10/98	New quad # 6?
7	1/10/98	28/10/98	New quad # 7?
8	1/10/98	28/10/98	New quad # 8? Positioned between 1&2
9	---	---	---
10	---	---	---

CARLESS REEF 1998

ABUNDANT GENERA (In order of Abundance)

	Hard Corals		Soft Corals
1	Acropora	1	*Lobophytum*
2	*Montipora*	2	*Sarcophyton*
3	*Porites*	3	*Sinularia*
4	*Favites*	4	*Dendronephthya*
5	*Fungia*	5	
6	*Millipora*	6	
7	*Anacropora*	7	

SUBSTRATE % COVER (2mX2m quadrant at 4 m depth)

Category/Quadrants	1	2	3	4	5	6	7	8	9
Hard Corals	20	25	50	35	10	15	10	10	--
Soft Corals	25	20	25	50	75	20	40	50	--
Sponge	0	0	0	0	0	0	0	0	--
Rock	55	55	25	15	15	65	50	40	--
Rubbles	0	0	0	0	0	0	0	0	--
Dead Corals	0	0	0	0	0	0	0	0	--
Sand	0	0	0	0	0	0	0	0	--
Algae > 1 cm height	0	0	0	0	0	0	0	0	--
Total (≈ 100%)									
Hard Corals w/Disease	0	0	0	0	0	0	0	0	--
Hard CoralsW/Bleaching	0	0	0	0	0	0	0	0	--

Other groups
Echinodermata
Echinus (Echinothrix diadema)
Mollusca
Bivalvia (Tridacna spp)

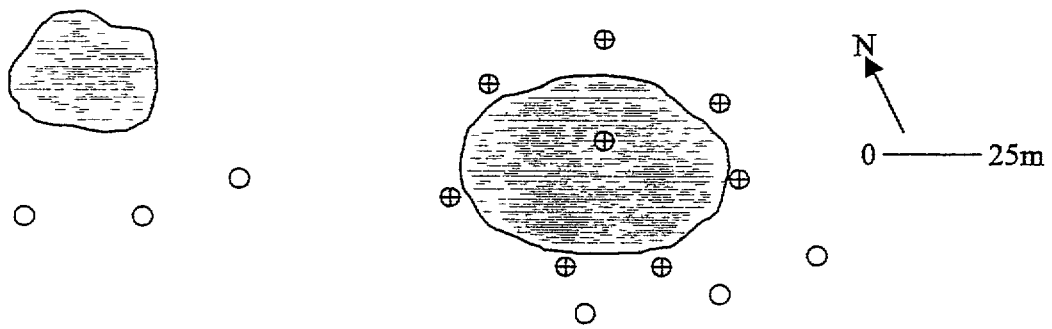
RAPID UNDERWATER ASSESSMENT DATA SHEET

GENERAL DATA

Site	**Carless Reef**	**Date**	28/10/98
Coordinates	27° 18 670 N 33° 56 416 E	**Dive Site Rating**	3 5
Air Temp	24 C	**Coral Diversity**	
Water Temp	23 C	**Number of Boats**	7
Current	Moderate	**Number of Anch.**	0
Wave height	25-50 CM	**Number of Divers**	56+18
Reef Zone	SLOPE	**Number of Buoys**	6

AERIAL VIEW (Showing location of Quadrants numbered and mooring buoys)

⊕ = **Quadrant** ○ = **Mooring Buoy**



LOCATION OF QUADRANTS

Quadrant #	1996 monitoring date	1998 monitoring Date	Remarks
1	1/10/98	28/10/98	New quad # 1?
2	1/10/98	28/10/98	New quad # 2?
3	1/10/98	28/10/98	New quad # 3?
4	1/10/98	28/10/98	New quad # 4?
5	1/10/98	28/10/98	New quad # 5?
6	1/10/98	28/10/98	New quad # 6?
7	1/10/98	28/10/98	New quad # 7?
8	1/10/98	28/10/98	New quad # 8? Positioned between 1&2
9	---	---	---
10	---	---	---

CARLESS REEF 1998

ABUNDANT GENERA (In order of Abundance)

	Hard Corals		Soft Corals
1	Acropora	1	*Lobophytum*
2	*Montipora*	2	*Sarcophyton*
3	*Porites*	3	*Sinularia*
4	*Favites*	4	*Dendronephthya*
5	*Fungia*	5	
6	*Millipora*	6	
7	*Anacropora*	7	

SUBSTRATE % COVER (2mX2m quadrant at 4 m depth)

Category/Quadrants	1	2	3	4	5	6	7	8	9
Hard Corals	20	25	50	35	10	15	10	10	--
Soft Corals	25	20	25	50	75	20	40	50	--
Sponge	0	0	0	0	0	0	0	0	--
Rock	55	55	25	15	15	65	50	40	--
Rubbles	0	0	0	0	0	0	0	0	--
Dead Corals	0	0	0	0	0	0	0	0	--
Sand	0	0	0	0	0	0	0	0	--
Algae > 1 cm height	0	0	0	0	0	0	0	0	--
Total (≈ 100%)									
Hard Corals w/Disease	0	0	0	0	0	0	0	0	--
Hard CoralsW/Bleaching	0	0	0	0	0	0	0	0	--

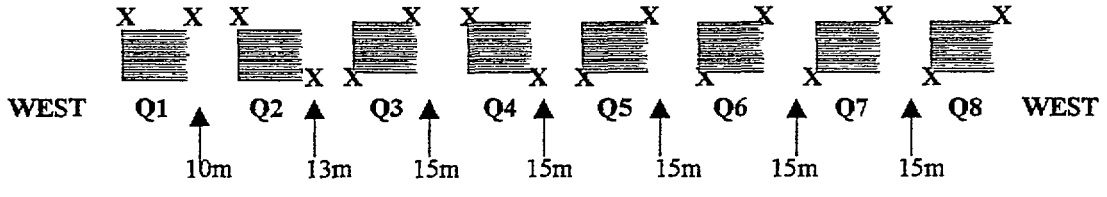
Other groups
Echinodermata
Echinus (Echinothrix diadema)
Mollusca
Bivalvia (Tridacna spp)

HURGHADA
SITE LOG **ERG SABINA**

1998:

DATE	21 Oct 98 Morning dive (10 15 depart, return 5 45 pm)
DIVERS	H.Mansour, Y Ibrahim, H. harb & M Habib
BOAT	White Dolphin
DIVE TIME	75 minutes
TASK	Seek old sites, locate 8 quads and place two corner markers (with a small yellow tie wrap as this year's indicator), and acquire the coral cover and minimal RUA data

The teamwork consisted from H. Mansour, Y Ibrahim, H. Harb and M. Habib The first one was assessing the quads, the 2nd was photographing the quads The other two were helping in-between the quads work. The area between each of the located old quads was about 10 to 15 m. The old marks of the first quad were located after a survey of the area near to the mooring buoys The rest of the 8 quads were newly chosen and marked The dive time was 75 minutes The old cable ties found were cleaned from the epizoans and the new plastic ties were inserted at the opposite corners of the quads We have located, marked, assessed and photographed 8 quads along the western side of Erg Sabina (1 old & 7 new) There was a very strong opposite current to our way of assessing the new quads and we had to do a great effort to assess the quads



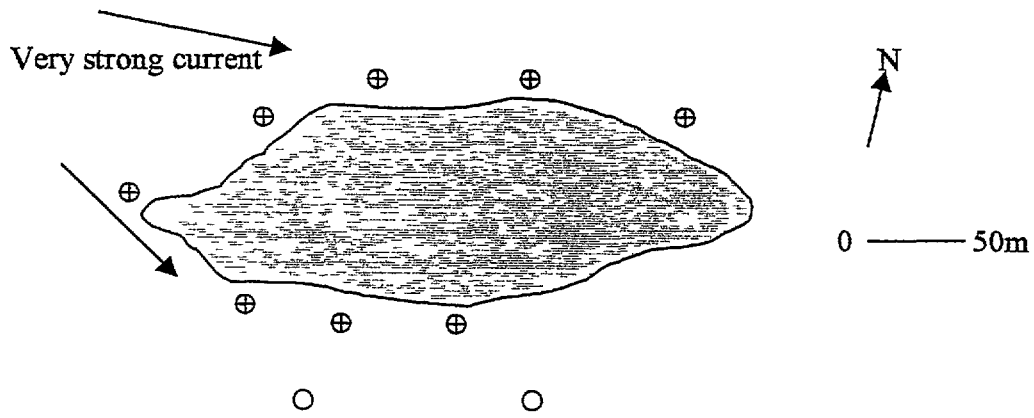
RAPID UNDERWATER ASSESSMENT DATA SHEET

GENERAL DATA

Site	**Erg Sabina**	**Date**	21/10/98
Coordinates	27° 12 966``N 33° 57` 277``E	**Dive Site Rating**	3
Air Temp	27 C	**Coral Diversity**	
Water Temp.	23 C	**Number of Boats**	2
Current	Very strong	**Number of Anch**	0
Wave height	25 CM	**Number of Divers**	15+4
Reef Zone	SLOPE	**Number of Buoys**	2

AERIAL VIEW (Showing location of Quadrants numbered and mooring buoys)

⊕ = **Quadrant** ○ = **Mooring Buoy**



LOCATION OF QUADRANTS

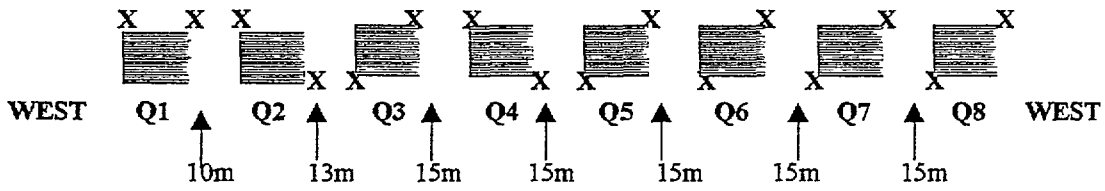
Quadrant #	1996 monitoring date	1998 monitoring Date	Remarks
1	5/10/98	21/10/98	New quad # 1?
2	5/10/98	21/10/98	Original quad # 2?
3	5/10/98	21/10/98	Original quad # 3?
4	5/10/98	21/10/98	New quad # 4?
5	5/10/98	21/10/98	New quad # 5?
6	5/10/98	21/10/98	New quad # 6?
7	5/10/98	21/10/98	New quad # 7?
8	5/10/98	21/10/98	New quad # 8?
9	---	---	---
10	---	---	---

HURGHADA
SITE LOG **ERG SABINA**

1998

DATE	21 Oct 98 Morning dive (10 15 depart, return 5 45 pm)
DIVERS	H.Mansour, Y Ibrahim, H. harb & M Habib
BOAT	White Dolphin
DIVE TIME	75 minutes
TASK	Seek old sites, locate 8 quads and place two corner markers (with a small yellow tie wrap as this year's indicator), and acquire the coral cover and minimal RUA data

The teamwork consisted from H. Mansour, Y Ibrahim, H. Harb and M. Habib The first one was assessing the quads, the 2nd was photographing the quads The other two were helping in-between the quads work. The area between each of the located old quads was about 10 to 15 m. The old marks of the first quad were located after a survey of the area near to the mooring buoys The rest of the 8 quads were newly chosen and marked The dive tim was 75 minutes The old cable ties found were cleaned from the epizoans and the new plastic ties were inserted at the opposite corners of the quads We have located, marked, assessed and photographed 8 quads along the western side of Erg Sabina (1 old & 7 new) There was a very strong opposite current to our way of assessing the new quads and we had to do a great effort to assess the quads



300

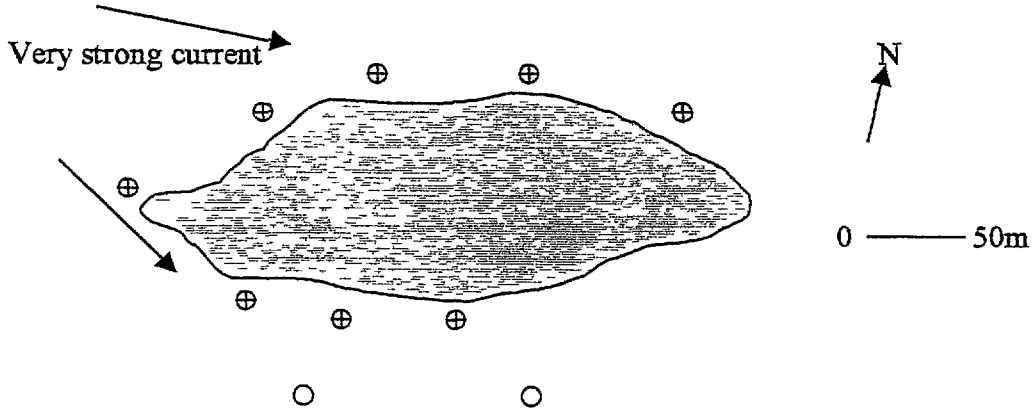
RAPID UNDERWATER ASSESSMENT DATA SHEET

GENERAL DATA

Site	**Erg Sabina**	**Date**	21/10/98
Coordinates	27° 12` 966` N 33° 57` 277``E	**Dive Site Rating**	3
Air Temp	27 C	**Coral Diversity**	
Water Temp	23 C	**Number of Boats**	2
Current	Very strong	**Number of Anch**	0
Wave height	25 CM	**Number of Divers**	15+4
Reef Zone	SLOPE	**Number of Buoys**	2

AERIAL VIEW (Showing location of Quadrants numbered and mooring buoys)

⊕ = **Quadrant** ○ = **Mooring Buoy**



LOCATION OF QUADRANTS

Quadrant #	1996 monitoring date	1998 monitoring Date	Remarks
1	5/10/98	21/10/98	New quad # 1?
2	5/10/98	21/10/98	Original quad # 2?
3	5/10/98	21/10/98	Original quad # 3?
4	5/10/98	21/10/98	New quad # 4?
5	5/10/98	21/10/98	New quad # 5?
6	5/10/98	21/10/98	New quad # 6?
7	5/10/98	21/10/98	New quad # 7?
8	5/10/98	21/10/98	New quad # 8?
9	---	---	---
10	---	---	---

ERG SABINA 1998

ABUNDANT GENERA (In order of Abundance)

	Hard Corals		Soft Corals
1	Acropora	1	*Lobophytum*
2	*Millipora*	2	*Dendronephathea*
3	*Porites*	3	*Cf Litophyton*
4	*Favites*	4	
5	*Montipora*	5	
6	*Dendrophilia*	6	
7	*Echinopora*	7	
8	*cf Anacropora*	8	
9			
10			

SUBSTRATE % COVER (2mX2m quadrant at 4 m depth)

Category/Quadrants	1	2	3	4	5	6	7	8	9
Hard Corals	15	15	15	100	85	70	70	20	--
Soft Corals	0	0	0	0	0	0	0	0	--
Sponge	0	0	0	0	0	0	0	0	--
Rock	80	85	85	0	15	30	30	80	--
Rubbles	5	0	0	0	0	0	0	0	--
Dead Corals	0	0	0	0	0	0	0	0	--
Sand	0	0	0	0	0	0	0	0	--
Algae > 1 cm height	0	0	0	0	0	0	0	0	--
Total (≈ 100%)									
Hard Corals w/Disease	0	0	0	0	0	0	0	0	--
Hard Corals W/Bleaching	0	0	0	0	0	0	0	0	--

Other groups
Echinodermata
Holothuroidea (Sea Cucumber)
Echinus (Pencil urchin cf Heterocentrotus, Echinothrix diadema)
Mollusca
Bivalvia (Tridacna spp)

HURGHADA
SITE LOG **FANOUS 1 EAST**

1998·

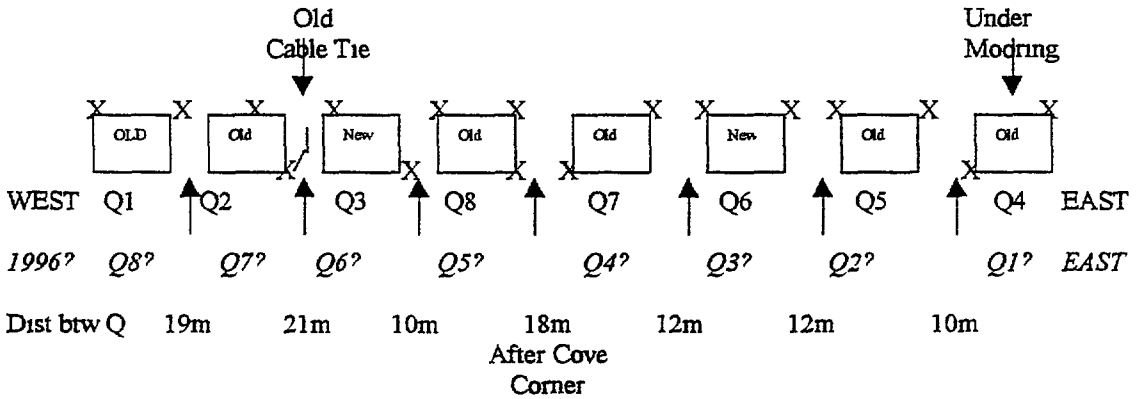
DATE	19 Oct 98 Afternoon dive (10 30 depart, return 5 30 pm)
DIVERS	H. Mansour &Y Ibrahim, S Tighe
BOAT	El Sherif
DIVE TIME	90 minutes
TASK	Seek old sites, locate 8 quads and place two corner markers (with a small yellow tie wrap as this year's indicator), and acquire the coral cover and minimal RUA data

We found 6 of the original quads from 1996 The 1996 diagram had all quads east of the corner where the moorings are located, before the inlet and cove The first quad was located under the last top reef pin to the east We started working from east to west with a light current opposing us We started at the western tip at what we thought was 1996 Quad 8, and moved east, finding Quads 7, 5, and 4, and creating Q6 But then there were no more quads, so we went back to the beginning, at the reef western point, and continued moving west of our Quad 8, creating new quad "3" We then found 3 more cable ties marking 1996 quad sites a spot 3 meters west of New Quad 3, Quad 2 and Quad 1 The new plastic ties were inserted at the opposite corners of the all the located and the new quads We have located, marked, assessed and photographed 8 quads along the west side of the reef of Fanous 1 E (2 new)

A lot of small (fist-sized) branching corals (Acroporas mostly) coming in Some new Xenia (small diameter)

Photos were taken with a slate marker, and a 20mm lens Roll # 98-10-01 All photos quad numbers refer to our sequence in 1998, and are therefore out of order relative to 1996, but still contain 6 of the 8 same quads of reef area

The HEPCA diagram has buoys, but they were reef top pins, also, they stretched out further to the East



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ERG SABINA 1998

ABUNDANT GENERA (In order of Abundance)

	Hard Corals		Soft Corals
1	Acropora	1	*Lobophytum*
2	*Millipora*	2	*Dendronephathea*
3	*Porites*	3	*Cf Litophyton*
4	*Favites*	4	
5	*Montipora*	5	
6	*Dendrophilia*	6	
7	*Echinopora*	7	
8	*cf Anacropora*	8	
9			
10			

SUBSTRATE % COVER (2mX2m quadrant at 4 m depth)

Category/Quadrants	1	2	3	4	5	6	7	8	9
Hard Corals	15	15	15	100	85	70	70	20	--
Soft Corals	0	0	0	0	0	0	0	0	--
Sponge	0	0	0	0	0	0	0	0	--
Rock	80	85	85	0	15	30	30	80	--
Rubbles	5	0	0	0	0	0	0	0	--
Dead Corals	0	0	0	0	0	0	0	0	--
Sand	0	0	0	0	0	0	0	0	--
Algae > 1 cm height	0	0	0	0	0	0	0	0	--
Total (≈ 100%)									
Hard Corals w/Disease	0	0	0	0	0	0	0	0	--
Hard Corals W/Bleaching	0	0	0	0	0	0	0	0	--

Other groups
Echinodermata
Holothuroidea (Sea Cucumber)
Echinus (Pencil urchin cf Heterocentrotus, Echinothrix diadema)
Mollusca
Bivalvia (Tridacna spp)

HURGHADA
SITE LOG **FANOUS 1 EAST**

1998

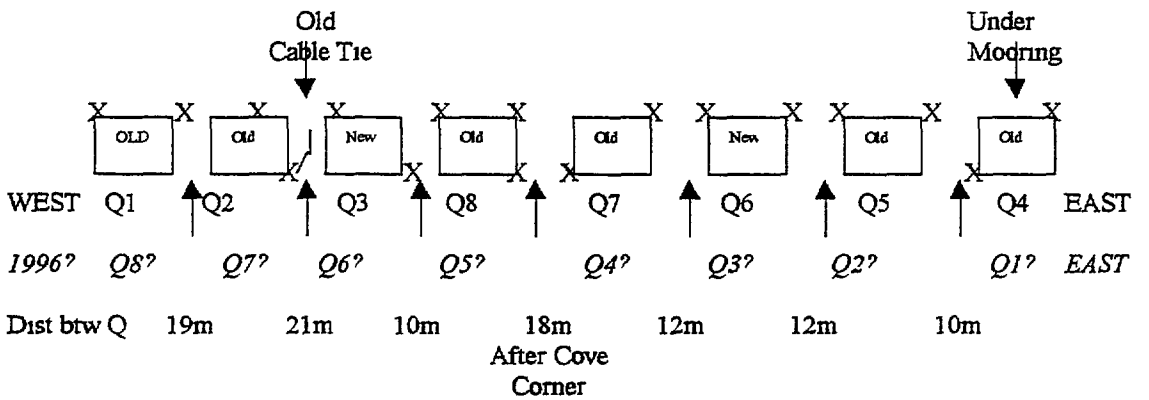
DATE	19 Oct 98 Afternoon dive (10 30 depart, return 5 30 pm)
DIVERS	H. Mansour &Y Ibrahim, S Tighe
BOAT	El Sherif
DIVE TIME	90 minutes
TASK	Seek old sites, locate 8 quads and place two corner markers (with a small yellow tie wrap as this year's indicator), and acquire the coral cover and minimal RUA data

We found 6 of the original quads from 1996 The 1996 diagram had all quads east of the corner where the moorings are located, before the inlet and cove The first quad was located under the last top reef pin to the east We started working from east to west with a light current opposing us We started at the western tip at what we thought was 1996 Quad 8, and moved east, finding Quads 7, 5 and 4, and creating Q6 But then there were no more quads, so we went back to the beginning at the reef western point, and continued moving west of our Quad 8, creating new quad "3" We then found 3 more cable ties marking 1996 quad sites a spot 3 meters west of New Quad 3, Quad 2 and Quad 1 The new plastic ties were inserted at the opposite corners of the all the located and the new quads We have located, marked, assessed and photographed 8 quads along the west side of the reef of Fanous 1 E (2 new)

A lot of small (fist-sized) branching corals (Acroporas mostly) coming in Some new Xenia (small diameter)

Photos were taken with a slate marker, and a 20mm lens Roll # 98-10-01 All photos quad numbers refer to our sequence in 1998, and are therefore out of order relative to 1996, but still contain 6 of the 8 same quads of reef area

The HEPCA diagram has buoys, but they were reef top pins, also, they stretched out further to the East



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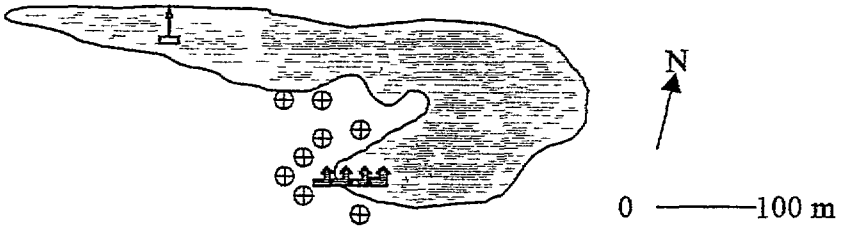
RAPID UNDERWATER ASSESSMENT DATA SHEET

GENERAL DATA

Site	**El Fanous 1 (E)**	**Date**	18/10/98
Coordinates	27° 16 066 N 33° 53 234` E	**Dive Site Rating**	3
Air Temp.	27 C	**Coral Diversity**	
Water Temp	23 C	**Number of Boats**	5
Current	MODERATE	**Number of Anch**	0
Wave height	25 CM	**Number of Divers**	40+10
Reef Zone	SLOPE	**Number of Buoys**	4

AERIAL VIEW (Showing location of Quadrants numbered and mooring buoys)

⊕ = **Quadrant** ○ = **Mooring Buoy**



= light house

= Top reef pins

LOCATION OF QUADRANTS

Quadrant #	1996 monitoring date	1998 monitoring Date	Remarks
1	3/10/98	19/10/98	Original quad # 5
2	3/10/98	19/10/98	Original quad # 4
3	3/10/98	19/10/98	Original quad # 3
4	3/10/98	19/10/98	Original quad # 2
5	3/10/98	19/10/98	Original quad # 1
6	3/10/98	19/10/98	Original quad # 6
7	3/10/98	19/10/98	New
8	3/10/98	19/10/98	Original quad # 8
9	---	---	---
10	---	---	---

FANOUS 1 EAST 1998

ABUNDANT GENERA (In order of Abundance)

	Hard Corals		Soft Corals
1	Acropora	1	*Lobophytun*
2	*Millipora*	2	*Sarcophyton*
3	*Seriatopora*	3	*Sinularia*
4	*Fungia*	4	*Entacmaea*
5		5	
6		6	
7		7	

SUBSTRATE % COVER (2mX2m quadrant at 4 m depth)

Category/Quadrants	1	2	3	4	5	6	7	8	9
Hard Corals	5	5	3	5	5	15	8	20	--
Soft Corals	5	5	2	0	0	10	0	0	--
Sponge	0	0	0	0	0	0	0	0	--
Rock	80	15	0	5	95	35	35	25	--
Rubbles	5	75	95	90	0	5	12	30	--
Dead Corals	0	0	0	0	0	0	5	10	--
Sand	5	0	0	0	0	30	40	15	--
Algae > 1 cm height	0	0	0	0	0	0	0	0	--
Total (≈ 100%)									
Hard Corals w/Disease	0	0	0	0	0	0	0	0	--
Hard Corals W/Bleaching	0	0	0	0	0	0	0	0	--

Other groups
Echinodermata
Holothuroidea (Sea Cucumber)
Echinus (Pencil urchin cf Heterocentrotus, Echinothrix diadema & cf Tripneustes)
Mollusca
Gastropoda
Strombus
Bivalvia (Tridacna spp)
Sponges
Encrusting small tubular, small massive, rounded

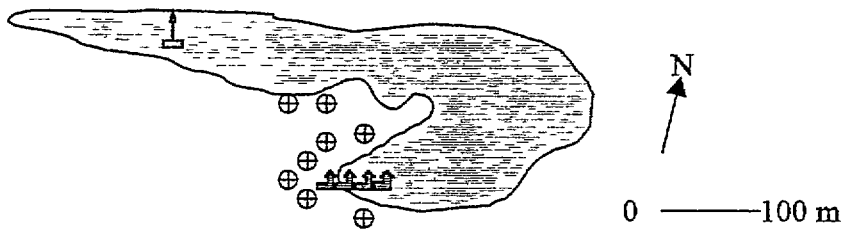
RAPID UNDERWATER ASSESSMENT DATA SHEET

GENERAL DATA

Site	**El Fanous 1 (E)**	**Date**	18/10/98
Coordinates	27° 16 066 N 33° 53 234 E	**Dive Site Rating**	3
Air Temp	27 C	**Coral Diversity**	
Water Temp	23 C	**Number of Boats**	5
Current	MODERATE	**Number of Anch**	0
Wave height	25 CM	**Number of Divers**	40+10
Reef Zone	SLOPE	**Number of Buoys**	4

AERIAL VIEW (Showing location of Quadrants numbered and mooring buoys)

⊕ = **Quadrant** ○ = **Mooring Buoy**



= light house

= Top reef pins

LOCATION OF QUADRANTS

Quadrant #	1996 monitoring date	1998 monitoring Date	Remarks
1	3/10/98	19/10/98	Original quad # 5
2	3/10/98	19/10/98	Original quad # 4
3	3/10/98	19/10/98	Original quad # 3
4	3/10/98	19/10/98	Original quad # 2
5	3/10/98	19/10/98	Original quad # 1
6	3/10/98	19/10/98	Original quad # 6
7	3/10/98	19/10/98	New
8	3/10/98	19/10/98	Original quad # 8
9	---	---	---
10	---	---	---

FANOUS 1 EAST 1998

ABUNDANT GENERA (In order of Abundance)

	Hard Corals		Soft Corals
1	Acropora	1	*Lobophytun*
2	*Millipora*	2	*Sarcophyton*
3	*Seriatopora*	3	*Sinularia*
4	*Fungia*	4	*Entacmaea*
5		5	
6		6	
7		7	

SUBSTRATE % COVER (2mX2m quadrant at 4 m depth)

Category/Quadrants	1	2	3	4	5	6	7	8	9
Hard Corals	5	5	3	5	5	15	8	20	--
Soft Corals	5	5	2	0	0	10	0	0	--
Sponge	0	0	0	0	0	0	0	0	--
Rock	80	15	0	5	95	35	35	25	--
Rubbles	5	75	95	90	0	5	12	30	--
Dead Corals	0	0	0	0	0	0	5	10	--
Sand	5	0	0	0	0	30	40	15	--
Algae > 1 cm height	0	0	0	0	0	0	0	0	--
Total (≈ 100%)									
Hard Corals w/Disease	0	0	0	0	0	0	0	0	--
Hard Corals W/Bleaching	0	0	0	0	0	0	0	0	--

Other groups
Echinodermata
Holothuroidea (Sea Cucumber)
Echinus (Pencil urchin cf Heterocentrotus, Echinothrix diadema & cf Tripneustes)
Mollusca
Gastropoda
Strombus
Bivalvia (Tridacna spp)
Sponges
Encrusting small tubular small massive, rounded

HURGHADA
SITE LOG **FANOUS 2 WEST**

1998

DATE 19 Oct 98 Morning dive (10 30 depart, return 5 30 pm)

DIVERS H. Mansour &Y Ibrahim, S Tighe

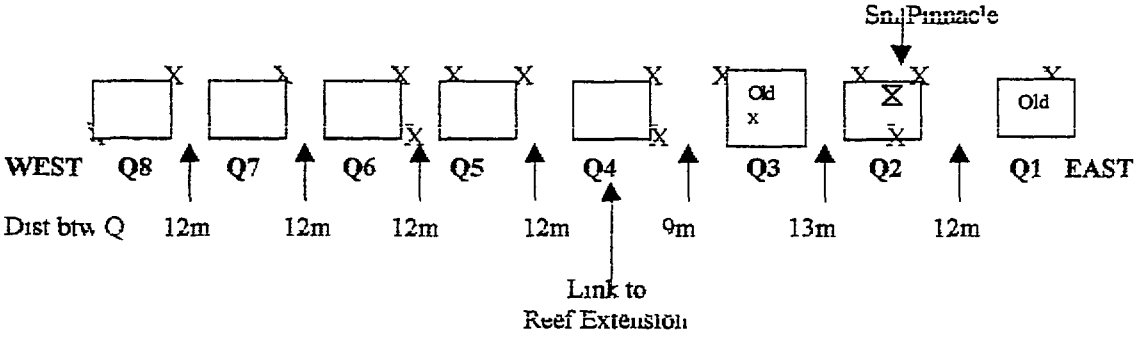
BOAT El Sherif

DIVE TIME 90 minutes

TASK Seek old sites, locate 8 quads and place two corner markers (with a small yellow tie wrap as this year's indicator), and acquire the coral cover and minimal RUA data

The team work consisted from H. Mansour & Y Ibrahim and S Tighe The first and third divers were locating the old marks of the old quads and assessing the quads, the 2nd diver was photographing the quads The site is formed of a moderate curved reef flat with deep solpe on its outer edge HEPCA diagram has buoys, but they were reef top pins, also, they stretched out further to the East than the map indicated We have located 3 of the 8 old quadrants The dive time was 90 minutes The new plastic ties were inserted at the opposite corners of the all the located and the new quads We started with the quad near the tip of the southern part of the reef, under the western-most reef-top pin, and moved west, creating quads 2-8 Within the cove, most of the quads sat at the foot of the reef wall, extending up the reef face Lots of rubble, especially under the mooring area A lot of small (fist-sized) branching corals (Acroporas mostly) coming in Not a lot of Xenia relative to other areas
We have located, marked, assessed and photographed 8 quads along the west side of the reef of Fanous 2 W (5 new)

This site is also a location of a Line-Transect study area Those cable ties are EAST of the QUADS, and begin under the eastern moorings of Fanous West, and have a yellow PARK STUDY SITE tag



Photos were take of quads with a marker slate, and a 20mm lens Roll # 98-10-02

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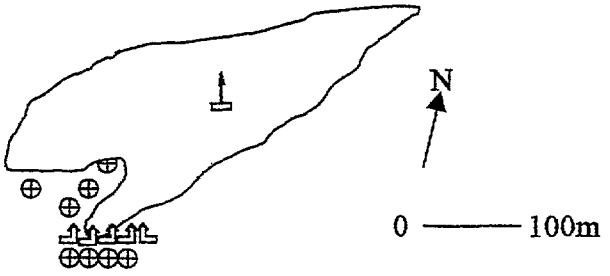
RAPID UNDERWATER ASSESSMENT DATA SHEET

GENERAL DATA

Site	(El) Fanous 2 (W)	Date	18/10/98
Coordinates	27° 21 219 N 33° 54 451 E	Dive Site Rating	3
Air Temp	27 C	Coral Diversity	
Water Temp	23 C	Number of Boats	5
Current	MODERATE	Number of Anch	0
Wave height	25 CM	Number of Divers	40+10
Reef Zone	SLOPE	Number of Buoys	5

AERIAL VIEW (Showing location of Quadrants numbered and mooring buoys)

⊕ = Quadrant ○ = Mooring Buoy



= light house

= Top reef pins

LOCATION OF QUADRANTS

Quadrant #	1996 monitoring date	1998 monitoring Date	Remarks
1	3/10/98	17/10/98	Original quad
2	3/10/98	17/10/98	Original quad
3	3/10/98	17/10/98	New
4	3/10/98	17/10/98	New
5	3/10/98	17/10/98	New
6	3/10/98	17/10/98	Original quad
7	3/10/98	17/10/98	Original quad
8	3/10/98	17/10/98	Original quad
9	---	---	---
10	---	---	---

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HURGHADA
SITE LOG **FANOUS 2 WEST**

1998

DATE 19 Oct 98 Morning dive (10 30 depart, return 5 30 pm)

DIVERS H. Mansour &Y Ibrahim, S Tighe

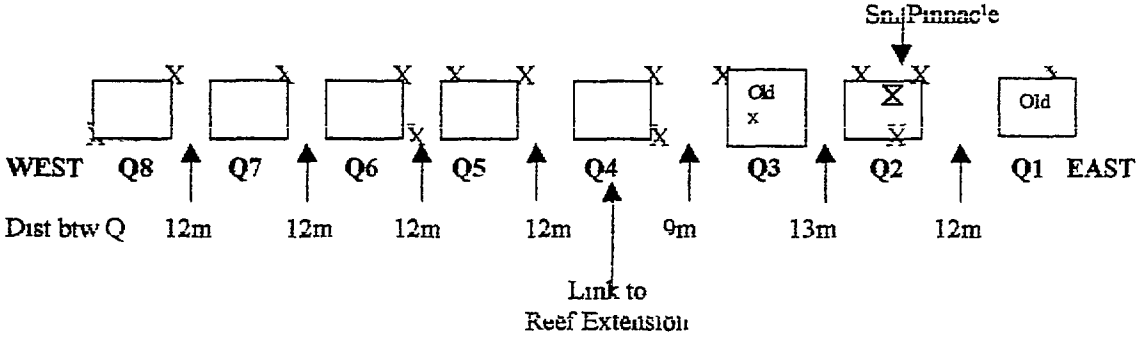
BOAT El Sherif

DIVE TIME 90 minutes

TASK Seek old sites, locate 8 quads and place two corner markers (with a small yellow tie wrap as this year's indicator), and acquire the coral cover and minimal RUA data

The team work consisted from H. Mansour & Y Ibrahim and S Tighe The first and third divers were locating the old marks of the old quads and assessing the quads, the 2nd diver was photographing the quads The site is formed of a moderate curved reef flat with deep solpe on its outer edge HEPCA diagram has buoys, but they were reef top pins, also, they stretched out further to the East than the map indicated We have located 3 of the 8 old quadrants The dive time was 90 minutes The new plastic ties were inserted at the opposite corners of the all the located and the new quads We started with the quad near the tip of the southern part of the reef, under the western-most reef-top pin, and moved west, creating quads 2-8 Within the cove, most of the quads sat at the foot of the reef wall, extending up the reef face Lots of rubble, especially under the mooring area A lot of small (fist-sized) branching corals (Acroporas mostly) coming in Not a lot of Xenia relative to other areas
We have located, marked, assessed and photographed 8 quads along the west side of the reef of Fanous 2 W (5 new)

This site is also a location of a Line-Transect study area Those cable ties are EAST of the QUADS, and begin under the eastern moorings of Fanous West, and have a yellow PARK STUDY SITE tag



Photos were take of quads with a marker slate, and a 20mm lens Roll # 98-10-02

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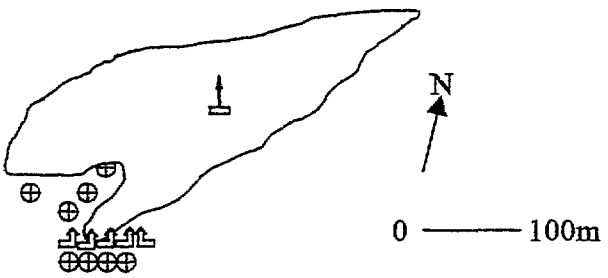
RAPID UNDERWATER ASSESSMENT DATA SHEET

GENERAL DATA

Site	**(El) Fanous 2 (W)**	**Date**	18/10/98
Coordinates	27° 21 219 N 33° 54 451 E	**Dive Site Rating**	3
Air Temp	27 C	**Coral Diversity**	
Water Temp	23 C	**Number of Boats**	5
Current	MODERATE	**Number of Anch.**	0
Wave height	25 CM	**Number of Divers**	40+10
Reef Zone	SLOPE	**Number of Buoys**	5

AERIAL VIEW (Showing location of Quadrants numbered and mooring buoys)

⊕ = **Quadrant** ○ = **Mooring Buoy**



= light house

= Top reef pins

LOCATION OF QUADRANTS

Quadrant #	1996 monitoring date	1998 monitoring Date	Remarks
1	3/10/98	17/10/98	Original quad
2	3/10/98	17/10/98	Original quad
3	3/10/98	17/10/98	New
4	3/10/98	17/10/98	New
5	3/10/98	17/10/98	New
6	3/10/98	17/10/98	Original quad
7	3/10/98	17/10/98	Original quad
8	3/10/98	17/10/98	Original quad
9	---	---	---
10	---	---	---

FANOUS 2 W 1998

ABUNDANT GENERA (In order of Abundance)

	Hard Corals		Soft Corals
1	Acropora	1	*Simularia*
2	*Millipora*	2	*Lobophytun*
3	*Seriatopora*	3	*Dendronephthya spp*
4	*Porites*	4	*Sarcophyton*
5	*Favites*	5	*Xenia*
6	*Fungia*	6	*Entacmaea*
7		7	

SUBSTRATE % COVER (2mX2m Quadrant at 4 m depth)

Quadrants	1	2	3	4	5	6	7	8	9
Hard Corals	8	5	10	40	65	30	40	25	
Soft Corals	2	3	0	10	8	10	20	25	
Sponge	0	0	0	0	0	0	0	0	
Rock	0	0	8	5	4	10	20	30	
Rubbles	80	78	46	40	5	20	15	15	
Dead Corals	0	0	0	5	10	20	5	5	
Sand	5	10	35	0	8	10	0	0	
Algae > 1 cm height	5	4	1	0	0	0	0	0	
Total (≈ 100%)									
Hard Corals w/Disease		0	0	0	0	0	0	0	
Hard Corals W/Bleaching		0	0	0	0	0	0	0	

Other interesting species
Echinodermata
Holothuroidea (Sea Cucumber)
Echinus (Pencil urchin cf Heterocentrotus, Echinothrix diadema)
Mollusca
Bivalvia (Tridacna spp)

NO SITE LOG FOR GOTA TORFA EAST

CREATED BY DR. MANSOUR –

PLEASE REFER TO RAW FIELD NOTES FOR MISSING INFORMATION

FANOUS 2 W 1998

ABUNDANT GENERA (In order of Abundance)

	Hard Corals		Soft Corals
1	Acropora	1	*Simularia*
2	*Millipora*	2	*Lobophytun*
3	*Seriatopora*	3	*Dendronephthya spp*
4	*Porites*	4	*Sarcophyton*
5	*Favites*	5	*Xenia*
6	*Fungia*	6	*Entacmaea*
7		7	

SUBSTRATE % COVER (2mX2m Quadrant at 4 m depth)

Quadrants	1	2	3	4	5	6	7	8	9
Hard Corals	8	5	10	40	65	30	40	25	
Soft Corals	2	3	0	10	8	10	20	25	
Sponge	0	0	0	0	0	0	0	0	
Rock	0	0	8	5	4	10	20	30	
Rubbles	80	78	46	40	5	20	15	15	
Dead Corals	0	0	0	5	10	20	5	5	
Sand	5	10	35	0	8	10	0	0	
Algae > 1 cm height	5	4	1	0	0	0	0	0	
Total (≈ 100%)									
Hard Corals w/Disease		0	0	0	0	0	0	0	
Hard Corals W/Bleaching		0	0	0	0	0	0	0	

Other interesting species
Echinodermata
Holothuroidea (Sea Cucumber)
Echinus (Pencil urchin cf Heterocentrotus, Echinothrix diadema)
Mollusca
Bivalvia (Tridacna spp)

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NO SITE LOG FOR GOTA TORFA EAST

CREATED BY DR. MANSOUR –

PLEASE REFER TO RAW FIELD NOTES FOR MISSING INFORMATION

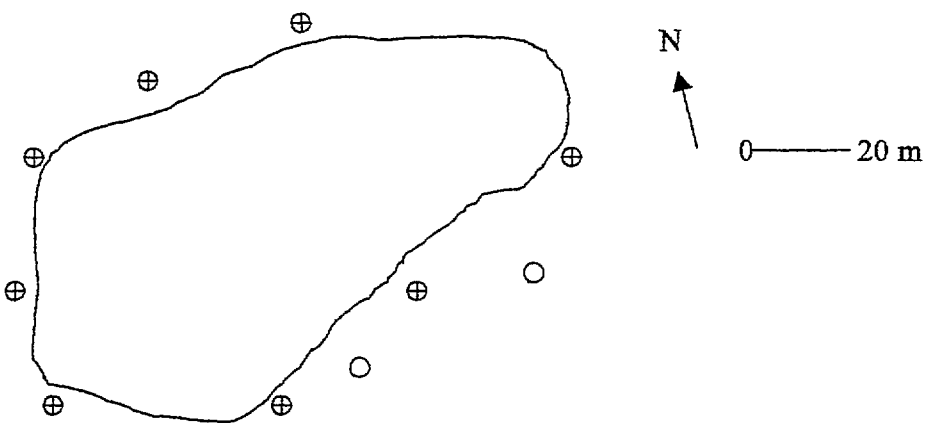
RAPID UNDERWATER ASSESSMENT DATA SHEET

GENERAL DATA

Site	**Gotta Torfa E**	**Date**	01/11/98
Coordinates	27° 13 428 N 33° 57 694 E	**Dive Site Rating**	2
Air Temp	21 C	**Coral Diversity**	
Water Temp	24 C	**Number of Boats**	1
Current	Weak	**Number of Anch**	0
Wave height	25-50 CM	**Number of Divers**	8+2
Reef Zone	Edge	**Number of Buoys**	2

AERIAL VIEW (Showing location of Quadrants numbered and mooring buoys)

⊕ **= Quadrant** ○ **= Mooring Buoy**



LOCATION OF QUADRANTS

Quadrant #	1996 monitoring date	1998 monitoring Date	Remarks
1	8/10/98	1/11/98	New quad # 1?
2	8/10/98	1/11/98	New quad # 2?
3	8/10/98	1/11/98	New quad # 3?
4	8/10/98	1/11/98	New quad # 4?
5	8/10/98	1/11/98	New quad # 5?
6	8/10/98	1/11/98	New quad # 6?
7	8/10/98	1/11/98	New quad # 7?
8	8/10/98	1/11/98	New quad # 8?
9	---	---	---
10	---	---	---

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GOTA TORFA EAST 1998

ABUNDANT GENERA (In order of Abundance)

	Hard Corals		Soft Corals
1	Acropora	1	*Lobophytum*
2	*Millipora*	2	*Sarcophyton*
3	*Porites*	3	*Sinularia*
4	*Pocillipora*	4	
5	*Turbinaria*	5	
6	*Goniopora*	6	
7	*Favites*	7	
8	*Fungia*	8	
9			
10			

SUBSTRATE % COVER (2mX2m quadrant at 4 m depth)

Category/Quadrants	1	2	3	4	5	6	7	8	9
Hard Corals	15	0	10	35	80	90	85	80	--
Soft Corals	30	5	2	15	0	0	0	0	--
Sponge	0	0	0	0	0	0	0	0	--
Rock	55	0	38	60	20	10	10	5	--
Rubbles	0	95	50	0	0	0	5	15	--
Dead Corals	0	0	0	0	0	0	0	0	--
Sand	0	0	0	0	0	0	0	0	--
Algae > 1 cm height	0	0	0	0	0	0	0	0	--
Total (≈ 100%)									
Hard Corals w/Disease	0	0	0	0	0	0	0	0	--
Hard Corals W/Bleaching	0	0	0	0	0	0	0	0	--

Other groups
Echinodermata
Echinus (*Echinothrix diadema*)
Mollusca
Bivalvia (*Tridacna sp*)

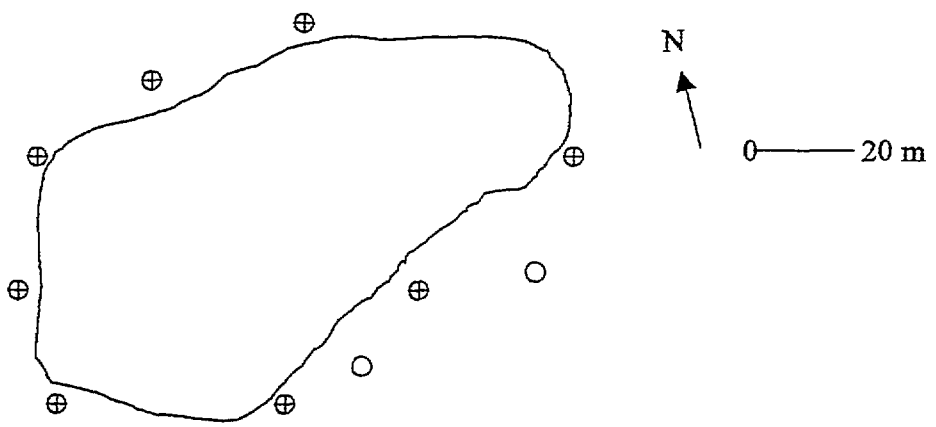
RAPID UNDERWATER ASSESSMENT DATA SHEET

GENERAL DATA

Site	Gotta Torfa E	Date	01/11/98
Coordinates	27° 13 428 N 33° 57 694 E	Dive Site Rating	2
Air Temp	21 C	Coral Diversity	
Water Temp	24 C	Number of Boats	1
Current	Weak	Number of Anch	0
Wave height	25-50 CM	Number of Divers	8+2
Reef Zone	Edge	Number of Buoys	2

AERIAL VIEW (Showing location of Quadrants numbered and mooring buoys)

⊕ = Quadrant ○ = Mooring Buoy



LOCATION OF QUADRANTS

Quadrant #	1996 monitoring date	1998 monitoring Date	Remarks
1	8/10/98	1/11/98	New quad # 1?
2	8/10/98	1/11/98	New quad # 2?
3	8/10/98	1/11/98	New quad # 3?
4	8/10/98	1/11/98	New quad # 4?
5	8/10/98	1/11/98	New quad # 5?
6	8/10/98	1/11/98	New quad # 6?
7	8/10/98	1/11/98	New quad # 7?
8	8/10/98	1/11/98	New quad # 8?
9	---	---	---
10	---	---	---

GOTA TORFA EAST 1998

ABUNDANT GENERA (In order of Abundance)

	Hard Corals		Soft Corals
1	Acropora	1	*Lobophytum*
2	*Millipora*	2	*Sarcophyton*
3	*Porites*	3	*Sinularia*
4	*Pocillipora*	4	
5	*Turbinaria*	5	
6	*Goniopora*	6	
7	*Favites*	7	
8	*Fungia*	8	
9			
10			

SUBSTRATE % COVER (2mX2m quadrant at 4 m depth)

Category/Quadrants	1	2	3	4	5	6	7	8	9
Hard Corals	15	0	10	35	80	90	85	80	--
Soft Corals	30	5	2	15	0	0	0	0	--
Sponge	0	0	0	0	0	0	0	0	--
Rock	55	0	38	60	20	10	10	5	--
Rubbles	0	95	50	0	0	0	5	15	--
Dead Corals	0	0	0	0	0	0	0	0	--
Sand	0	0	0	0	0	0	0	0	--
Algae > 1 cm height	0	0	0	0	0	0	0	0	--
Total (≈ 100%)									
Hard Corals w/Disease	0	0	0	0	0	0	0	0	--
Hard Corals W/Bleaching	0	0	0	0	0	0	0	0	--

Other groups
Echinodermata
Echinus (*Echinothrix diadema*)
Mollusca
Bivalvia (*Tridacna sp*)

NO SITE LOG FOR SHAAB ESHTA 1998

CREATED BY DR. MANSOUR—PLEASE CHECK RAW FIELD LOGS FOR MISSING INFORMATION

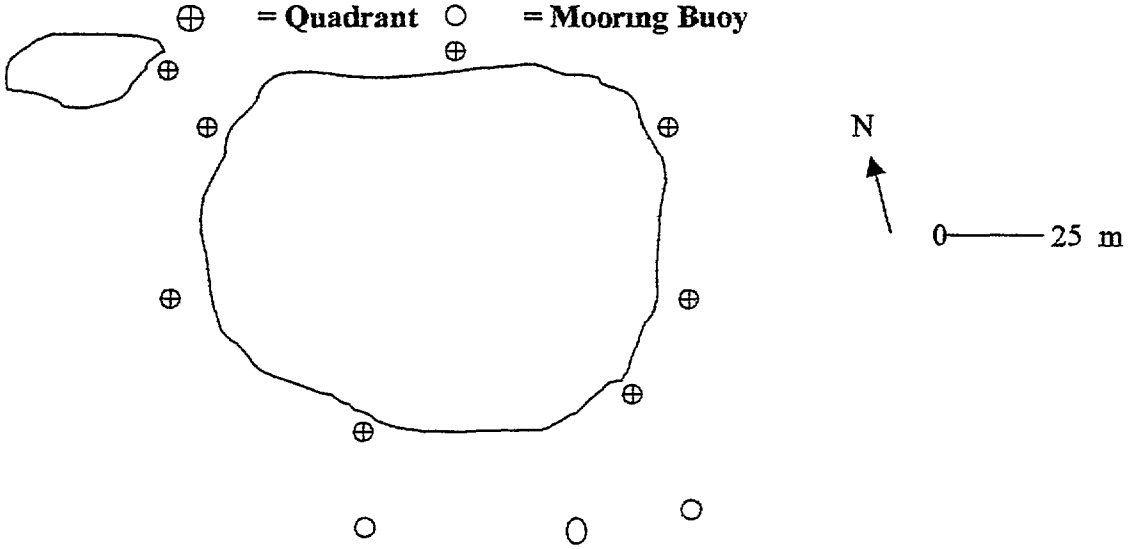
RAPID UNDERWATER ASSESSMENT DATA SHEET

GENERAL DATA

Site	**Shaab Eshta**	**Date**	04/11/98
Coordinates	27° 08 991 N 33° 53 636 E	**Dive Site Rating**	1
Air Temp	26 C	**Coral Diversity**	
Water Temp	23 C	**Number of Boats**	0
Current	Weak	**Number of Anch**	0
Wave height	25 CM	**Number of Divers**	0
Reef Zone	Edge	**Number of Buoys**	2+1

AERIAL VIEW (Showing location of Quadrants numbered and mooring buoys)

⊕ **= Quadrant** ○ **= Mooring Buoy**



LOCATION OF QUADRANTS

Quadrant #	1996 monitoring date	1998 monitoring Date	Remarks
1	20/9/98	4/11/98	Original quad # 1?
2	20/9/98	4/11/98	Original quad # 2?
3	20/9/98	4/11/98	New quad # 3?
4	20/9/98	4/11/98	Original quad # 4?
5	20/9/98	4/11/98	New quad # 5?
6	20/9/98	4/11/98	New quad # 6?
7	20/9/98	4/11/98	New quad # 7?
8	20/9/98	4/11/98	New quad # 8?
9	---	---	---
10	---	---	---

NO SITE LOG FOR SHAAB ESHTA 1998

CREATED BY DR. MANSOUR—PLEASE CHECK RAW FIELD LOGS FOR MISSING INFORMATION

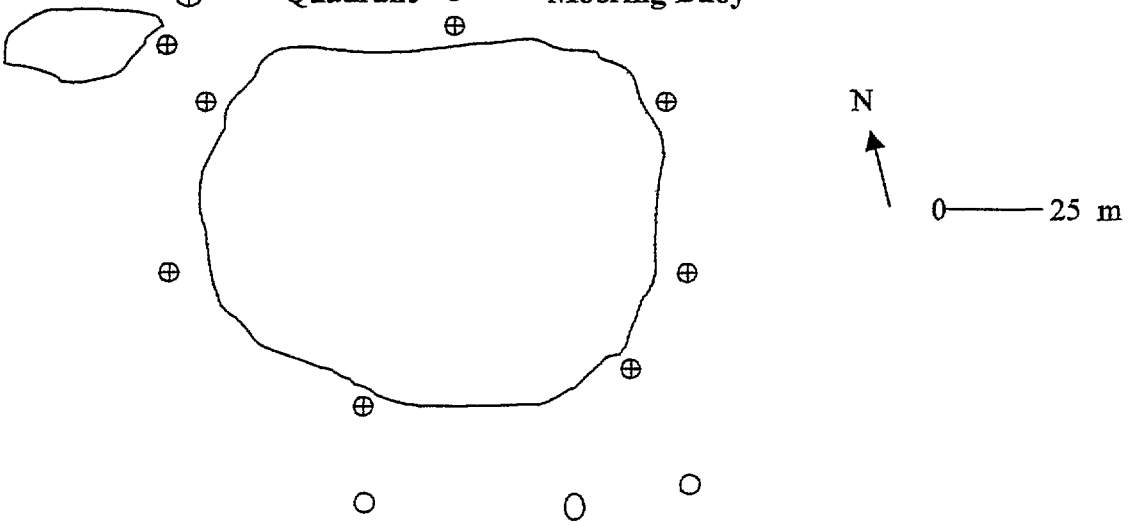
RAPID UNDERWATER ASSESSMENT DATA SHEET

GENERAL DATA

Site	**Shaab Eshta**	**Date**	04/11/98
Coordinates	27° 08 991 N 33° 53 636 E	**Dive Site Rating**	1
Air Temp	26 C	**Coral Diversity**	
Water Temp	23 C	**Number of Boats**	0
Current	Weak	**Number of Anch**	0
Wave height	25 CM	**Number of Divers**	0
Reef Zone	Edge	**Number of Buoys**	2+1

AERIAL VIEW (Showing location of Quadrants numbered and mooring buoys)

⊕ **= Quadrant** ○ **= Mooring Buoy**



LOCATION OF QUADRANTS

Quadrant #	1996 monitoring date	1998 monitoring Date	Remarks
1	20/9/98	4/11/98	Original quad # 1?
2	20/9/98	4/11/98	Original quad # 2?
3	20/9/98	4/11/98	New quad # 3?
4	20/9/98	4/11/98	Original quad # 4?
5	20/9/98	4/11/98	New quad # 5?
6	20/9/98	4/11/98	New quad # 6?
7	20/9/98	4/11/98	New quad # 7?
8	20/9/98	4/11/98	New quad # 8?
9	---	---	---
10	---	---	---

SHAAB ESHTA 1998

ABUNDANT GENERA (In order of Abundance)

	Hard Corals		Soft Corals
1	Acropora	1	*Sinularia*
2	*Millipora*	2	*Sarcophytum*
3	*Porites*	3	
4	*Pocillipora*	4	
5	*Turbinaria*	5	
6	*Goniopora*	6	
7	*Favites*	7	
8	*Fungia*	8	
9	*c f Galaxea*	9	
10	*Dendrophilia*		

SUBSTRATE % COVER (2mX2m quadrant at 4 m depth)

Category/Quadrants	1	2	3	4	5	6	7	8	9
Hard Corals	35	65	45	30	10	20	55	60	--
Soft Corals	5	2	15	25	25	0	0	2	--
Sponge	0	0	0	0	0	0	0	0	--
Rock	60	33	30	40	55	80	45	38	--
Rubbles	0	0	0	0	10	0	0	0	--
Dead Corals	0	0	0	0	0	0	0	0	--
Sand	0	0	0	0	0	0	0	0	--
Algae > 1 cm height	0	0	0	0	0	0	0	0	--
Total (≈ 100%)									
Hard Corals w/Disease	0	0	0	0	0	0	0	0	--
Hard Corals W/Bleaching	0	0	0	0	0	0	0	0	--

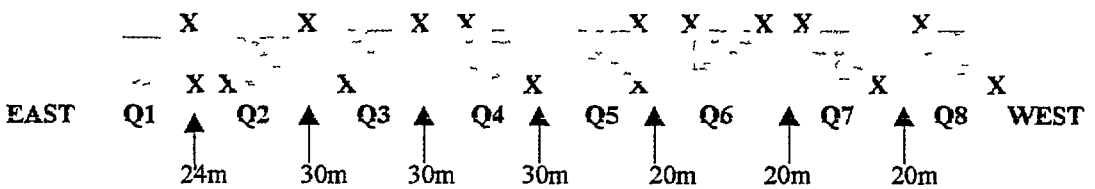
Other groups
Echinodermata
Echinus (*Echinothrix diadema*)
Mollusca
Bivalvia (*Tridacna sp*)
Sea anemone *Entacmae quadricolor*
Holothuroidea

HURGHADA
SITE LOG **SHAAB SABINA**

1998

DATE	21 Oct 98 Noon dive (10 15 depart, return 5 45 pm)
DIVERS	H.Mansour, Y Ibrahim, H Harb & M Habib
BOAT	White Dolphin
DIVE TIME	80 minutes
TASK	Seek old sites, locate 9 quads and place two corner markers (with a small yellow tie wrap as this year's indicator), and acquire the coral cover and minimal RUA data

The team work consisted from H. Mansour, Y Ibrahim, H Harb and M Habib The first one was assessing the quads, the 2nd was photographing the quads The other two were helping in-between the quad- work. The area between each of the located old quads was about 20 to 30 m. The old marks of the first two quads were located after a survey of the area near to the mooring buoys The rest of the 8 quads were newly chosen and marked The dive time was 80 minutes The old cable ties found were cleaned from the epizoans and the new plastic ties were inserted at the opposite corners of the quads We have located, marked, assessed and photographed 8 quads along the western side of Shaab Sabina (2 old & 6 new) There was a strong opposite current to our way of assessing the new quads



SHAAB ESHTA 1998

ABUNDANT GENERA (In order of Abundance)

	Hard Corals		Soft Corals
1	Acropora	1	*Sinularia*
2	*Millipora*	2	*Sarcophytum*
3	*Porites*	3	
4	*Pocillipora*	4	
5	*Turbinaria*	5	
6	*Goniopora*	6	
7	*Favites*	7	
8	*Fungia*	8	
9	*c f Galaxea*	9	
10	*Dendrophilia*		

SUBSTRATE % COVER (2mX2m quadrant at 4 m depth)

Category/Quadrants	1	2	3	4	5	6	7	8	9
Hard Corals	35	65	45	30	10	20	55	60	--
Soft Corals	5	2	15	25	25	0	0	2	--
Sponge	0	0	0	0	0	0	0	0	--
Rock	60	33	30	40	55	80	45	38	--
Rubbles	0	0	0	0	10	0	0	0	--
Dead Corals	0	0	0	0	0	0	0	0	--
Sand	0	0	0	0	0	0	0	0	--
Algae > 1 cm height	0	0	0	0	0	0	0	0	--
Total (≈ 100%)									
Hard Corals w/Disease	0	0	0	0	0	0	0	0	--
Hard Corals W/Bleaching	0	0	0	0	0	0	0	0	--

Other groups
Echinodermata
Echinus (*Echinothrix diadema*)
Mollusca
Bivalvia (*Tridacna sp*)
Sea anemone *Entacmae quadricolor*
Holothuroidea

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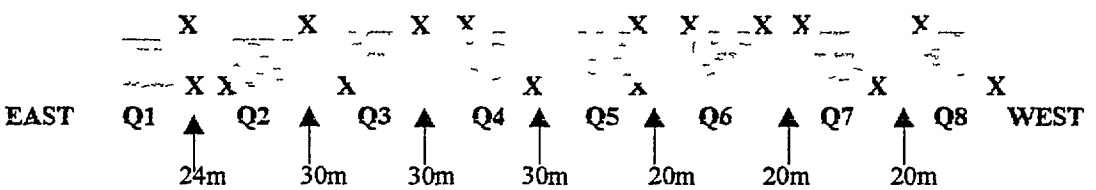
HURGHADA
SITE LOG **SHAAB SABINA**

1998:

DATE	21 Oct 98 Noon dive (10 15 depart, return 5 45 pm)
DIVERS	H.Mansour, Y Ibrahim, H Harb & M Habib
BOAT	White Dolphin
DIVE TIME	80 minutes
TASK	Seek old sites, locate 9 quads and place two corner markers (with a small yellow tie wrap as this year's indicator), and acquire the coral cover and minimal RUA data

The team work consisted from H. Mansour, Y Ibrahim, H Harb and M. Habib The first one was assessing the quads, the 2nd was photographing the quads The other two were helping in-between the quad- work. The area between each of the located old quads was about 20 to 30 m. The old marks of the first two quads were located after a survey of the area near to the mooring buoys The rest of the 8 quads were newly chosen and marked The dive time was 80 minutes The old cable ties found were cleaned from the epizoans and the new plastic ties were inserted at the opposite corners of the quads We have located, marked, assessed and photographed 8 quads along the western side of Shaab Sabina (2 old & 6 new) There was a strong opposite current to our way of assessing the new quads



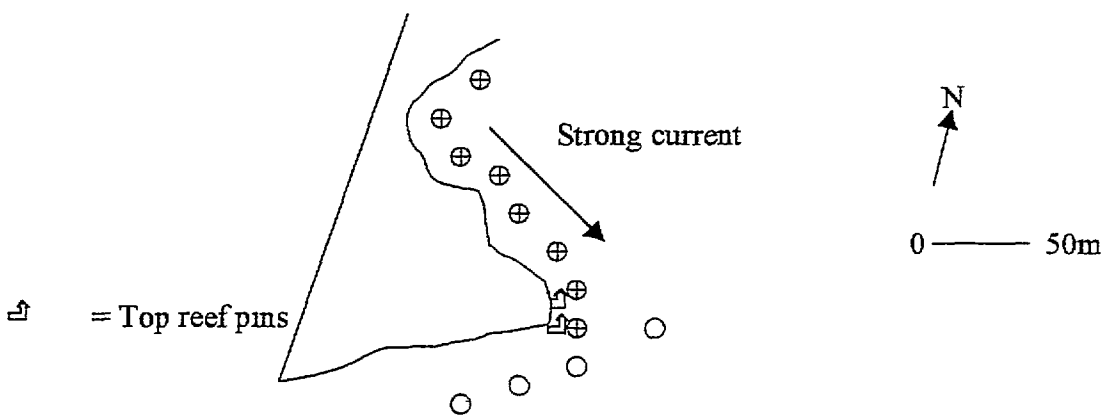
RAPID UNDERWATER ASSESSMENT DATA SHEET

GENERAL DATA

Site	Shaab Sabina	**Date**	21/10/98
Coordinates	27° 12 856 N 33° 57 191 E	**Dive Site Rating**	3
Air Temp.	27 C	**Coral Diversity**	
Water Temp	23 C	**Number of Boats**	4
Current	Strong	**Number of Anch**	0
Wave height	25 CM	**Number of Divers**	32+20
Reef Zone	SLOPE	**Number of Buoys**	4+2

AERIAL VIEW (Showing location of Quadrants numbered and mooring buoys)

⊕ = **Quadrant** ○ = **Mooring Buoy**



LOCATION OF QUADRANTS

Quadrant #	1996 monitoring date	1998 monitoring Date	Remarks
1	5/10/98	21/10/98	Original quad # 1?
2	5/10/98	21/10/98	Original quad # 2?
3	5/10/98	21/10/98	New quad # 3?
4	5/10/98	21/10/98	New quad # 4?
5	5/10/98	21/10/98	New quad # 5?
6	5/10/98	21/10/98	New quad # 6?
7	5/10/98	21/10/98	New quad # 7?
8	5/10/98	21/10/98	New quad # 8?
9	---	---	---
10	---	---	---

SHAAB SABINA - 1998

ABUNDANT GENERA (In order of Abundance)

	Hard Corals		Soft Corals
1	Acropora	1	*Lobophytum*
2	*Pocillipora*	2	
3	*Porites*	3	
4	*Favites*	4	
5	*Fungia*	5	
6	*Millipora*	6	
7		7	

SUBSTRATE % COVER (2mX2m quadrant at 4 m depth)

Category/Quadrants	1	2	3	4	5	6	7	8	9
Hard Corals	5	5	25	90	75	60	85	85	--
Soft Corals	0	0	25	0	15	20	0	0	--
Sponge	0	0	0	0	0	20	0	0	--
Rock	95	80	40	10	10	0	15	15	--
Rubbles	0	15	10	90	0	0	0	0	--
Dead Corals	0	0	0	0	0	0	5	0	--
Sand	0	0	0	0	0	0	0	0	--
Algae > 1 cm height	0	0	0	0	0	0	0	0	--
Total (≈ 100%)									
Hard Corals w/Disease	0	0	0	0	0	0	0	0	--
Hard CoralsW/Bleaching	0	0	0	0	0	0	0	0	--

Other groups
Echinodermata
Holothuroidea (Sea Cucumber)
Echinus (Pencil urchin cf *Heterocentrotus, Echinothrix diadema*)
Mollusca
Bivalvia (*Tridacna spp*)

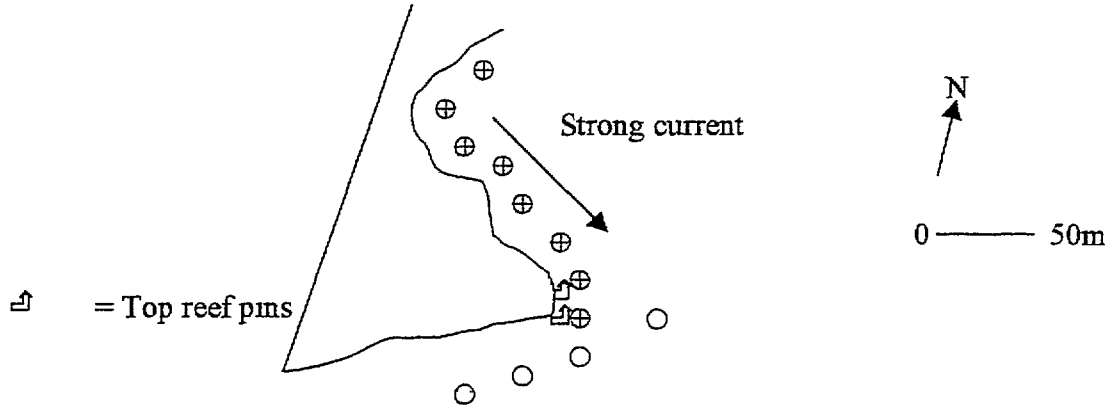
RAPID UNDERWATER ASSESSMENT DATA SHEET

GENERAL DATA

Site	**Shaab Sabina**	**Date**	21/10/98
Coordinates	27° 12` 856 N 33° 57 191 E	**Dive Site Rating**	3
Air Temp	27 C	**Coral Diversity**	
Water Temp	23 C	**Number of Boats**	4
Current	Strong	**Number of Anch**	0
Wave height	25 CM	**Number of Divers**	32+20
Reef Zone	SLOPE	**Number of Buoys**	4+2

AERIAL VIEW (Showing location of Quadrants numbered and mooring buoys)

⊕ = Quadrant ○ = Mooring Buoy



LOCATION OF QUADRANTS

Quadrant #	1996 monitoring date	1998 monitoring Date	Remarks
1	5/10/98	21/10/98	Original quad # 1?
2	5/10/98	21/10/98	Original quad # 2?
3	5/10/98	21/10/98	New quad # 3?
4	5/10/98	21/10/98	New quad # 4?
5	5/10/98	21/10/98	New quad # 5?
6	5/10/98	21/10/98	New quad # 6?
7	5/10/98	21/10/98	New quad # 7?
8	5/10/98	21/10/98	New quad # 8?
9	---	---	---
10	---	---	---

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SHAAB SABINA - 1998

ABUNDANT GENERA (In order of Abundance)

	Hard Corals		Soft Corals
1	Acropora	1	*Lobophytum*
2	*Pocillipora*	2	
3	*Porites*	3	
4	*Favites*	4	
5	*Fungia*	5	
6	*Millipora*	6	
7		7	

SUBSTRATE % COVER (2mX2m quadrant at 4 m depth)

Category/Quadrants	1	2	3	4	5	6	7	8	9
Hard Corals	5	5	25	90	75	60	85	85	--
Soft Corals	0	0	25	0	15	20	0	0	--
Sponge	0	0	0	0	0	20	0	0	--
Rock	95	80	40	10	10	0	15	15	--
Rubbles	0	15	10	90	0	0	0	0	--
Dead Corals	0	0	0	0	0	0	5	0	--
Sand	0	0	0	0	0	0	0	0	--
Algae > 1 cm height	0	0	0	0	0	0	0	0	--
Total (≈ 100%)									
Hard Corals w/Disease	0	0	0	0	0	0	0	0	--
Hard CoralsW/Bleaching	0	0	0	0	0	0	0	0	--

Other groups
Echinodermata
Holothuroidea (Sea Cucumber)
Echinus (Pencil urchin cf *Heterocentrotus, Echinothrix diadema*)
Mollusca
Bivalvia (*Tridacna spp*)

HURGHADA
SITE LOG **SHAAB TORFA**

1998

DATE 1 Nov 98 Morning dive (10 30 depart, return 5 40 pm)

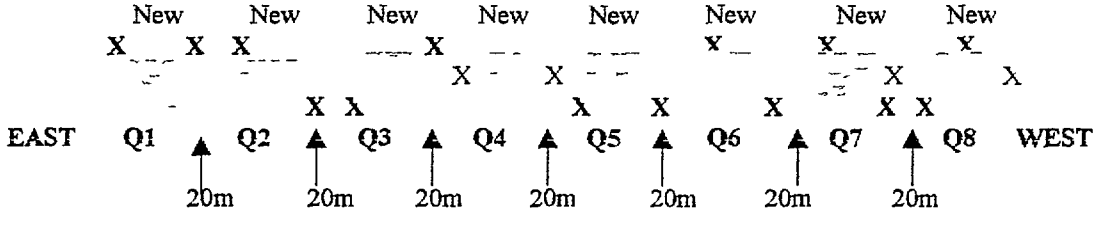
DIVERS H.Mansour, Y Ibrahim & H. harb

BOAT King Tut

DIVE TIME 65 minutes

TASK Seek old sites locate 8 quads and place two corner markers (with a small yellow tie wrap as this year's indicator), and acquire the coral cover and minimal RUA data

The teamwork consisted from H Mansour, Y Ibrahim, and H Harb The first diver was assessing the quads, the 2nd diver was photographing the quads The third diver was helping in between the quad work The area between each of the located old quads was about 20 m. The site is a long reef flat with semi-rounded in shape and shallow depths We have tried to locate the old quads but there were no old marks The whole eight quads were newly located after a survey of the area for locating the old marks The dive time was 65 minutes The new plastic ties were inserted at the opposite corners of all the new quads We have located, marked, assessed and photographed 8 quads along the semi-rounded edge of Shaab Torfa (8 new) The first quad was located at a distance of 40 m east of the first eastern buoy We started working from east to west almost equidistant of 20 m apart from each quad Quad # 8 is located about 20 m to the west of the western-most buoy at the site



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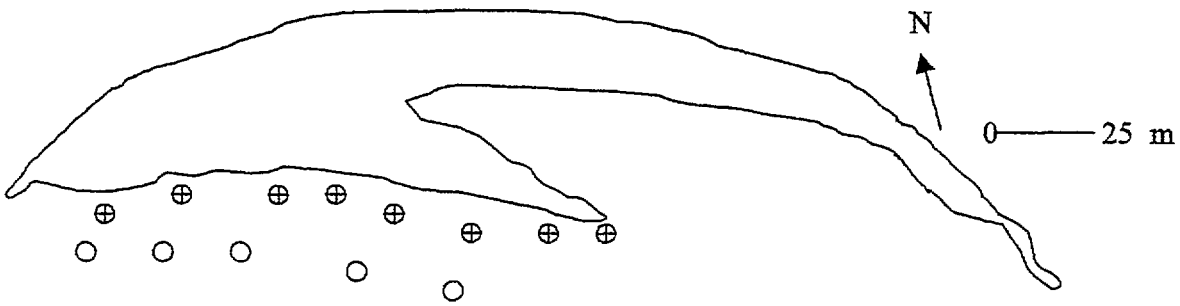
RAPID UNDERWATER ASSESSMENT DATA SHEET

GENERAL DATA

Site	**Shaab Torfa**	**Date**	01/11/98
Coordinates	27° 13 372 'N 33° 57 252 E	**Dive Site Rating**	2 5
Air Temp	21 C	**Coral Diversity**	
Water Temp	25 C	**Number of Boats**	3
Current	Weak	**Number of Anch**	0
Wave height	50-75 CM	**Number of Divers**	18+6
Reef Zone	Edge	**Number of Buoys**	5

AERIAL VIEW (Showing location of Quadrants numbered and mooring buoys)

⊕ = **Quadrant** ○ = **Mooring Buoy**



LOCATION OF QUADRANTS

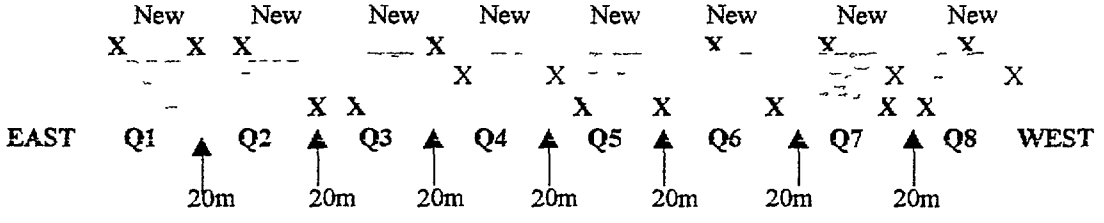
Quadrant #	1996 monitoring date	1998 monitoring Date	Remarks
1	8/10/98	1/11/98	New quad # 1?
2	8/10/98	1/11/98	New quad # 2?
3	8/10/98	1/11/98	New quad # 3?
4	8/10/98	1/11/98	New quad # 4?
5	8/10/98	1/11/98	New quad # 5?
6	8/10/98	1/11/98	New quad # 6?
7	8/10/98	1/11/98	New quad # 7?
8	8/10/98	1/11/98	New quad # 8?
9	---	---	---
10	---	---	---

HURGHADA
SITE LOG **SHAAB TORFA**

1998

DATE	1 Nov 98 Morning dive (10 30 depart, return 5 40 pm)
DIVERS	H.Mansour, Y Ibrahim & H. harb
BOAT	King Tut
DIVE TIME	65 minutes
TASK	Seek old sites locate 8 quads and place two corner markers (with a small yellow tie wrap as this year s indicator), and acquire the coral cover and minimal RUA data

The teamwork consisted from H. Mansour, Y Ibrahim. and H Harb The first diver was assessing the quads, the 2nd diver was photographing the quads The third diver was helping in between the quad work The area between each of the located old quads was about 20 m. The site is a long reef flat with semi-rounded in shape and shallow depths We have tried to locate the old quads but there were no old marks The whole eight quads were newly located after a survey of the area for locating the old marks The dive time was 65 minutes The new plastic ties were inserted at the opposite corners of all the new quads We have located, marked, assessed and photographed 8 quads along the semi-rounded edge of Shaab Torfa (8 new) The first quad was located at a distance of 40 m east of the first eastern buoy We started working from east to west almost equidistant of 20 m apart from each quad Quad # 8 is located about 20 m to the west of the western-most buoy at the site



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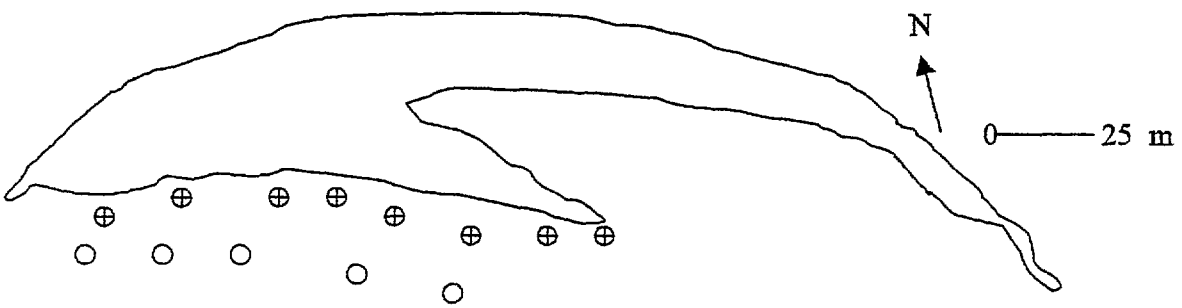
RAPID UNDERWATER ASSESSMENT DATA SHEET

GENERAL DATA

Site	Shaab Torfa	Date	01/11/98
Coordinates	27° 13 372 `N 33° 57` 252 `E	Dive Site Rating	2 5
Air Temp	21 C	Coral Diversity	
Water Temp	25 C	Number of Boats	3
Current	Weak	Number of Anch.	0
Wave height	50-75 CM	Number of Divers	18+6
Reef Zone	Edge	Number of Buoys	5

AERIAL VIEW (Showing location of Quadrants numbered and mooring buoys)

⊕ = Quadrant ○ = Mooring Buoy



LOCATION OF QUADRANTS

Quadrant #	1996 monitoring date	1998 monitoring Date	Remarks
1	8/10/98	1/11/98	New quad # 1?
2	8/10/98	1/11/98	New quad # 2?
3	8/10/98	1/11/98	New quad # 3?
4	8/10/98	1/11/98	New quad # 4?
5	8/10/98	1/11/98	New quad # 5?
6	8/10/98	1/11/98	New quad # 6?
7	8/10/98	1/11/98	New quad # 7?
8	8/10/98	1/11/98	New quad # 8?
9	---	---	---
10	---	---	---

SHAAB TORFA 1998

ABUNDANT GENERA (In order of Abundance)

	Hard Corals		Soft Corals
1	Acropora	1	*Xenia*
2	*Millipora*	2	*Sarcophyton*
3	*Porites*	3	*Simularia*
4	*Favites*	4	
5	*Montipora*	5	
6	*Goniopora*	6	
7	*Straitopora*	7	
8	*Turbinaria*	8	
9	*Fungia*		
10			

SUBSTRATE % COVER (2mX2m quadrant at 4 m depth)

Category/Quadrants	1	2	3	4	5	6	7	8	9
Hard Corals	40	10	40	25	25	25	45	65	--
Soft Corals	0	3	1	1	2	0	0	0	--
Sponge	0	0	0	0	0	0	0	0	--
Rock	20	62	35	50	13	60	35	15	--
Rubbles	5	10	0	0	10	0	0	5	--
Dead Corals	0	0	0	0	0	0	0	0	--
Sand	35	15	24	24	50	15	20	15	--
Algae > 1 cm height	0	0	0	0	0	0	0	0	--
Total (≈ 100%)									
Hard Corals w/Disease	0	0	0	0	0	0	0	0	--
Hard Corals W/Bleaching	0	0	0	0	0	0	0	0	--

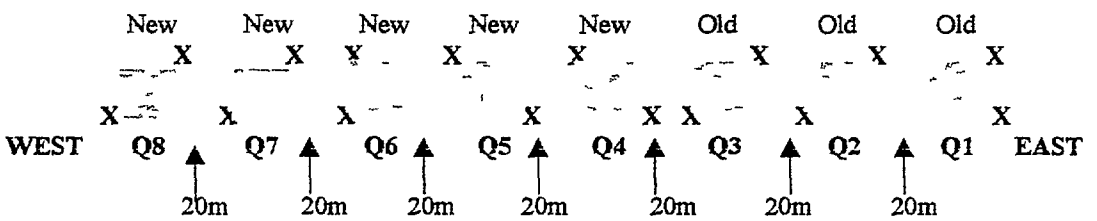
Other groups
Echinodermata
Echinus (Pencil urchin *Echinothrix diadema*)
Mollusca
Bivalvia (*Tridacna sp*)
Marine turtle (Medium size)

HURGHADA
SITE LOG **SHABROUR UM GAMAR**

1998

DATE	28 Oct 98 Morning dive (09 55 depart, return 5 00 pm)
DIVERS	H.Mansour, Y Ibrahim & H. harb
BOAT	Sandina
DIVE TIME	80 minutes
TASK	Seek old sites, locate 8 quads and place two corner markers (with a small yellow tie wrap as this year's indicator), and acquire the coral cover and minimal RUA data

The teamwork consisted from H. Mansour, Y Ibrahim, and H. Harb The first diver was assessing the quads, the 2nd diver was photographing the quads The third diver was helping in-between the quads work The area between each of the located old quads was about 20 m. The old marks of the first three quads were located after a survey of the area near to the mooring buoys The rest of the 8 quads were newly chosen and marked The dive time was 80 minutes The old cable ties found were cleaned from the epizoans and the new plastic ties were inserted at the opposite corners of the quads We have located, marked, assessed and photographed 8 quads along the southern side of Shabrour Um Gamar (3 old & 5 new) The first quad was in front of the buoy # 3 from the eastern side and then we started working to the west at almost equidistant of 20 m apart from each quad



SHAAB TORFA 1998

ABUNDANT GENERA (In order of Abundance)

	Hard Corals		Soft Corals
1	Acropora	1	*Xenia*
2	*Millipora*	2	*Sarcophyton*
3	*Porites*	3	*Sinularia*
4	*Favites*	4	
5	*Montipora*	5	
6	*Goniopora*	6	
7	*Stratopora*	7	
8	*Turbinaria*	8	
9	*Fungia*		
10			

SUBSTRATE % COVER (2mX2m quadrant at 4 m depth)

Category/Quadrants	1	2	3	4	5	6	7	8	9
Hard Corals	40	10	40	25	25	25	45	65	--
Soft Corals	0	3	1	1	2	0	0	0	--
Sponge	0	0	0	0	0	0	0	0	--
Rock	20	62	35	50	13	60	35	15	--
Rubbles	5	10	0	0	10	0	0	5	--
Dead Corals	0	0	0	0	0	0	0	0	--
Sand	35	15	24	24	50	15	20	15	--
Algae > 1 cm height	0	0	0	0	0	0	0	0	--
Total (≈ 100%)									
Hard Corals w/Disease	0	0	0	0	0	0	0	0	--
Hard Corals W/Bleaching	0	0	0	0	0	0	0	0	--

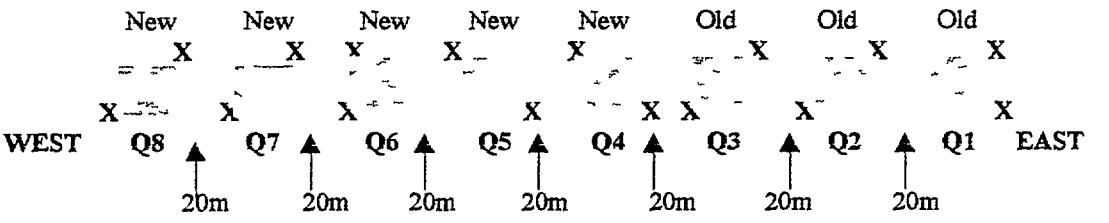
Other groups
Echinodermata
Echinus (Pencil urchin *Echinothrix diadema*)
Mollusca
Bivalvia (*Tridacna sp*)
Marine turtle (Medium size)

HURGHADA
SITE LOG **SHABROUR UM GAMAR**

1998

DATE	28 Oct 98 Morning dive (09 55 depart, return 5 00 pm)
DIVERS	H.Mansour, Y Ibrahim & H. harb
BOAT	Sandina
DIVE TIME	80 minutes
TASK	Seek old sites, locate 8 quads and place two corner markers (with a small yellow tie wrap as this year's indicator), and acquire the coral cover and minimal RUA data

The teamwork consisted from H. Mansour, Y Ibrahim, and H. Harb The first diver was assessing the quads, the 2nd diver was photographing the quads The third diver was helping in-between the quads work The area between each of the located old quads was about 20 m. The old marks of the first three quads were located after a survey of the area near to the mooring buoys The rest of the 8 quads were newly chosen and marked The dive time was 80 minutes The old cable ties found were cleaned from the epizoans and the new plastic ties were inserted at the opposite corners of the quads We have located, marked, assessed and photographed 8 quads along the southern side of Shabrour Um Gamar (3 old & 5 new) The first quad was in front of the buoy # 3 from the eastern side and then we started working to the west at almost equidistant of 20 m apart from each quad



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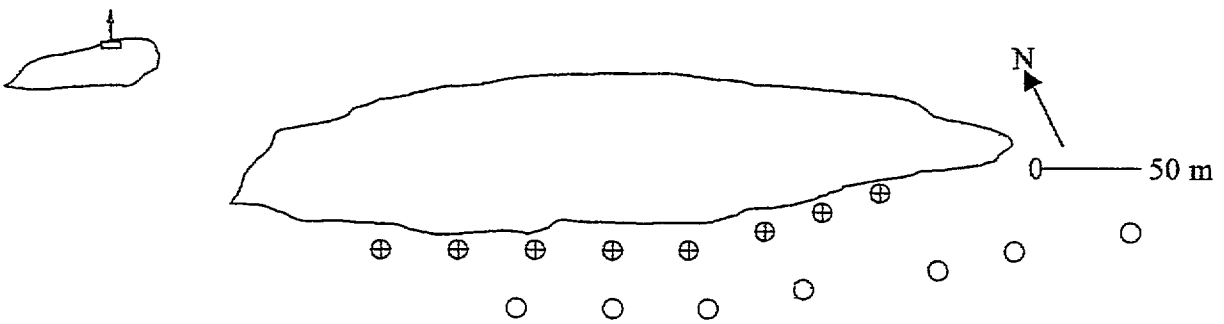
RAPID UNDERWATER ASSESSMENT DATA SHEET

GENERAL DATA

Site	Shabrour Um Gamar	Date	28/10/98
Coordinates	27° 19 970 N 33° 55 025 E	Dive Site Rating	3 5
Air Temp	25 C	Coral Diversity	
Water Temp	24 C	Number of Boats	3
Current	Weak	Number of Anch	0
Wave height	25-50 CM	Number of Divers	18+6
Reef Zone	SLOPE	Number of Buoys	7

AERIAL VIEW (Showing location of Quadrants numbered and mooring buoys)

⊕ = Quadrant ○ = Mooring Buoy



LOCATION OF QUADRANTS

Quadrant #	1996 monitoring date	1998 monitoring Date	Remarks
1	1/10/98	28/10/98	Original quad # 1?
2	1/10/98	28/10/98	Original quad # 2?
3	1/10/98	28/10/98	Original quad # 3?
4	1/10/98	28/10/98	New quad # 4?
5	1/10/98	28/10/98	New quad # 5?
6	1/10/98	28/10/98	New quad # 6?
7	1/10/98	28/10/98	New quad # 7?
8	1/10/98	28/10/98	New quad # 8?
9	---	---	---
10	---	---	---

SHABROUR UM GAMAR 1998

ABUNDANT GENERA (In order of Abundance)

	Hard Corals		Soft Corals
1	Acropora- Montipora	1	*Lobophytum*
2	*Pocillipora*	2	*Sarcophytun*
3	*Porites*	3	*Sinularia*
4	*Favites- Favia*	4	*Xenia*
5	*Fungia*	5	
6	*Millipora- cf Galaxea*	6	
7	*Denderophillia*	7	

SUBSTRATE % COVER (2mX2m quadrant at 4 m depth)

Category/Quadrants	1	2	3	4	5	6	7	8	9
Hard Corals	25	5	60	70	30	60	45	25	--
Soft Corals	20	50	0	5	20	0	15	5	--
Sponge	5	0	0	0	0	0	0	0	--
Rock	35	45	40	25	50	40	40	70	--
Rubbles	0	0	0	0	0	0	0	0	--
Dead Corals	15	0	0	0	0	0	0	0	--
Sand	0	0	0	0	0	0	0	0	--
Algae > 1 cm height	0	0	0	0	0	0	0	0	--
Total (≈ 100%)									
Hard Corals w/Disease	0	0	0	0	0	0	0	0	--
Hard CoralsW/Bleaching	0	0	0	0	0	0	0	0	--

Other groups
Echinodermata
Echinus (*Echinothrix diadema*)
Mollusca
Bivalvia (*Tridacna spp*)

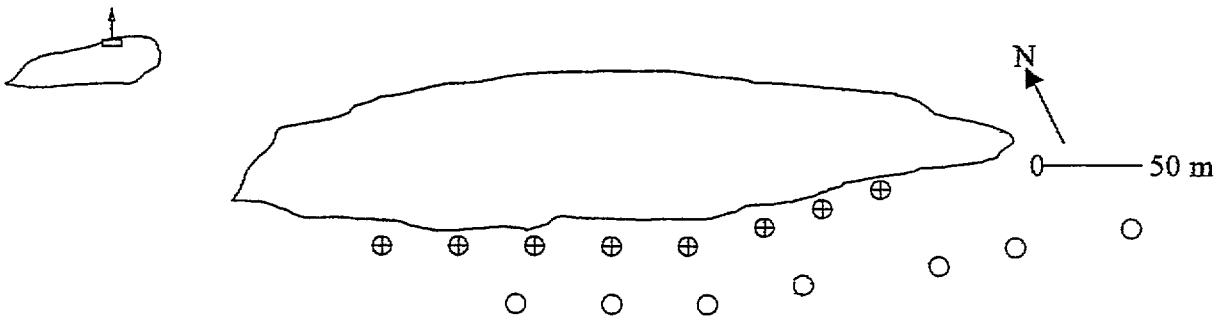
RAPID UNDERWATER ASSESSMENT DATA SHEET

GENERAL DATA

Site	Shabrour Um Gamar	Date	28/10/98
Coordinates	27° 19 970 N 33° 55 025 E	Dive Site Rating	3 5
Air Temp	25 C	Coral Diversity	
Water Temp	24 C	Number of Boats	3
Current	Weak	Number of Anch	0
Wave height	25-50 CM	Number of Divers	18+6
Reef Zone	SLOPE	Number of Buoys	7

AERIAL VIEW (Showing location of Quadrants numbered and mooring buoys)

⊕ = Quadrant ○ = Mooring Buoy



LOCATION OF QUADRANTS

Quadrant #	1996 monitoring date	1998 monitoring Date	Remarks
1	1/10/98	28/10/98	Original quad # 1?
2	1/10/98	28/10/98	Original quad # 2?
3	1/10/98	28/10/98	Original quad # 3?
4	1/10/98	28/10/98	New quad # 4?
5	1/10/98	28/10/98	New quad # 5?
6	1/10/98	28/10/98	New quad # 6?
7	1/10/98	28/10/98	New quad # 7?
8	1/10/98	28/10/98	New quad # 8?
9	---	---	---
10	---	---	---

SHABROUR UM GAMAR 1998

ABUNDANT GENERA (In order of Abundance)

	Hard Corals		Soft Corals
1	Acropora- Montipora	1	*Lobophytum*
2	*Pocillipora*	2	*Sarcophytun*
3	*Porites*	3	*Sinularia*
4	*Favites- Favia*	4	*Xenia*
5	*Fungia*	5	
6	*Millipora- cf Galaxea*	6	
7	*Denderophillia*	7	

SUBSTRATE % COVER (2mX2m quadrant at 4 m depth)

Category/Quadrants	1	2	3	4	5	6	7	8	9
Hard Corals	25	5	60	70	30	60	45	25	--
Soft Corals	20	50	0	5	20	0	15	5	--
Sponge	5	0	0	0	0	0	0	0	--
Rock	35	45	40	25	50	40	40	70	--
Rubbles	0	0	0	0	0	0	0	0	--
Dead Corals	15	0	0	0	0	0	0	0	--
Sand	0	0	0	0	0	0	0	0	--
Algae > 1 cm height	0	0	0	0	0	0	0	0	--
Total (≈ 100%)									
Hard Corals w/Disease	0	0	0	0	0	0	0	0	--
Hard CoralsW/Bleaching	0	0	0	0	0	0	0	0	--

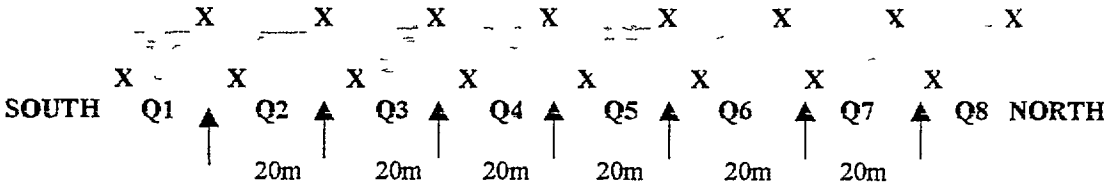
Other groups
Echinodermata
Echinus (*Echinothrix diadema*)
Mollusca
Bivalvia (*Tridacna spp*)

HURGHADA
SITE LOG **UM GAMAR WEST**

1998

DATE	15 Oct 98 Noon dive (11 40 depart, return 5 00 pm)
DIVERS	H.Mansour, A Afifi Y Ibrahim
BOAT	Molly 1
DIVE TIME	140 minutes
TASK	Seek old sites, locate 9 quads and place two corner markers (with a small yellow tie wrap as this year's indicator), and acquire the coral cover and minimal RUA data

The teamwork consisted from H Mansour, A Afifi and Y Ibrahim. The first two were assessing the quads and the last was photographing the quads The area between each of the located old quads was about 20 m. The first dive was to locate the old cable ties for all the quads To the middle of the western reef area we spotted a cable tie with a broken coral part on 6 m depth Afterwards we found three other cable ties as we reach the end of the western part of the reef. The dive time for the 1st dive was 75 minutes The 2nd dive we cleaned the old cable ties from the epizoans and the new plastic ties were inserted at the opposite corners of the quads The 2nd dive was started from the last cable tie that was found in the first dive and we have located, marked, assessed and photographed 8 quads along the western side of Um Gamar island (4 old & 4 new) The light was becoming darker and we saw big marine turtle at 7 m and marine snake at 5 m.



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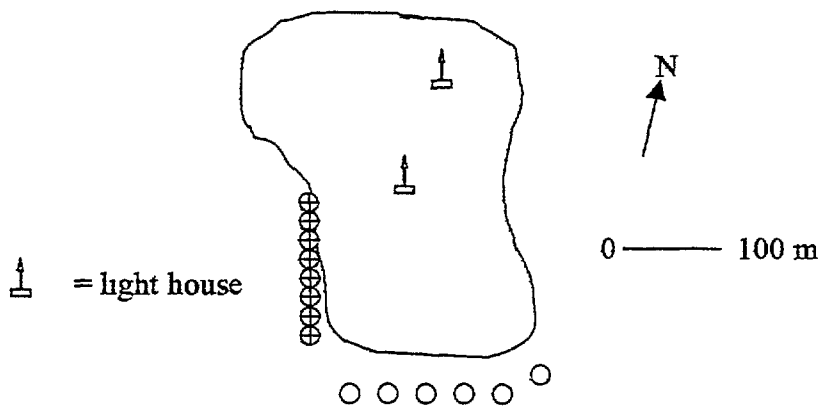
RAPID UNDERWATER ASSESSMENT DATA SHEET

GENERAL DATA

Site	**UM GAMAR (W)**	**Date**	15/10/98
Coordinates	27° 21 219` N 33° 54 451 E	**Dive Site Rating**	3
Air Temp	28 C	**Coral Diversity**	2 5
Water Temp	24 C	**Number of Boats**	5
Current	MODERATE	**Number of Anch**	0
Wave height	25 CM	**Number of Divers**	40+10
Reef Zone	SLOPE	**Number of Buoys**	6

AERIAL VIEW (Showing location of Quadrants numbered and mooring buoys)

⊕ **= Quadrant** ○ **= Mooring Buoy**



LOCATION OF QUADRANTS

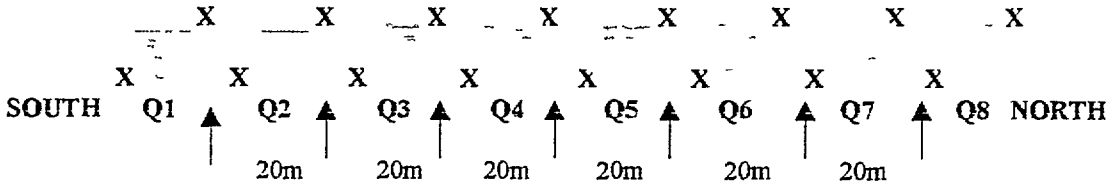
Quadrant #	1996 monitoring date	1998 monitoring Date	Remarks
1	21/9/98		Not detected
2	21/9/98	15/10/98	New
3	21/9/98	15/10/98	New
4	21/9/98	15/10/98	New
5	21/9/98	15/10/98	Original
6	21/9/98	15/10/98	Original
7	21/9/98	15/10/98	Original
8	21/9/98	15/10/98	Original
9	---	---	
10	---	---	

HURGHADA
SITE LOG **UM GAMAR WEST**

1998:

DATE	15 Oct 98 Noon dive (11 40 depart, return 5 00 pm)
DIVERS	H.Mansour, A Afifi, Y Ibrahim
BOAT	Molly 1
DIVE TIME	140 minutes
TASK	Seek old sites, locate 9 quads and place two corner markers (with a small yellow tie wrap as this year's indicator), and acquire the coral cover and minimal RUA data

The teamwork consisted from H Mansour, A. Afifi and Y Ibrahim. The first two were assessing the quads and the last was photographing the quads The area between each of the located old quads was about 20 m. The first dive was to locate the old cable ties for all the quads To the middle of the western reef area we spotted a cable tie with a broken coral part on 6 m depth Afterwards we found three other cable ties as we reach the end of the western part of the reef. The dive time for the 1st dive was 75 minutes The 2nd dive we cleaned the old cable ties from the epizoans and the new plastic ties were inserted at the opposite corners of the quads The 2nd dive was started from the last cable tie that was found in the first dive and we have located, marked, assessed and photographed 8 quads along the western side of Um Gamar island (4 old & 4 new) The light was becoming darker and we saw big marine turtle at 7 m and marine snake at 5 m.



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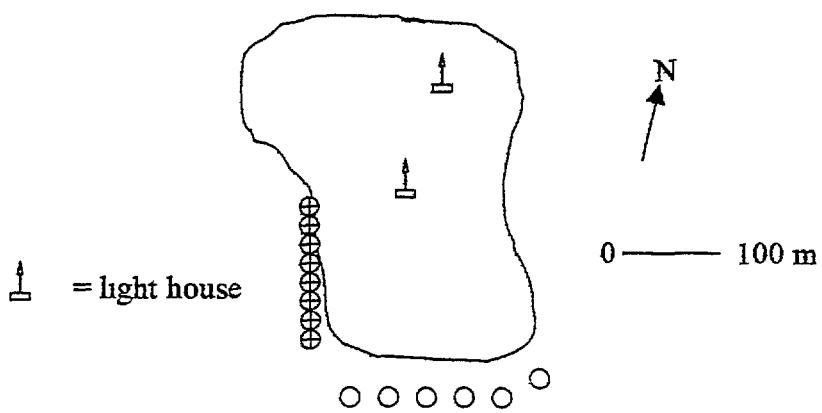
RAPID UNDERWATER ASSESSMENT DATA SHEET

GENERAL DATA

Site	**UM GAMAR (W)**	**Date**	15/10/98
Coordinates	27° 21 219 N 33° 54 451 E	**Dive Site Rating**	3
Air Temp	28 C	**Coral Diversity**	2 5
Water Temp.	24 C	**Number of Boats**	5
Current	MODERATE	**Number of Anch**	0
Wave height	25 CM	**Number of Divers**	40+10
Reef Zone	SLOPE	**Number of Buoys**	6

AERIAL VIEW (Showing location of Quadrants numbered and mooring buoys)

⊕ **= Quadrant** ○ **= Mooring Buoy**



LOCATION OF QUADRANTS

Quadrant #	1996 monitoring date	1998 monitoring Date	Remarks
1	21/9/98		Not detected
2	21/9/98	15/10/98	New
3	21/9/98	15/10/98	New
4	21/9/98	15/10/98	New
5	21/9/98	15/10/98	Original
6	21/9/98	15/10/98	Original
7	21/9/98	15/10/98	Original
8	21/9/98	15/10/98	Original
9	---	---	
10	---	---	

UM GAMAR WEST 1998

ABUNDANT GENERA (In order of Abundance)

	Hard Corals		Soft Corals
1	Acropora	1	*Sinularia*
2	*Millipora*	2	*Lobophytun*
3	*Pocillopora*	3	*Dendronephthya spp*
4	*Dendrophyllia*	4	*Sarcophyton*
5	*Porites*	5	
6	*Favia*	6	
7		7	

SUBSTRATE % COVER (2mX2m Quadrant at 4 m depth)

Quadrants	1	2	3	4	5	6	7	8	9
Hard Corals		25	15	15	35	60	25	25	
Soft Corals		5	48	8	25	0	20	50	
Sponge		10	2	0	0	0	0	0	
Rock		48	25	67	12	18	35	20	
Rubbles		0	0	0	0	0	0	0	
Recent Dead Corals (na)		10	10	10	13	20	15	5	
Recent Broken Corals		0	0	0	15	2	5	0	
Algae > 1 cm height		2	0	0	0	0	0	0	
Total (≈ 100%)									
Hard Corals w/Disease		0	0	0	0	0	0	0	
Hard Corals W/Bleaching		0	0	0	0	0	0	0	

Watched
Sea snake (gray with yellow dots 1 2 m in length)
Marine Turtle (big one)

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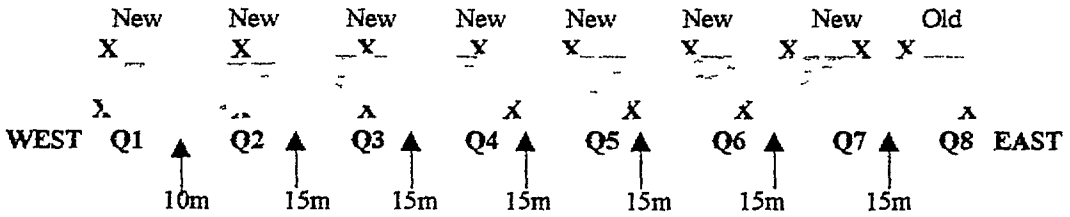
SAFAGA
SITE LOG **ABU KEFAN EAST**

1998

DATE	7 Nov 98 Noon dive (09 30 depart, return 5 30 pm)
DIVERS	H.Mansour, Y Ibrahim & Y Said
BOAT	Heros
DIVE TIME	60 minutes
TASK	Seek old sites, locate 8 quads and place two corner markers (with a small yellow tie wrap as this year's indicator), and acquire the coral cover and minimal RUA data

The teamwork consisted from H. Mansour Y Ibrahim and Y Said The first diver was locating the old marks of the old quads and assessing the quads, the 2nd & the 3rd divers were photographing the quads The area between each of the located old quads was about 10-15 m. The site is a large elongated reef with edges dropping off deep We have tried to locate the old quads and we had found only one old mark The rest of the eight quads were newly located after a survey of the area for locating the old marks The dive time was 60 minutes The new plastic ties were inserted at the opposite corners of all the new quads We have located, marked, assessed and photographed 8 quads along the eastern part of the reef of Abu Kefan E (7 new) The first quad was located to the west of the first top reef pin at a distance of about 40 m. We started working from west to east with a mild current at almost equidistant of 10-15 m apart from each quad



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UM GAMAR WEST 1998

ABUNDANT GENERA (In order of Abundance)

	Hard Corals		Soft Corals
1	Acropora	1	*Sinularia*
2	*Millipora*	2	*Lobophytun*
3	*Pocillopora*	3	*Dendronephthya spp*
4	*Dendrophyllia*	4	*Sarcophyton*
5	*Porites*	5	
6	*Favia*	6	
7		7	

SUBSTRATE % COVER (2mX2m Quadrant at 4 m depth)

Quadrants	1	2	3	4	5	6	7	8	9
Hard Corals		25	15	15	35	60	25	25	
Soft Corals		5	48	8	25	0	20	50	
Sponge		10	2	0	0	0	0	0	
Rock		48	25	67	12	18	35	20	
Rubbles		0	0	0	0	0	0	0	
Recent Dead Corals (na)		10	10	10	13	20	15	5	
Recent Broken Corals		0	0	0	15	2	5	0	
Algae > 1 cm height		2	0	0	0	0	0	0	
Total (≈ 100%)									
Hard Corals w/Disease		0	0	0	0	0	0	0	
Hard Corals W/Bleaching		0	0	0	0	0	0	0	

Watched
Sea snake (gray with yellow dots 1 2 m in length)
Marine Turtle (big one)

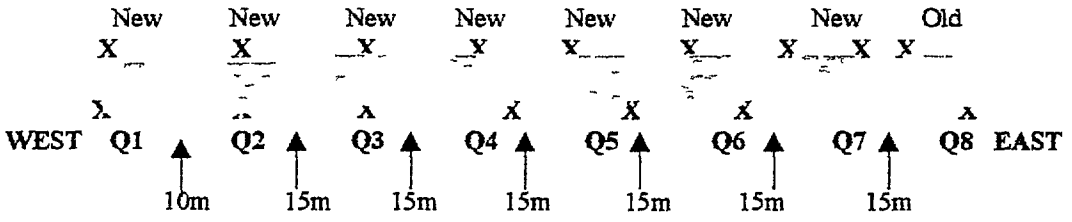
356

SAFAGA
SITE LOG **ABU KEFAN EAST**

1998

DATE	7 Nov 98 Noon dive (09 30 depart, return 5 30 pm)
DIVERS	H.Mansour Y Ibrahim & Y Said
BOAT	Heros
DIVE TIME	60 minutes
TASK	Seek old sites, locate 8 quads and place two corner markers (with a small yellow tie wrap as this year's indicator), and acquire the coral cover and minimal RUA data

The teamwork consisted from H. Mansour Y Ibrahim and Y Said The first diver was locating the old marks of the old quads and assessing the quads, the 2nd & the 3rd divers were photographing the quads The area between each of the located old quads was about 10-15 m. The site is a large elongated reef with edges dropping off deep We have tried to locate the old quads and we had found only one old mark. The rest of the eight quads were newly located after a survey of the area for locating the old marks The dive time was 60 minutes The new plastic ties were inserted at the opposite corners of all the new quads We have located, marked, assessed and photographed 8 quads along the eastern part of the reef of Abu Kefan E (7 new) The first quad was located to the west of the first top reef pin at a distance of about 40 m. We started working from west to east with a mild current at almost equidistant of 10-15 m apart from each quad



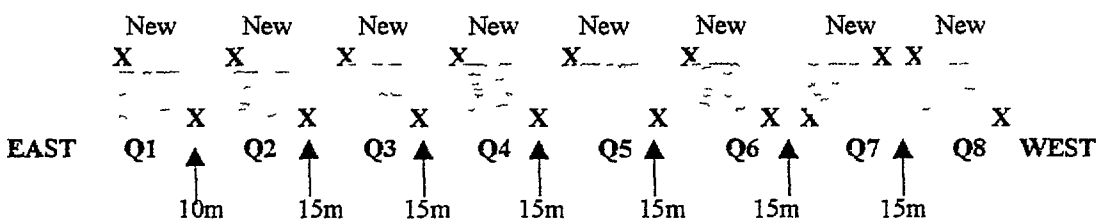
No Site Map for Abu Kefan East
was Created by Dr. Mansour for this report.
Please refer to the raw field notes for the missing information

SAFAGA
SITE LOG **ABU KEFAN WEST**

1998

DATE	7 Nov 98 Noon dive (09 30 depart, return 5 30 pm)
DIVERS	H.Mansour, Y Ibrahim & Y Said
BOAT	Heros
DIVE TIME	60 minutes
TASK	Seek old sites, locate 8 quads and place two corner markers (with a small yellow tie wrap as this year's indicator), and acquire the coral cover and minimal RUA data

The team work consisted from H. Mansour, Y Ibrahim and Y Said The first diver was locating the old marks of the old quads and assessing the quads, the 2nd & the 3rd divers were photographing the quads The area between each of the located old quads was about 10-15 m. The site is a large elongated reef with edges dropping off deep We have tried to locate the old quads and we did not find any of the old marks The eight quads were newly located after a survey of the area for locating the old marks The dive time was 60 minutes The new plastic ties were inserted at the opposite corners of all the new quads We have located, marked, assessed and photographed 8 quads along the eastern part of the reef of Abu Kefan W (8 new) The first quad was located to the east of the first top reef pin at a distance of about 25 m. We started working from east to west with a strong current at almost equidistant of 10-15 m apart from each quad



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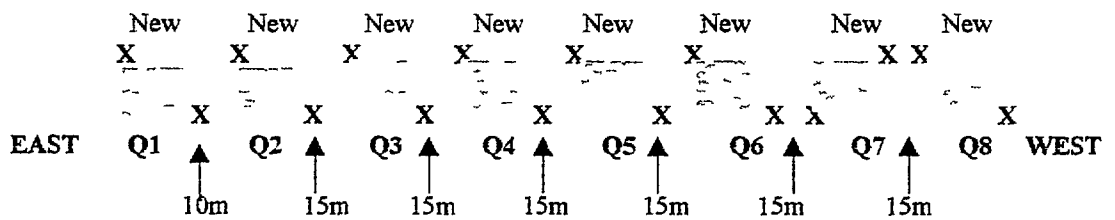
No Site Map for Abu Kefan East
was Created by Dr. Mansour for this report.
Please refer to the raw field notes for the missing information

SAFAGA
SITE LOG **ABU KEFAN WEST**

1998:

DATE	7 Nov 98 Noon dive (09 30 depart, return 5 30 pm)
DIVERS	H.Mansour, Y Ibrahim & Y Said
BOAT	Heros
DIVE TIME	60 minutes
TASK	Seek old sites, locate 8 quads and place two corner markers (with a small yellow tie wrap as this year's indicator), and acquire the coral cover and minimal RUA data

The team work consisted from H. Mansour, Y Ibrahim and Y Said The first diver was locating the old marks of the old quads and assessing the quads, the 2nd & the 3rd divers were photographing the quads The area between each of the located old quads was about 10-15 m. The site is a large elongated reef with edges dropping off deep We have tried to locate the old quads and we did not find any of the old marks The eight quads were newly located after a survey of the area for locating the old marks The dive time was 60 minutes The new plastic ties were inserted at the opposite corners of all the new quads We have located, marked, assessed and photographed 8 quads along the eastern part of the reef of Abu Kefan W (8 new) The first quad was located to the east of the first top reef pin at a distance of about 25 m. We started working from east to west with a strong current at almost equidistant of 10-15 m apart from each quad



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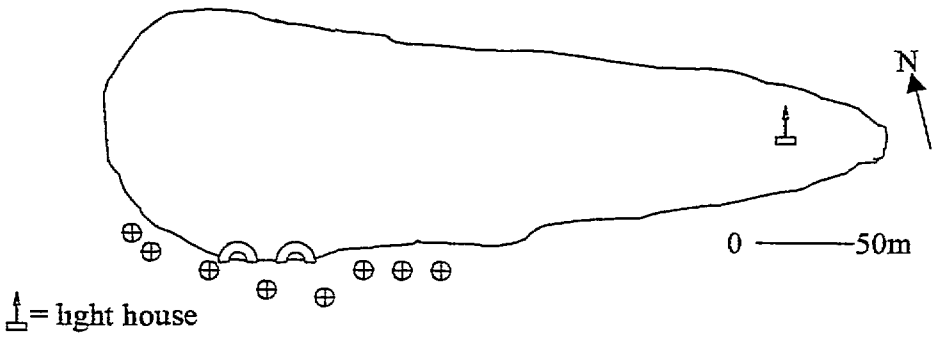
RAPID UNDERWATER ASSESSMENT DATA SHEET

GENERAL DATA

Site	**Abu Kefan (W)**	**Date**	07/11/98
Coordinates	26° 39 182 N 34° 06 519 E	**Dive Site Rating**	2
Air Temp	23 C	**Coral Diversity**	
Water Temp	23 C	**Number of Boats**	1
Current	MODERATE	**Number of Anch**	0
Wave height	25 CM	**Number of Divers**	12+8
Reef Zone	Edge- Slope	**Number of Buoys**	2

AERIAL VIEW (Showing location of Quadrants numbered and mooring buoys)

⊕ **= Quadrant** ○ **= Mooring Buoy**



LOCATION OF QUADRANTS

Quadrant #	1996 monitoring date	1998 monitoring Date	Remarks
1	10/11/98	7/11/98	New
2	10/11/98	7/11/98	New
3	10/11/98	7/11/98	New
4	10/11/98	7/11/98	New
5	10/11/98	7/11/98	New
6	10/11/98	7/11/98	New
7	10/11/98	7/11/98	New
8	10/11/98	7/11/98	New
9	---	---	
10	---	---	

ABU KEFAN WEST-1998

ABUNDANT GENERA (In order of Abundance)

	Hard Corals		Soft Corals
1	Acropora	1	*Sarcophyton*
2	*Millipora*	2	*Lobophytum*
3	*Pocillopora*	3	*Dendronephthya*
4	*Dendrophyllia*	4	*Xenia*
5	*Porites*	5	*Gorgonians*
6	*Favites- Turbinaria*	6	*Simularia*
7	*Straitopora*	7	

SUBSTRATE % COVER (2mX2m Quadrant at 4 m depth)

Quadrants	1	2	3	4	5	6	7	8	9
Hard Corals	20	65	40	25	5	30	30	50	
Soft Corals	0	0	0	25	20	30	10	10	
Sponge	0	0	0	0	0	0	0	0	
Rock	80	35	60	20	75	40	30	40	
Rubbles	0	0	0	20	0	0	30	0	
Dead Corals	0	0	0	0	0	0	0	0	
Sand	0	0	0	10	0	0	0	0	
Algae > 1 cm height	0	0	0	0	0	0	0	0	
Total (≈ 100%)									
Hard Corals w/Disease	0	0	0	0	0	0	0	0	
Hard Corals W/Bleaching	0	0	0	0	0	0	0	0	

Echinodermata *Diadema sp*
Pencil urchin *Heterocentrotus mammillatus*
Shark White tipped

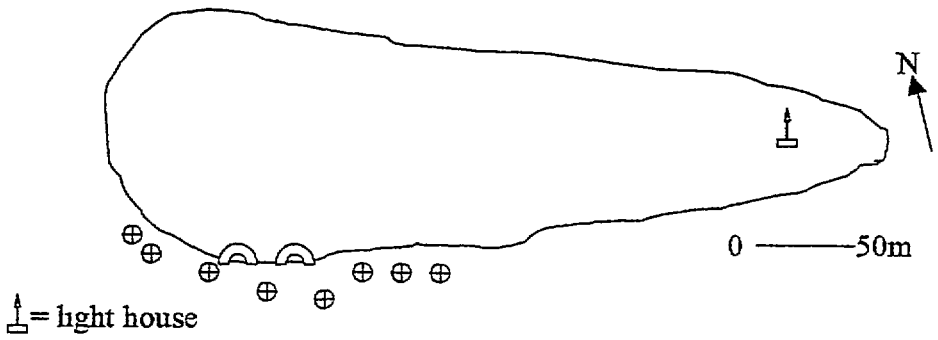
RAPID UNDERWATER ASSESSMENT DATA SHEET

GENERAL DATA

Site	**Abu Kefan (W)**	**Date**	07/11/98
Coordinates	26° 39 182 N 34° 06 519 E	**Dive Site Rating**	2
Air Temp	23 C	**Coral Diversity**	
Water Temp	23 C	**Number of Boats**	1
Current	MODERATE	**Number of Anch**	0
Wave height	25 CM	**Number of Divers**	12+8
Reef Zone	Edge- Slope	**Number of Buoys**	2

AERIAL VIEW (Showing location of Quadrants numbered and mooring buoys)

⊕ = **Quadrant** ○ = **Mooring Buoy**



LOCATION OF QUADRANTS

Quadrant #	1996 monitoring date	1998 monitoring Date	Remarks
1	10/11/98	7/11/98	New
2	10/11/98	7/11/98	New
3	10/11/98	7/11/98	New
4	10/11/98	7/11/98	New
5	10/11/98	7/11/98	New
6	10/11/98	7/11/98	New
7	10/11/98	7/11/98	New
8	10/11/98	7/11/98	New
9	---	---	
10	---	---	

ABU KEFAN WEST-1998

ABUNDANT GENERA (In order of Abundance)

	Hard Corals		Soft Corals
1	Acropora	1	*Sarcophyton*
2	*Millipora*	2	*Lobophytum*
3	*Pocillopora*	3	*Dendronephthya*
4	*Dendrophyllia*	4	*Xenia*
5	*Porites*	5	*Gorgonians*
6	*Favites- Turbinaria*	6	*Simularia*
7	*Straitopora*	7	

SUBSTRATE % COVER (2mX2m Quadrant at 4 m depth)

Quadrants	1	2	3	4	5	6	7	8	9
Hard Corals	20	65	40	25	5	30	30	50	
Soft Corals	0	0	0	25	20	30	10	10	
Sponge	0	0	0	0	0	0	0	0	
Rock	80	35	60	20	75	40	30	40	
Rubbles	0	0	0	20	0	0	30	0	
Dead Corals	0	0	0	0	0	0	0	0	
Sand	0	0	0	10	0	0	0	0	
Algae > 1 cm height	0	0	0	0	0	0	0	0	
Total (≈ 100%)									
Hard Corals w/Disease	0	0	0	0	0	0	0	0	
Hard Corals W/Bleaching	0	0	0	0	0	0	0	0	

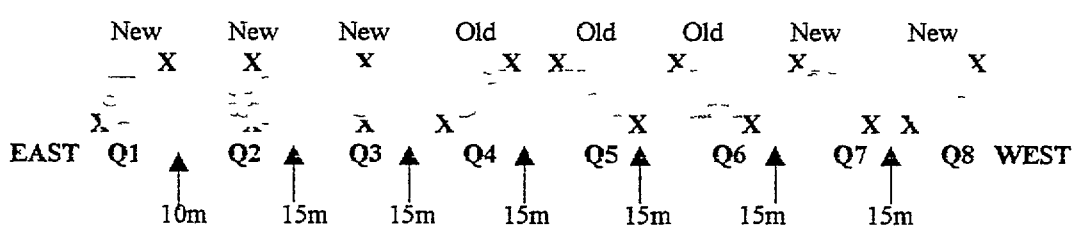
Echinodermata *Diadema sp*
Pencil urchin *Heterocentrotus mammillatus*
Shark White tipped

SAFAGA
SITE LOG **GAMUL KEBIR**

1998

DATE	9 Nov 98 Morning dive (10 30 depart, return 5 30 pm)
DIVERS	H Mansour &Y Ibrahim
BOAT	Silver wave
DIVE TIME	60 minutes
TASK	Seek old sites, locate 8 quads and place two corner markers (with a small yellow tie wrap as this year's indicator), and acquire the coral cover and minimal RUA data

The team work consisted from H. Mansour & Y Ibrahim The first diver was locating the old marks of the old quads and assessing the quads, the 2nd diver was photographing the quads The area between each of the located old quads was about 10-15 m. The site is formed of a large reef flat with a gentle slope on the eastern side The site encloses a small bay We have located 3 of the old marks out of the eight quads and we have constructed five new quads on the western side The dive time was 60 minutes The new plastic ties were inserted at the opposite corners of the all the located and the new quads We have located, marked, assessed and photographed 8 quads along the reef flat of Gamul Kebir (5 new) The first quad was located to the east of the first buoy on the right side near the eastern edge of the reef flat at a distance of about 40 m. We started working from east to west with a moderate current opposing us



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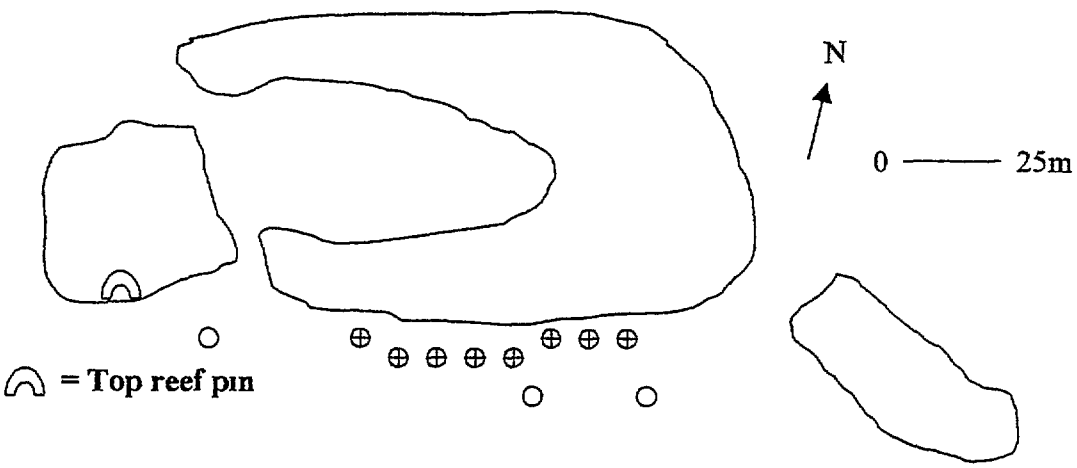
RAPID UNDERWATER ASSESSMENT DATA SHEET

GENERAL DATA

Site	**Gamul Kebir**	**Date**	09/11/98
Coordinates	26° 46 941 N 33° 59 185 E	**Dive Site Rating**	3
Air Temp	23 C	**Coral Diversity**	
Water Temp	23 C	**Number of Boats**	4
Current	Moderate	**Number of Anch**	0
Wave height	25-50 CM	**Number of Divers**	32+16
Reef Zone	Slope	**Number of Buoys**	3+1

AERIAL VIEW (Showing location of Quadrants numbered and mooring buoys)

⊕ = **Quadrant** ○ = **Mooring Buoy**



LOCATION OF QUADRANTS

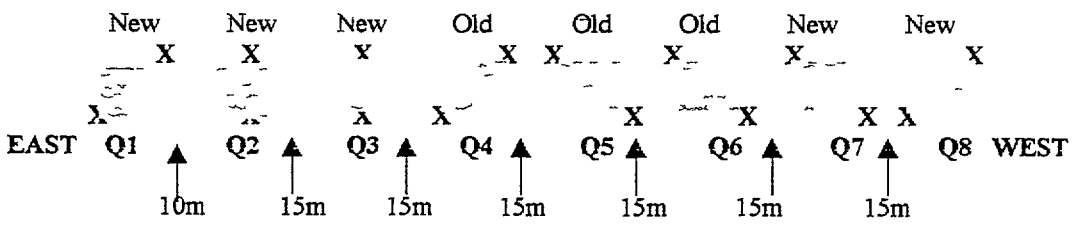
Quadrant #	1996 monitoring date	1998 monitoring Date	Remarks
1	1/11/96	8/11/98	New
2	1/11/96	8/11/98	New
3	1/11/96	8/11/98	New
4	1/11/96	8/11/98	Old
5	1/11/96	8/11/98	Old
6	1/11/96	8/11/98	Old
7	1/11/96	8/11/98	New
8	1/11/96	8/11/98	New
9	---	---	---
10	---	---	---

SAFAGA
SITE LOG **GAMUL KEBIR**

1998

DATE	9 Nov 98 Morning dive (10 30 depart, return 5 30 pm)
DIVERS	H.Mansour &Y Ibrahim
BOAT	Silver wave
DIVE TIME	60 minutes
TASK	Seek old sites, locate 8 quads and place two corner markers (with a small yellow tie wrap as this year's indicator), and acquire the coral cover and minimal RUA data

The team work consisted from H. Mansour & Y Ibrahim The first diver was locating the old marks of the old quads and assessing the quads, the 2nd diver was photographing the quads The area between each of the located old quads was about 10-15 m. The site is formed of a large reef flat with a gentle slope on the eastern side The site encloses a small bay We have located 3 of the old marks out of the eight quads and we have constructed five new quads on the western side The dive time was 60 minutes The new plastic ties were inserted at the opposite corners of the all the located and the new quads We have located, marked, assessed and photographed 8 quads along the reef flat of Gamul Kebir (5 new) The first quad was located to the east of the first buoy on the right side near the eastern edge of the reef flat at a distance of about 40 m. We started working from east to west with a moderate current opposing us



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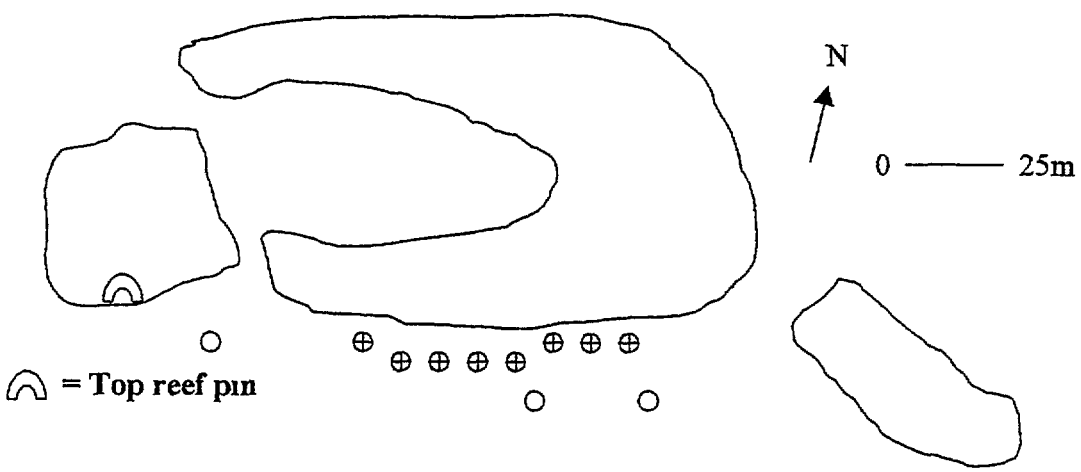
RAPID UNDERWATER ASSESSMENT DATA SHEET

GENERAL DATA

Site	**Gamul Kebir**	**Date**	09/11/98
Coordinates	26° 46 941 N 33° 59` 185 E	**Dive Site Rating**	3
Air Temp	23 C	**Coral Diversity**	
Water Temp.	23 C	**Number of Boats**	4
Current	Moderate	**Number of Anch**	0
Wave height	25-50 CM	**Number of Divers**	32+16
Reef Zone	Slope	**Number of Buoys**	3+1

AERIAL VIEW (Showing location of Quadrants numbered and mooring buoys)

⊕ **= Quadrant** ○ **= Mooring Buoy**



LOCATION OF QUADRANTS

Quadrant #	1996 monitoring date	1998 monitoring Date	Remarks
1	1/11/96	8/11/98	New
2	1/11/96	8/11/98	New
3	1/11/96	8/11/98	New
4	1/11/96	8/11/98	Old
5	1/11/96	8/11/98	Old
6	1/11/96	8/11/98	Old
7	1/11/96	8/11/98	New
8	1/11/96	8/11/98	New
9	---	---	---
10	---	---	---

GAMEL KEBIR 1998

ABUNDANT GENERA (In order of Abundance)

	Hard Corals		Soft Corals
1	*Porites*	1	*Sarcophytum*
2	*Millipora*	2	*Lobophytum*
3	Acropora	3	*Sinularia*
4	*Montipora*	4	
5	*Pocillipora*	5	
6	*Favites*	6	
7	*Fungia*	7	
8	*Dendrophilia*	8	
9	*Turbinaria – Galexia*	9	
10	*Striatopora*		

SUBSTRATE % COVER (2mX2m quadrant at 4 m depth)

Category/Quadrants	1	2	3	4	5	6	7	8	9
Hard Corals	75	55	35	15	20	40	45	40	--
Soft Corals	5	0	15	5	5	0	0	0	--
Sponge	0	0	0	0	0	0	0	0	--
Rock	20	45	50	15	25	25	25	35	--
Rubbles	0	0	0	15	10	15	20	5	--
Dead Corals	0	0	0	10	0	0	0	20	--
Sand	0	0	0	40	40	20	10	5	--
Algae > 1 cm height	0	0	0	0	0	0	0	0	--
Total (≈ 100%)									
Hard Corals w/Disease	0	0	0	0	0	0	0	0	--
Hard Corals W/Bleaching	0	0	0	0	0	0	0	0	--

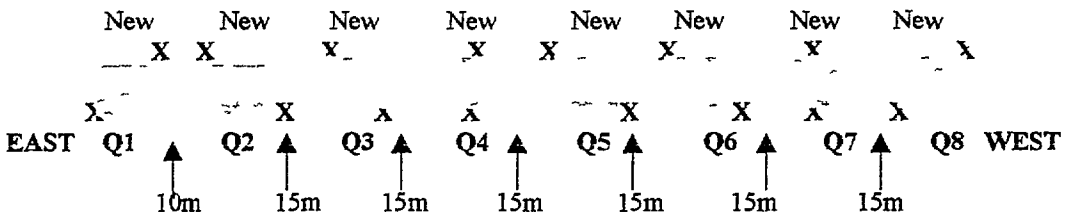
Other groups
Echinodermata
Echinus (*Echinothrix diadema*)
Mollusca
Bivalvia (*Tridacna spp*)

SAFAGA
SITE LOG **GAMUL SEGIR**

1998

DATE	9 Nov 98 Noon dive (10 30 depart, return 5 30 pm)
DIVERS	H.Mansour &Y Ibrahim
BOAT	Silver wave
DIVE TIME	60 minutes
TASK	Seek old sites, locate 8 quads and place two corner markers (with a small yellow tie wrap as this year's indicator), and acquire the coral cover and minimal RUA data

The team work consisted from H Mansour & Y Ibrahim The first diver was locating the old marks of the old quads and assessing the quads, the 2nd diver was photographing the quads The area between each of the located old quads was about 10-15 m. The site is formed of a small reef flat with a gentle slope on the eastern side We have not been able to locate any of the old marks and we have constructed eight new quads on the east-west sides of the reef. The dive time was 60 minutes The new plastic ties were inserted at the opposite corners of the all the located and the new quads We have located, marked, assessed and photographed 8 quads along the reef flat of Gamul Sagir (8 new) The first quad was located to the east of the first buoy on the right side near the eastern edge of the reef flat at a distance of about 40 m. We started working from east to west with a moderate current opposing us



GAMEL KEBIR 1998

ABUNDANT GENERA (In order of Abundance)

	Hard Corals		Soft Corals
1	*Porites*	1	*Sarcophytum*
2	*Millipora*	2	*Lobophytum*
3	Acropora	3	*Sinularia*
4	*Montipora*	4	
5	*Pocillipora*	5	
6	*Favites*	6	
7	*Fungia*	7	
8	*Dendrophilia*	8	
9	*Turbinaria – Galexia*	9	
10	*Striatopora*		

SUBSTRATE % COVER (2mX2m quadrant at 4 m depth)

Category/Quadrants	1	2	3	4	5	6	7	8	9
Hard Corals	75	55	35	15	20	40	45	40	--
Soft Corals	5	0	15	5	5	0	0	0	--
Sponge	0	0	0	0	0	0	0	0	--
Rock	20	45	50	15	25	25	25	35	--
Rubbles	0	0	0	15	10	15	20	5	--
Dead Corals	0	0	0	10	0	0	0	20	--
Sand	0	0	0	40	40	20	10	5	--
Algae > 1 cm height	0	0	0	0	0	0	0	0	--
Total (≈ 100%)									
Hard Corals w/Disease	0	0	0	0	0	0	0	0	--
Hard Corals W/Bleaching	0	0	0	0	0	0	0	0	--

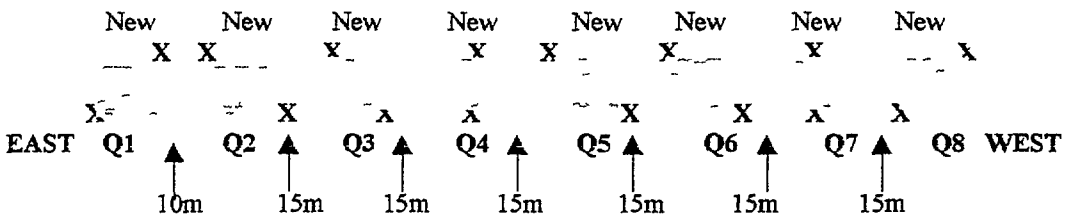
Other groups
Echinodermata
Echinus (*Echinothrix diadema*)
Mollusca
Bivalvia (*Tridacna spp*)

SAFAGA
SITE LOG **GAMUL SEGIR**

1998

DATE	9 Nov 98 Noon dive (10 30 depart, return 5 30 pm)
DIVERS	H.Mansour &Y Ibrahim
BOAT	Silver wave
DIVE TIME	60 minutes
TASK	Seek old sites, locate 8 quads and place two corner markers (with a small yellow tie wrap as this year's indicator), and acquire the coral cover and minimal RUA data

The team work consisted from H Mansour & Y Ibrahim The first diver was locating the old marks of the old quads and assessing the quads, the 2nd diver was photographing the quads The area between each of the located old quads was about 10-15 m. The site is formed of a small reef flat with a gentle slope on the eastern side We have not been able to locate any of the old marks and we have constructed eight new quads on the east-west sides of the reef. The dive time was 60 minutes The new plastic ties were inserted at the opposite corners of the all the located and the new quads We have located, marked, assessed and photographed 8 quads along the reef flat of Gamul Sagir (8 new) The first quad was located to the east of the first buoy on the right side near the eastern edge of the reef flat at a distance of about 40 m. We started working from east to west with a moderate current opposing us



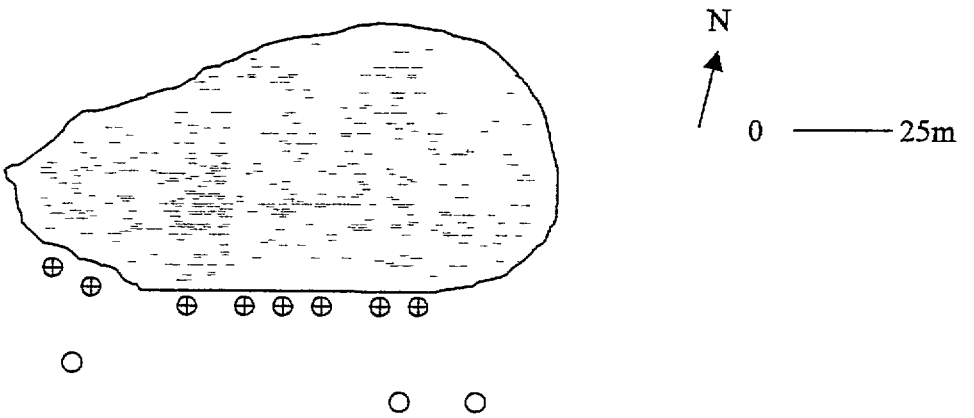
RAPID UNDERWATER ASSESSMENT DATA SHEET

GENERAL DATA

Site	Gamul Sagir	Date	09/11/98
Coordinates	26° 47 111 N 33° 59 260 E	Dive Site Rating	2 5
Air Temp	23 C	Coral Diversity	
Water Temp	23 C	Number of Boats	3
Current	Moderate	Number of Anch	0
Wave height	25-50 CM	Number of Divers	28+12
Reef Zone	Slope	Number of Buoys	3

AERIAL VIEW (Showing location of Quadrants numbered and mooring buoys)

⊕ = Quadrant ○ = Mooring Buoy



LOCATION OF QUADRANTS

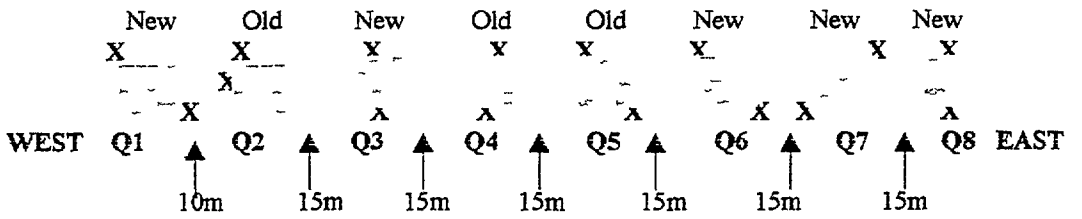
Quadrant #	1996 monitoring date	1998 monitoring Date	Remarks
1	1/11/96	8/11/98	New
2	1/11/96	8/11/98	New
3	1/11/96	8/11/98	New
4	1/11/96	8/11/98	New
5	1/11/96	8/11/98	New
6	1/11/96	8/11/98	New
7	1/11/96	8/11/98	New
8	1/11/96	8/11/98	New
9	---	---	---
10	---	---	---

SAFAGA
SITE LOG **PANORAMA REEF EAST**

1998

DATE	10 Nov 98 Morning dive (10 30 depart, return 5 30 pm)
DIVERS	H.Mansour &Y Ibrahim
BOAT	Silver wave
DIVE TIME	60 minutes
TASK	Seek old sites, locate 8 quads and place two corner markers (with a small yellow tie wrap as this year's indicator), and acquire the coral cover and minimal RUA data

The team work consisted from H. Mansour & Y Ibrahim The first diver was locating the old marks of the old quads and assessing the quads, the 2nd diver was photographing the quads The area between each of the located old quads was about 10-15 m. The site is formed of a large reef flat with a steep slope on its sides We have been able to locate three of the old marks and we have constructed five new quads on the eastern side of the reef. The dive time was 60 minutes The new plastic ties were inserted at the opposite corners of the all the located and the new quads We have located, marked, assessed and photographed 8 quads along the east side of the reef flat of Panorama Reef E (5 new) The first quad was located in front of the third top reef pin to the right at a distance of about 25 m from the boat We started working from west to east with a moderate current opposing us The water was turbid



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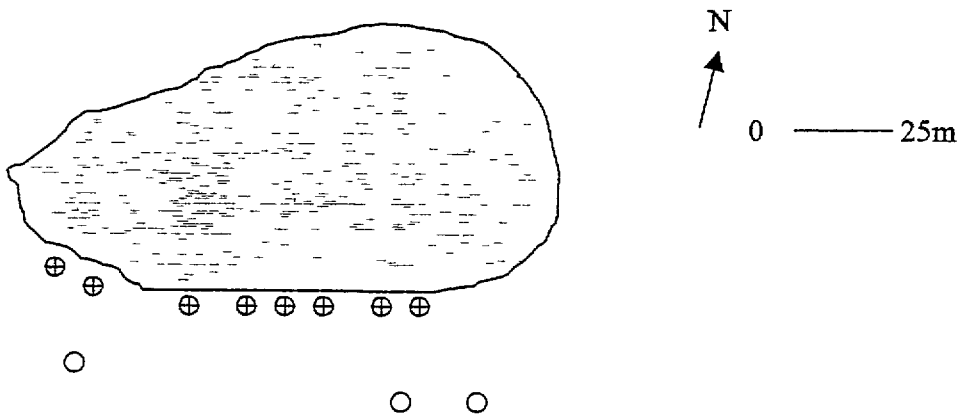
RAPID UNDERWATER ASSESSMENT DATA SHEET

GENERAL DATA

Site	Gamul Sagir	Date	09/11/98
Coordinates	26° 47 111 N 33° 59 260 E	Dive Site Rating	2 5
Air Temp	23 C	Coral Diversity	
Water Temp	23 C	Number of Boats	3
Current	Moderate	Number of Anch	0
Wave height	25-50 CM	Number of Divers	28+12
Reef Zone	Slope	Number of Buoys	3

AERIAL VIEW (Showing location of Quadrants numbered and mooring buoys)

⊕ = Quadrant ○ = Mooring Buoy



LOCATION OF QUADRANTS

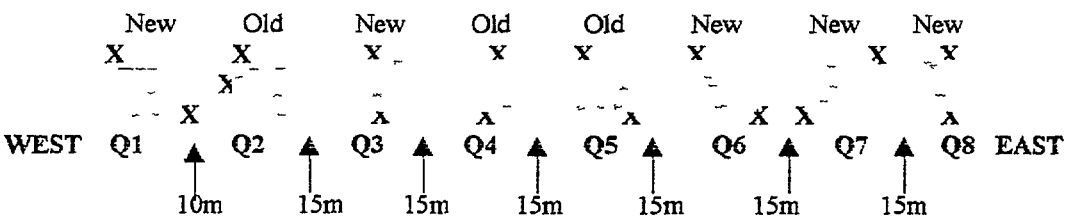
Quadrant #	1996 monitoring date	1998 monitoring Date	Remarks
1	1/11/96	8/11/98	New
2	1/11/96	8/11/98	New
3	1/11/96	8/11/98	New
4	1/11/96	8/11/98	New
5	1/11/96	8/11/98	New
6	1/11/96	8/11/98	New
7	1/11/96	8/11/98	New
8	1/11/96	8/11/98	New
9	---	---	---
10	---	---	---

SAFAGA
SITE LOG **PANORAMA REEF EAST**

1998

DATE	10 Nov 98 Morning dive (10 30 depart, return 5 30 pm)
DIVERS	H.Mansour &Y Ibrahim
BOAT	Silver wave
DIVE TIME	60 minutes
TASK	Seek old sites, locate 8 quads and place two corner markers (with a small yellow tie wrap as this year's indicator), and acquire the coral cover and minimal RUA data

The team work consisted from H. Mansour & Y Ibrahim The first diver was locating the old marks of the old quads and assessing the quads, the 2nd diver was photographing the quads The area between each of the located old quads was about 10-15 m. The site is formed of a large reef flat with a steep slope on its sides We have been able to locate three of the old marks and we have constructed five new quads on the eastern side of the reef. The dive time was 60 minutes The new plastic ties were inserted at the opposite corners of the all the located and the new quads We have located, marked, assessed and photographed 8 quads along the east side of the reef flat of Panorama Reef E (5 new) The first quad was located in front of the third top reef pin to the right at a distance of about 25 m from the boat We started working from west to east with a moderate current opposing us The water was turbid



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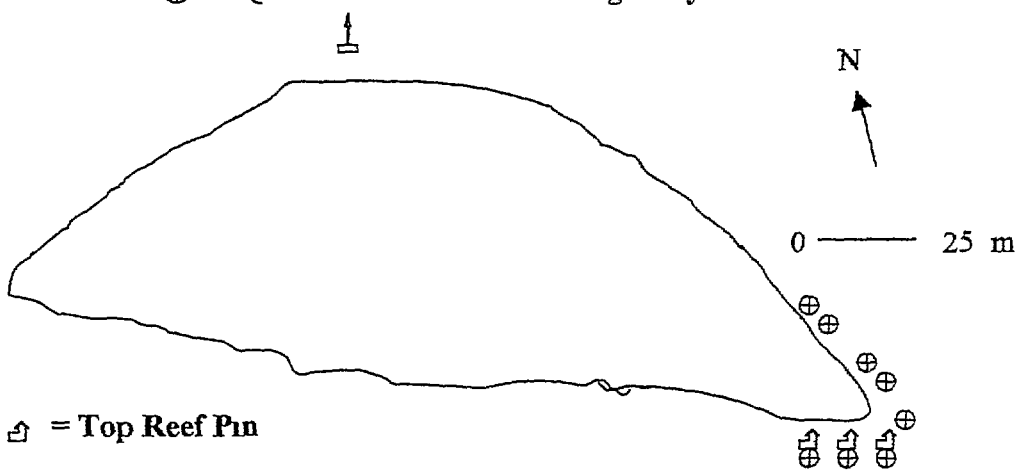
RAPID UNDERWATER ASSESSMENT DATA SHEET

GENERAL DATA

Site	Panorama Reef E	Date	10/11/98
Coordinates	26° 44 931 N 34° 05 084' E	Dive Site Rating	3
Air Temp	23 C	Coral Diversity	
Water Temp	23 C	Number of Boats	8
Current	Weak	Number of Anch	0
Wave height	25 CM	Number of Divers	120+32
Reef Zone	Edge	Number of Buoys	3

AERIAL VIEW (Showing location of Quadrants numbered and mooring buoys)

⊕ = Quadrant ○ = Mooring Buoy



⇧ = Top Reef Pin

LOCATION OF QUADRANTS

Quadrant #	1996 monitoring date	1998 monitoring Date	Remarks
1	8/11/96	10/11/98	New
2	8/11/96	10/11/98	Old
3	8/11/96	10/11/98	New
4	8/11/96	10/11/98	Old
5	8/11/96	10/11/98	Old
6	8/11/96	10/11/98	New
7	8/11/96	10/11/98	New
8	8/11/96	10/11/98	New
9	---	---	---
10	---	---	---

PANORAMA EAST 1998

ABUNDANT GENERA (In order of Abundance)

	Hard Corals		Soft Corals
1	*Porites*	1	*Sarcophytum*
2	*Millipora*	2	*Lobophytum*
3	Acropora	3	*Xenia*
4	*Montipora*	4	
5	*Pocillipora*	5	
6	*Favites*	6	
7	*Fungia*	7	
8	*Dendrophilia*	8	
9	*Favia - Straitopora*	9	
10	*Galexia*		

SUBSTRATE % COVER (2mX2m quadrant at 4 m depth)

Category/Quadrants	1	2	3	4	5	6	7	8	9
Hard Corals	70	70	60	55	75	55	60	20	--
Soft Corals	10	10	10	15	10	15	20	40	--
Sponge	0	0	0	0	0	0	0	0	--
Rock	15	20	30	20	10	30	20	40	--
Rubbles	5	0	0	10	5	0	0	0	--
Dead Corals	0	0	0	0	0	0	0	0	--
Sand	0	0	0	0	0	0	0	0	--
Algae > 1 cm height	0	0	0	0	0	0	0	0	--
Total (≈ 100%)									
Hard Corals w/Disease	0	0	0	0	0	0	0	0	--
Hard Corals W/Bleaching	0	0	0	0	0	0	0	0	--

Other groups
Echinodermata
(*Echinothrix diadema*)
Mollusca
Bivalvia (*Tridacna spp*)

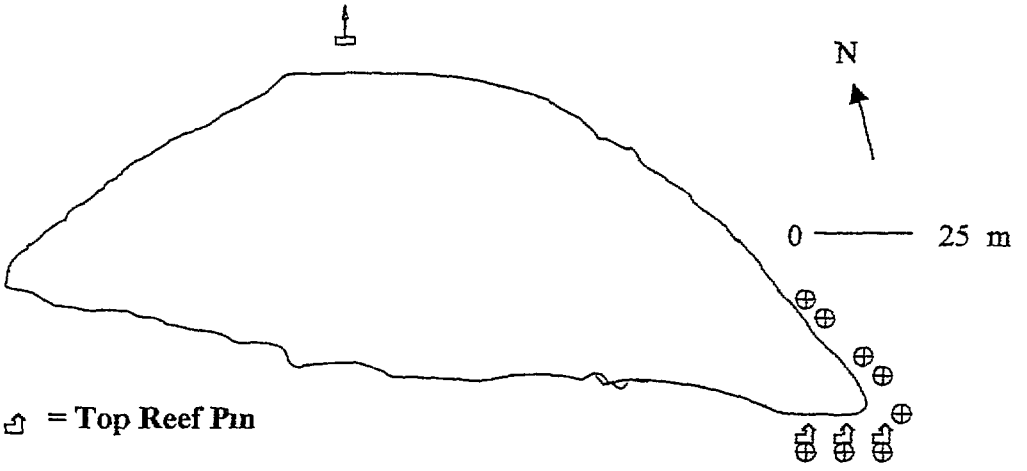
RAPID UNDERWATER ASSESSMENT DATA SHEET

GENERAL DATA

Site	Panorama Reef E	Date	10/11/98
Coordinates	26° 44 931 N 34° 05 084 E	Dive Site Rating	3
Air Temp	23 C	Coral Diversity	
Water Temp.	23 C	Number of Boats	8
Current	Weak	Number of Anch	0
Wave height	25 CM	Number of Divers	120+32
Reef Zone	Edge	Number of Buoys	3

AERIAL VIEW (Showing location of Quadrants numbered and mooring buoys)

⊕ = Quadrant ○ = Mooring Buoy



= Top Reef Pin

LOCATION OF QUADRANTS

Quadrant #	1996 monitoring date	1998 monitoring Date	Remarks
1	8/11/96	10/11/98	New
2	8/11/96	10/11/98	Old
3	8/11/96	10/11/98	New
4	8/11/96	10/11/98	Old
5	8/11/96	10/11/98	Old
6	8/11/96	10/11/98	New
7	8/11/96	10/11/98	New
8	8/11/96	10/11/98	New
9	---	---	---
10	---	---	---

PANORAMA EAST 1998

ABUNDANT GENERA (In order of Abundance)

	Hard Corals		Soft Corals
1	*Porites*	1	*Sarcophytum*
2	*Millipora*	2	*Lobophytum*
3	Acropora	3	*Xenia*
4	*Montipora*	4	
5	*Pocillipora*	5	
6	*Favites*	6	
7	*Fungia*	7	
8	*Dendrophilia*	8	
9	*Favia - Straitopora*	9	
10	*Galexia*		

SUBSTRATE % COVER (2mX2m quadrant at 4 m depth)

Category/Quadrants	1	2	3	4	5	6	7	8	9
Hard Corals	70	70	60	55	75	55	60	20	--
Soft Corals	10	10	10	15	10	15	20	40	--
Sponge	0	0	0	0	0	0	0	0	--
Rock	15	20	30	20	10	30	20	40	--
Rubbles	5	0	0	10	5	0	0	0	--
Dead Corals	0	0	0	0	0	0	0	0	--
Sand	0	0	0	0	0	0	0	0	--
Algae > 1 cm height	0	0	0	0	0	0	0	0	--
Total (≈ 100%)									
Hard Corals w/Disease	0	0	0	0	0	0	0	0	--
Hard Corals W/Bleaching	0	0	0	0	0	0	0	0	--

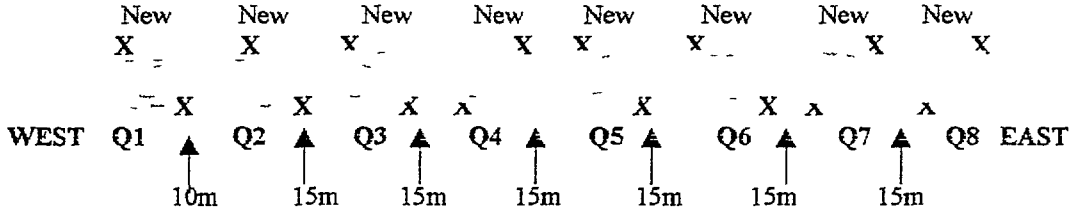
Other groups
Echinodermata
(*Echinothrix diadema*)
Mollusca
Bivalvia (*Tridacna spp*)

SAFAGA
SITE LOG **PANORAMA REEF WEST**

1998

DATE	10 Nov 98 Noon dive (10 30 depart, return 5 30 pm)
DIVERS	H.Mansour &Y Ibrahim
BOAT	Silver wave
DIVE TIME	60 minutes
TASK	Seek old sites locate 8 quads and place two corner markers (with a small yellow tie wrap as this year's indicator), and acquire the coral cover and minimal RUA data

The team work consisted from H. Mansour & Y Ibrahim The first diver was locating the old marks of the old quads and assessing the quads, the 2nd diver was photographing the quads The area between each of the located old quads was about 10-15 m. The site is formed of a large reef flat with a steep slope on its sides We have not been able to locate any of the old marks and we have constructed eight new quads on the western side of the reef The dive time was 60 minutes The new plastic ties were inserted at the opposite corners of the all the located and the new quads We have located, marked, assessed and photographed 8 quads along the west side of the reef flat of Panorama Reef E The first quad was located in front of the only top reef pin to the left at a distance of about 30 m from the boat We started working from east to west with a moderate current opposing us on our way back The water was turbid



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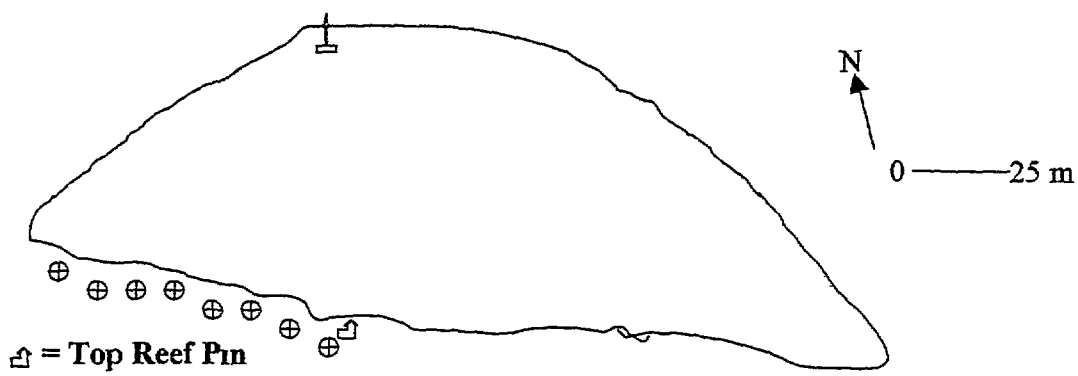
RAPID UNDERWATER ASSESSMENT DATA SHEET

GENERAL DATA

Site	**Panorama Reef W**	**Date**	10/11/98
Coordinates	26° 44 931 N 34° 05 084 E	**Dive Site Rating**	3
Air Temp	23 C	**Coral Diversity**	
Water Temp	23 C	**Number of Boats**	8
Current	Weak	**Number of Anch**	0
Wave height	25 CM	**Number of Divers**	120+32
Reef Zone	Edge	**Number of Buoys**	1

AERIAL VIEW (Showing location of Quadrants numbered and mooring buoys)

⊕ = **Quadrant** ○ = **Mooring Buoy**



LOCATION OF QUADRANTS

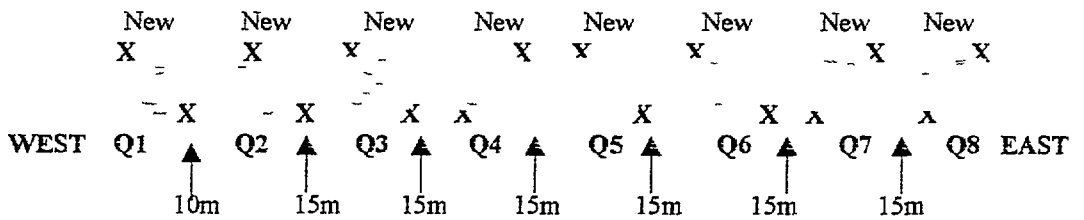
Quadrant #	1996 monitoring date	1998 monitoring Date	Remarks
1	8/11/96	10/11/98	New
2	8/11/96	10/11/98	New
3	8/11/96	10/11/98	New
4	8/11/96	10/11/98	New
5	8/11/96	10/11/98	New
6	8/11/96	10/11/98	New
7	8/11/96	10/11/98	New
8	8/11/96	10/11/98	New
9	---	---	---
10	---	---	---

SAFAGA
SITE LOG **PANORAMA REEF WEST**

1998

DATE	10 Nov 98 Noon dive (10 30 depart, return 5 30 pm)
DIVERS	H Mansour &Y Ibrahim
BOAT	Silver wave
DIVE TIME	60 minutes
TASK	Seek old sites, locate 8 quads and place two corner markers (with a small yellow tie wrap as this year's indicator), and acquire the coral cover and minimal RUA data

The team work consisted from H. Mansour & Y Ibrahim The first diver was locating the old marks of the old quads and assessing the quads, the 2nd diver was photographing the quads The area between each of the located old quads was about 10-15 m. The site is formed of a large reef flat with a steep slope on its sides We have not been able to locate any of the old marks and we have constructed eight new quads on the western side of the reef The dive time was 60 minutes The new plastic ties were inserted at the opposite corners of the all the located and the new quads We have located, marked, assessed and photographed 8 quads along the west side of the reef flat of Panorama Reef E The first quad was located in front of the only top reef pin to the left at a distance of about 30 m from the boat We started working from east to west with a moderate current opposing us on our way back The water was turbid



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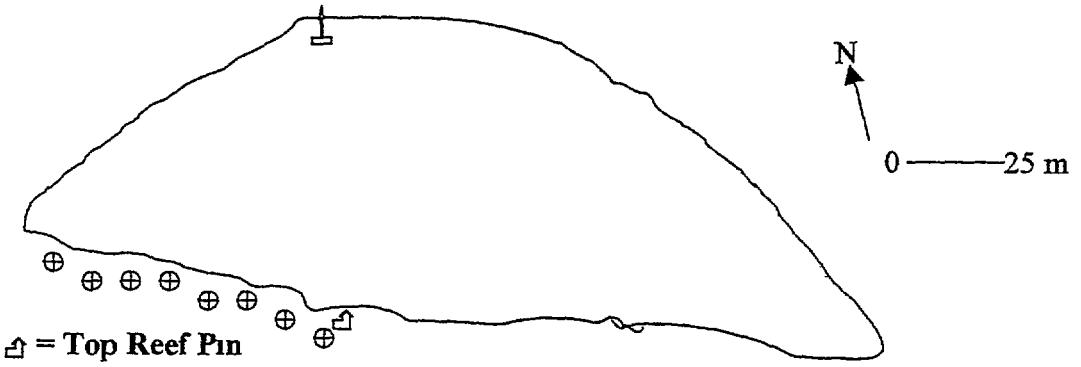
RAPID UNDERWATER ASSESSMENT DATA SHEET

GENERAL DATA

Site	**Panorama Reef W**	**Date**	10/11/98
Coordinates	26° 44 931 `N 34° 05 084` E	**Dive Site Rating**	3
Air Temp.	23 C	**Coral Diversity**	
Water Temp	23 C	**Number of Boats**	8
Current	Weak	**Number of Anch.**	0
Wave height	25 CM	**Number of Divers**	120+32
Reef Zone	Edge	**Number of Buoys**	1

AERIAL VIEW (Showing location of Quadrants numbered and mooring buoys)

⊕ = **Quadrant** ○ = **Mooring Buoy**



LOCATION OF QUADRANTS

Quadrant #	1996 monitoring date	1998 monitoring Date	Remarks
1	8/11/96	10/11/98	New
2	8/11/96	10/11/98	New
3	8/11/96	10/11/98	New
4	8/11/96	10/11/98	New
5	8/11/96	10/11/98	New
6	8/11/96	10/11/98	New
7	8/11/96	10/11/98	New
8	8/11/96	10/11/98	New
9	---	---	---
10	---	---	---

PANORAMA REEF WEST 1998

ABUNDANT GENERA (In order of Abundance)

	Hard Corals		Soft Corals
1	*Porites*	1	*Sarcophytum*
2	*Millipora*	2	*Lobophytum*
3	Acropora	3	*Xenia*
4	*Montipora*	4	
5	*Pocillipora*	5	
6	*Favites*	6	
7	*Fungia*	7	
8	*Dendrophilia*	8	
9	*Straitopora*	9	
10			

SUBSTRATE % COVER (2mX2m quadrant at 4 m depth)

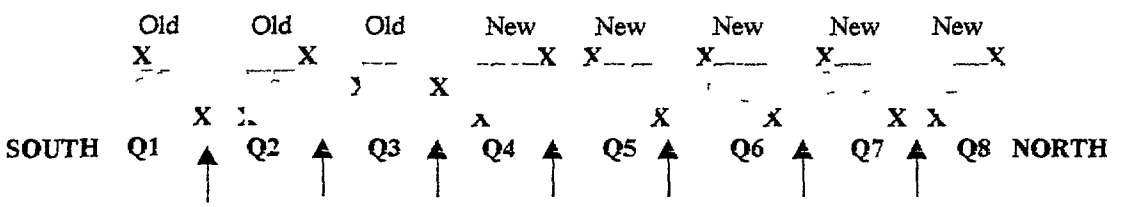
Category/Quadrants	1	2	3	4	5	6	7	8	9
Hard Corals	30	40	30	40	30	25	20	70	--
Soft Corals	35	24	40	20	25	45	10	5	--
Sponge	5	1	0	1	0	0	1	0	--
Rock	25	25	25	39	35	25	45	10	--
Rubbles	0	0	0	0	10	5	25	15	--
Dead Corals	10	10	5	0	0	0	0	0	--
Sand	0	0	0	0	0	0	0	0	--
Algae > 1 cm height	0	0	0	0	0	0	0	0	--
Total (≈ 100%)									
Hard Corals w/Disease	0	0	0	0	0	0	0	0	--
Hard Corals W/Bleaching	0	0	0	0	0	0	0	0	--

Other groups
Echinodermata
(*Echinothrix diadema*)
Mollusca
Bivalvia (*Tridacna spp*)

SAFAGA
SITE LOG **TOBIA ARBA**
1998

DATE	11 Nov 98 Morning dive (10 30 depart, return 5 30 pm)
DIVERS	H Mansour, Y Ibrahim & W Abdel Fatah
BOAT	Silver wave
DIVE TIME	60 minutes
TASK	Seek old sites, locate 8 quads and place two corner markers (with a small yellow tie wrap as this year's indicator), and acquire the coral cover and minimal RUA data

The team work consisted from H. Mansour , Y Ibrahim & W Abdel Fatah The first diver was locating the old marks of the old quads and assessing the quads, the 2nd & the 3rd divers were photographing the quads The area between each of the located old quads can not be measured as they are far away from each other The site is formed of seven submerged ergs that are distributed as follows one separated erg followed by two on our way north, then followed by another two and then one The maximum depth was about 12m. The water was turbid We have been able to locate three of the old marks and we have constructed five new quads on the same old places pointed out in the first survey The dive time was 60 minutes The new plastic ties were inserted at the opposite corners of the all the located and the new quads We have located, marked, assessed and photographed 8 quads along the submerged ergs of Tobia Arba (5 new) The first quad was located in front of the left or western buoy at a distance of about 30 m from the boat We started working from south to north with a moderate current opposing us on our way back



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PANORAMA REEF WEST 1998

ABUNDANT GENERA (In order of Abundance)

	Hard Corals		Soft Corals
1	*Porites*	1	*Sarcophytum*
2	*Millipora*	2	*Lobophytum*
3	Acropora	3	*Xenia*
4	*Montipora*	4	
5	*Pocillipora*	5	
6	*Favites*	6	
7	*Fungia*	7	
8	*Dendrophilia*	8	
9	*Straitopora*	9	
10			

SUBSTRATE % COVER (2mX2m quadrant at 4 m depth)

Category/Quadrants	1	2	3	4	5	6	7	8	9
Hard Corals	30	40	30	40	30	25	20	70	--
Soft Corals	35	24	40	20	25	45	10	5	--
Sponge	5	1	0	1	0	0	1	0	--
Rock	25	25	25	39	35	25	45	10	--
Rubbles	0	0	0	0	10	5	25	15	--
Dead Corals	10	10	5	0	0	0	0	0	--
Sand	0	0	0	0	0	0	0	0	--
Algae > 1 cm height	0	0	0	0	0	0	0	0	--
Total (≈ 100%)									
Hard Corals w/Disease	0	0	0	0	0	0	0	0	--
Hard Corals W/Bleaching	0	0	0	0	0	0	0	0	--

Other groups
Echinodermata
(*Echinothrix diadema*)
Mollusca
Bivalvia (*Tridacna spp*)

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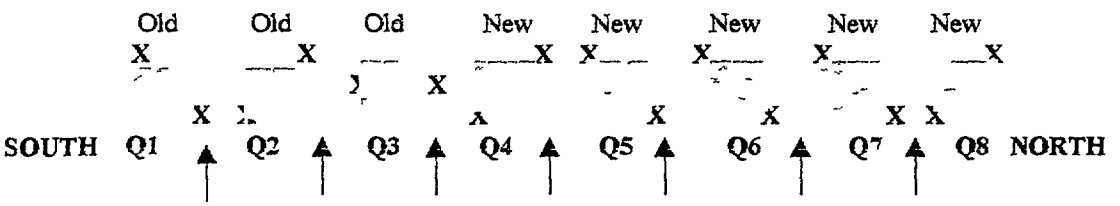
SAFAGA
SITE LOG
1998

TOBIA ARBA

DATE	11 Nov 98 Morning dive (10 30 depart, return 5 30 pm)
DIVERS	H Mansour, Y Ibrahim & W Abdel Fatah
BOAT	Silver wave
DIVE TIME	60 minutes
TASK	Seek old sites, locate 8 quads and place two corner markers (with a small yellow tie wrap as this year's indicator), and acquire the coral cover and minimal RUA data

The team work consisted from H. Mansour , Y Ibrahim & W Abdel Fatah The first diver was locating the old marks of the old quads and assessing the quads, the 2nd & the 3rd divers were photographing the quads The area between each of the located old quads can not be measured as they are far away from each other The site is formed of seven submerged ergs that are distributed as follows one separated erg followed by two on our way north, then followed by another two and then one The maximum depth was about 12m. The water was turbid We have been able to locate three of the old marks and we have constructed five new quads on the same old places pointed out in the first survey The dive time was 60 minutes The new plastic ties were inserted at the opposite corners of the all the located and the new quads We have located, marked, assessed and photographed 8 quads along the submerged ergs of Tobia Arba (5 new) The first quad was located in front of the left or western buoy at a distance of about 30 m from the boat We started working from south to north with a moderate current opposing us on our way back



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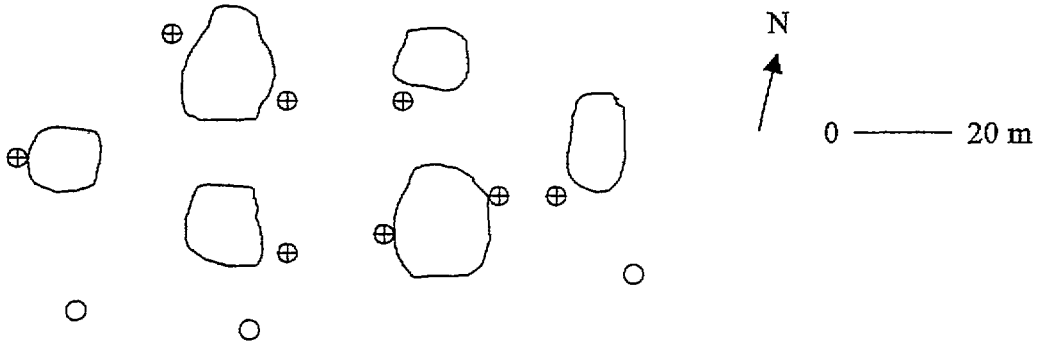
RAPID UNDERWATER ASSESSMENT DATA SHEET

GENERAL DATA

Site	**Tobia Arba**	**Date**	11/11/98
Coordinates	26° 50 170 N 33° 59 500 E	**Dive Site Rating**	2 5
Air Temp	23 C	**Coral Diversity**	
Water Temp.	23 C	**Number of Boats**	2
Current	Weak	**Number of Anch**	0
Wave height	25-50 CM	**Number of Divers**	40+16
Reef Zone	Submerged Eurks	**Number of Buoys**	3

AERIAL VIEW (Showing location of Quadrants numbered and mooring buoys)

⊕ **= Quadrant** ○ **= Mooring Buoy**



LOCATION OF QUADRANTS

Quadrant #	1996 monitoring date	1998 monitoring Date	Remarks
1	5/11/98	11/11/98	Old
2	5/11/98	11/11/98	Old
3	5/11/98	11/11/98	Old
4	5/11/98	11/11/98	New
5	5/11/98	11/11/98	New
6	5/11/98	11/11/98	New
7	5/11/98	11/11/98	New
8	5/11/98	11/11/98	New
9	---	---	---
10	---	---	---

TOBIA ARBA 1998

ABUNDANT GENERA (In order of Abundance)

	Hard Corals		Soft Corals
1	Acropora	1	*Dendronephthea*
2	*Millipora*	2	*Sarcophyton*
3	*Porites*	3	*Simularia*
4	*Pocillipora*	4	*Lobophytum*
5	*Turbinaria*	5	
6	*Dendrophillia*	6	
7	*Favites*	7	
8	*Montipora*	8	
9	*Fungia*		
10			

SUBSTRATE % COVER (2mX2m quadrant at 4 m depth)

Category/Quadrants	1	2	3	4	5	6	7	8	9
Hard Corals	25	30	40	25	10	30	55	40	--
Soft Corals	10	15	25	45	40	45	30	40	--
Sponge	0	0	0	0	0	0	0	0	--
Rock	65	55	20	30	45	25	20	15	--
Rubbles	0	0	0	0	0	0	0	0	--
Dead Corals	0	0	15	0	5	0	5	0	--
Sand	0	0	0	0	0	0	0	0	--
Algae > 1 cm height	0	0	0	0	0	0	0	0	--
Total (≈ 100%)									
Hard Corals w/Disease	0	0	0	0	0	0	0	0	--
Hard Corals W/Bleaching	0	0	0	0	0	0	0	0	--

Other groups
Echinodermata
Echinus (*Echinothrix diadema*)
Mollusca
Bivalvia (*Tridacna sp*)
Murex- Sponges

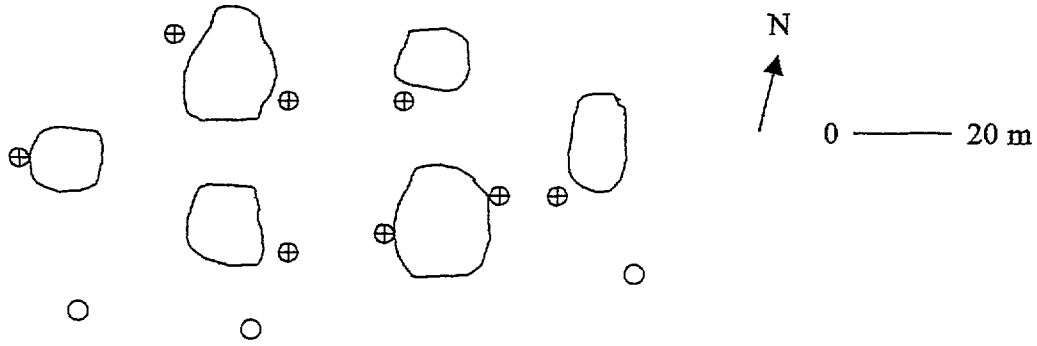
RAPID UNDERWATER ASSESSMENT DATA SHEET

GENERAL DATA

Site	**Tobia Arba**	**Date**	11/11/98
Coordinates	26° 50 170 N 33° 59 500 E	**Dive Site Rating**	2 5
Air Temp	23 C	**Coral Diversity**	
Water Temp	23 C	**Number of Boats**	2
Current	Weak	**Number of Anch**	0
Wave height	25-50 CM	**Number of Divers**	40+16
Reef Zone	Submerged Eurks	**Number of Buoys**	3

AERIAL VIEW (Showing location of Quadrants numbered and mooring buoys)

⊕ **= Quadrant** ○ **= Mooring Buoy**



LOCATION OF QUADRANTS

Quadrant #	1996 monitoring date	1998 monitoring Date	Remarks
1	5/11/98	11/11/98	Old
2	5/11/98	11/11/98	Old
3	5/11/98	11/11/98	Old
4	5/11/98	11/11/98	New
5	5/11/98	11/11/98	New
6	5/11/98	11/11/98	New
7	5/11/98	11/11/98	New
8	5/11/98	11/11/98	New
9	---	---	---
10	---	---	---

TOBIA ARBA 1998

ABUNDANT GENERA (In order of Abundance)

	Hard Corals		Soft Corals
1	Acropora	1	*Dendronephthea*
2	*Millipora*	2	*Sarcophyton*
3	*Porites*	3	*Sinularia*
4	*Pocillipora*	4	*Lobophytum*
5	*Turbinaria*	5	
6	*Dendrophillia*	6	
7	*Favites*	7	
8	*Montipora*	8	
9	*Fungia*		
10			

SUBSTRATE % COVER (2mX2m quadrant at 4 m depth)

Category/Quadrants	1	2	3	4	5	6	7	8	9
Hard Corals	25	30	40	25	10	30	55	40	--
Soft Corals	10	15	25	45	40	45	30	40	--
Sponge	0	0	0	0	0	0	0	0	--
Rock	65	55	20	30	45	25	20	15	--
Rubbles	0	0	0	0	0	0	0	0	--
Dead Corals	0	0	15	0	5	0	5	0	--
Sand	0	0	0	0	0	0	0	0	--
Algae > 1 cm height	0	0	0	0	0	0	0	0	--
Total (≈ 100%)									
Hard Corals w/Disease	0	0	0	0	0	0	0	0	--
Hard Corals W/Bleaching	0	0	0	0	0	0	0	0	--

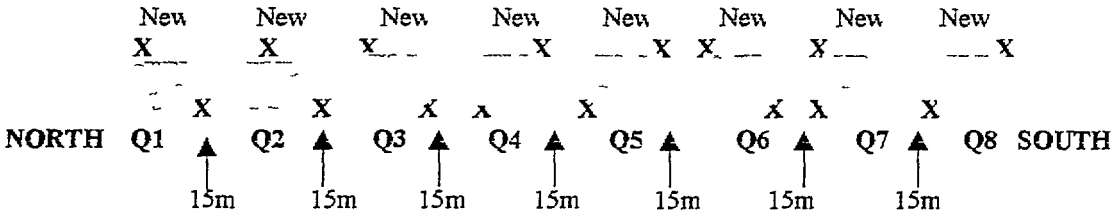
Other groups
Echinodermata
Echinus (*Echinothrix diadema*)
Mollusca
Bivalvia (*Tridacna sp*)
Murex- Sponges

SAFAGA
SITE LOG **TOBIA HAMRA**

1998

DATE	11 Nov 98 Noon dive (10 30 depart return 4 45 pm)
DIVERS	H Mansour &Y Ibrahim
BOAT	Silver wave
DIVE TIME	60 minutes
TASK	Seek old sites locate 8 quads and place two corner markers (with a small yellow tie wrap as this year s indicator), and acquire the coral cover and minimal RUA data

The team work consisted from H. Mansour & Y Ibrahim The first diver was locating the old marks of the old quads and assessing the quads, the 2nd diver was photographing the quads The area between each of the located old quads was about 10-15 m. The site is formed of a large reef flat with a gentle slope on its eastern side in front of Tobia Hamra Island We have not been able to locate any of the old marks and we have constructed eight new quads on the eastern side of the reef. The dive time was 45 minutes The new plastic ties were inserted at the opposite corners of the all the located and the new quads We have located, marked, assessed and photographed 8 quads along the east side of Tobia Hamra (8 new) The first quad was located in front of the north buoy little to the left at a distance of about 30 m from the boat We started working from north to south with a moderate current opposing us on our way back to the boat The water was turbid



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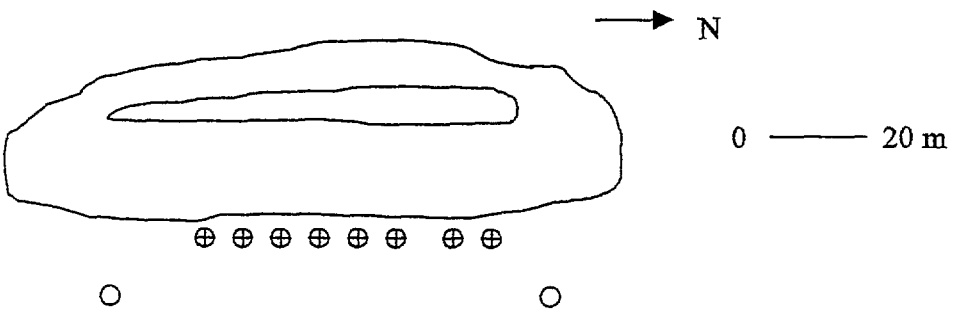
RAPID UNDERWATER ASSESSMENT DATA SHEET

GENERAL DATA

Site	**Tobia Hamra**	**Date**	11/11/98
Coordinates	26° 50`170 N 33° 59` 500``E	**Dive Site Rating**	2
Air Temp	23 C	**Coral Diversity**	
Water Temp	23 C	**Number of Boats**	0
Current	Weak	**Number of Anch**	0
Wave height	25-50 CM	**Number of Divers**	0
Reef Zone	Slope	**Number of Buoys**	2

AERIAL VIEW (Showing location of Quadrants numbered and mooring buoys)

⊕ **= Quadrant** ○ **= Mooring Buoy**



LOCATION OF QUADRANTS

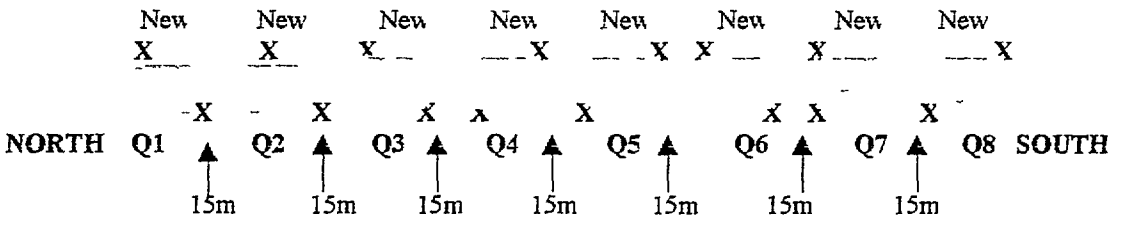
Quadrant #	1996 monitoring date	1998 monitoring Date	Remarks
1	2/11/98	11/11/98	New
2	2/11/98	11/11/98	New
3	2/11/98	11/11/98	New
4	2/11/98	11/11/98	New
5	2/11/98	11/11/98	New
6	2/11/98	11/11/98	New
7	2/11/98	11/11/98	New
8	2/11/98	11/11/98	New
9	---	---	---
10	---	---	---

SAFAGA·
SITE LOG **TOBIA HAMRA**

1998

DATE	11 Nov 98 Noon dive (10 30 depart, return 4 45 pm)
DIVERS	H.Mansour &Y Ibrahim
BOAT	Silver wave
DIVE TIME	60 minutes
TASK	Seek old sites, locate 8 quads and place two corner markers (with a small yellow tie wrap as this year s indicator), and acquire the coral cover and minimal RUA data

The team work consisted from H. Mansour & Y Ibrahim The first diver was locating the old marks of the old quads and assessing the quads, the 2nd diver was photographing the quads The area between each of the located old quads was about 10-15 m. The site is formed of a large reef flat with a gentle slope on its eastern side in front of Tobia Hamra Island We have not been able to locate any of the old marks and we have constructed eight new quads on the eastern side of the reef. The dive time was 45 minutes The new plastic ties were inserted at the opposite corners of the all the located and the new quads We have located, marked, assessed and photographed 8 quads along the east side of Tobia Hamra (8 new) The first quad was located in front of the north buoy little to the left at a distance of about 30 m from the boat We started working from north to south with a moderate current opposing us on our way back to the boat The water was turbid



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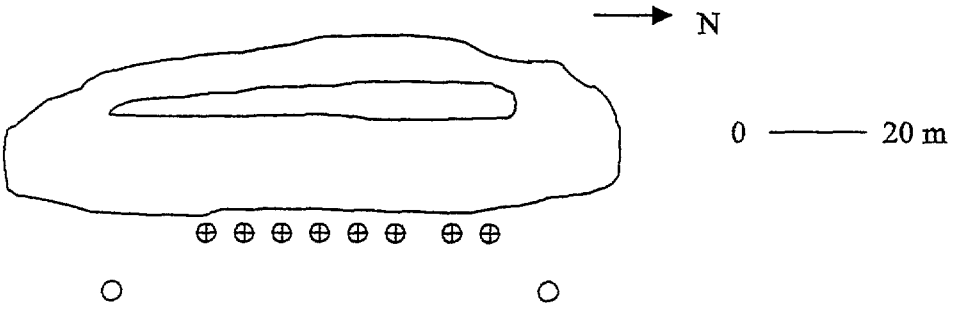
RAPID UNDERWATER ASSESSMENT DATA SHEET

GENERAL DATA

Site	**Tobia Hamra**	**Date**	11/11/98
Coordinates	26° 50 170 N 33° 59` 500` E	**Dive Site Rating**	2
Air Temp	23 C	**Coral Diversity**	
Water Temp	23 C	**Number of Boats**	0
Current	Weak	**Number of Anch**	0
Wave height	25-50 CM	**Number of Divers**	0
Reef Zone	Slope	**Number of Buoys**	2

AERIAL VIEW (Showing location of Quadrants numbered and mooring buoys)

⊕ **= Quadrant** ○ **= Mooring Buoy**



LOCATION OF QUADRANTS

Quadrant #	1996 monitoring date	1998 monitoring Date	Remarks
1	2/11/98	11/11/98	New
2	2/11/98	11/11/98	New
3	2/11/98	11/11/98	New
4	2/11/98	11/11/98	New
5	2/11/98	11/11/98	New
6	2/11/98	11/11/98	New
7	2/11/98	11/11/98	New
8	2/11/98	11/11/98	New
9	---	---	---
10	---	---	---

TOBIA HAMRA 1998

ABUNDANT GENERA (In order of Abundance)

	Hard Corals		Soft Corals
1	Acropora	1	*Dendronephthea*
2	*Millipora*	2	*Sarcophyton*
3	*Porites*	3	*Sinularia*
4	*Pocillipora*	4	*Lobophytum*
5	*Turbinaria*	5	
6	*Dendrophillia*	6	
7	*Favites*	7	
8	*Fungia*	8	
9			
10			

SUBSTRATE % COVER (2mX2m quadrant at 4 m depth)

Category/Quadrants	1	2	3	4	5	6	7	8	9
Hard Corals	65	35	60	58	40	65	60	45	--
Soft Corals	0	35	35	2	2	0	5	0	--
Sponge	0	0	0	0	0	0	0	0	--
Rock	35	10	5	40	58	35	35	35	--
Rubbles	0	0	0	0	0	0	0	0	--
Dead Corals	0	20	0	0	0	0	0	0	--
Sand	0	0	0	0	0	0	0	0	--
Algae > 1 cm height	0	0	0	0	0	0	0	0	--
Total (≈ 100%)									
Hard Corals w/Disease	0	0	0	0	0	0	0	0	--
Hard Corals W/Bleaching	0	0	0	0	0	0	0	0	--

Other groups
Echinodermata
Echinus (*Echinothrix diadema*)
Mollusca
Bivalvia (*Tridacna sp*)
Holothurians
Octopus -Pencil urchin- Stone fish

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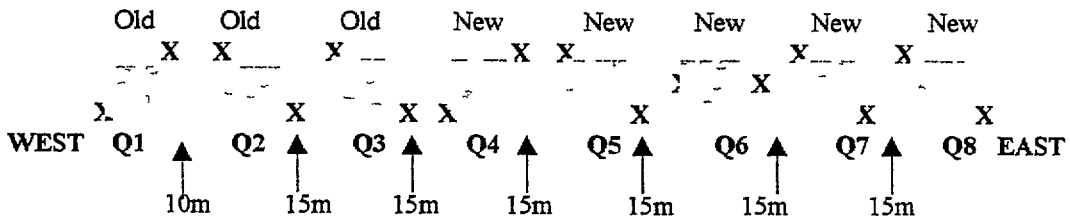
SAFAGA
SITE LOG: **TOBIA KEBIR**

1998

DATE	8 Nov 98 Noon dive (11 30 depart, return 5 30 pm)
DIVERS	H Mansour &Y Ibrahim
BOAT	Heros
DIVE TIME	60 minutes
TASK	Seek old sites, locate 8 quads and place two corner markers (with a small yellow tie wrap as this year's indicator), and acquire the coral cover and minimal RUA data

The team work consisted from H. Mansour & Y Ibrahim The first diver was locating the old marks of the old quads and assessing the quads, the 2nd diver was photographing the quads The area between each of the located old quads was about 10-15 m. The site is formed of a large reef flat with a gentle slope on the eastern side We have located 3 of the old marks out of the eight quads and we have constructed five new quads on the eastern side The dive time was 60 minutes The new plastic ties were inserted at the opposite corners of the all the located and the new quads We have located, marked, assessed and photographed 8 quads along the reef flat of Tobia Kebir (5 new) The first quad was located to the east of the first buoy on the right side near the eastern edge of the reef flat at a distance of about 40 m. We started working from west to east with a mild current opposing us



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TOBIA HAMRA 1998

ABUNDANT GENERA (In order of Abundance)

	Hard Corals		Soft Corals
1	Acropora	1	*Dendronephthea*
2	*Millipora*	2	*Sarcophyton*
3	*Porites*	3	*Sinularia*
4	*Pocillipora*	4	*Lobophytum*
5	*Turbinaria*	5	
6	*Dendrophillia*	6	
7	*Favites*	7	
8	*Fungia*	8	
9			
10			

SUBSTRATE % COVER (2mX2m quadrant at 4 m depth)

Category/Quadrants	1	2	3	4	5	6	7	8	9
Hard Corals	65	35	60	58	40	65	60	45	--
Soft Corals	0	35	35	2	2	0	5	0	--
Sponge	0	0	0	0	0	0	0	0	--
Rock	35	10	5	40	58	35	35	35	--
Rubbles	0	0	0	0	0	0	0	0	--
Dead Corals	0	20	0	0	0	0	0	0	--
Sand	0	0	0	0	0	0	0	0	--
Algae > 1 cm height	0	0	0	0	0	0	0	0	--
Total (≈ 100%)									
Hard Corals w/Disease	0	0	0	0	0	0	0	0	--
Hard Corals W/Bleaching	0	0	0	0	0	0	0	0	--

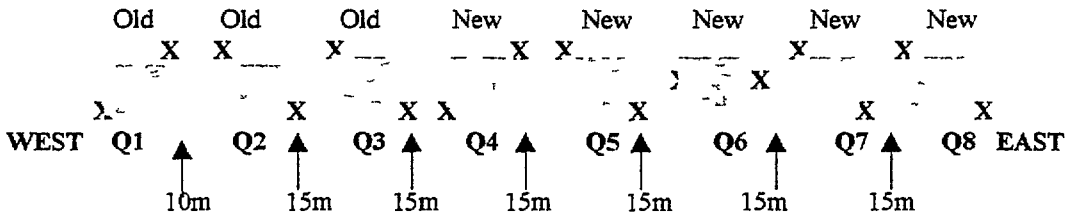
Other groups
Echinodermata
Echinus (*Echinothrix diadema*)
Mollusca
Bivalvia (*Tridacna sp*)
Holothurians
Octopus -Pencil urchin- Stone fish

SAFAGA
SITE LOG: **TOBIA KEBIR**

1998

DATE	8 Nov 98 Noon dive (11 30 depart, return 5 30 pm)
DIVERS	H Mansour &Y Ibrahim
BOAT	Heros
DIVE TIME	60 minutes
TASK	Seek old sites, locate 8 quads and place two corner markers (with a small yellow tie wrap as this year's indicator), and acquire the coral cover and minimal RUA data

The team work consisted from H Mansour & Y Ibrahim The first diver was locating the old marks of the old quads and assessing the quads, the 2nd diver was photographing the quads The area between each of the located old quads was about 10-15 m. The site is formed of a large reef flat with a gentle slope on the eastern side We have located 3 of the old marks out of the eight quads and we have constructed five new quads on the eastern side The dive time was 60 minutes The new plastic ties were inserted at the opposite corners of the all the located and the new quads We have located, marked, assessed and photographed 8 quads along the reef flat of Tobia Kebir (5 new) The first quad was located to the east of the first buoy on the right side near the eastern edge of the reef flat at a distance of about 40 m. We started working from west to east with a mild current opposing us



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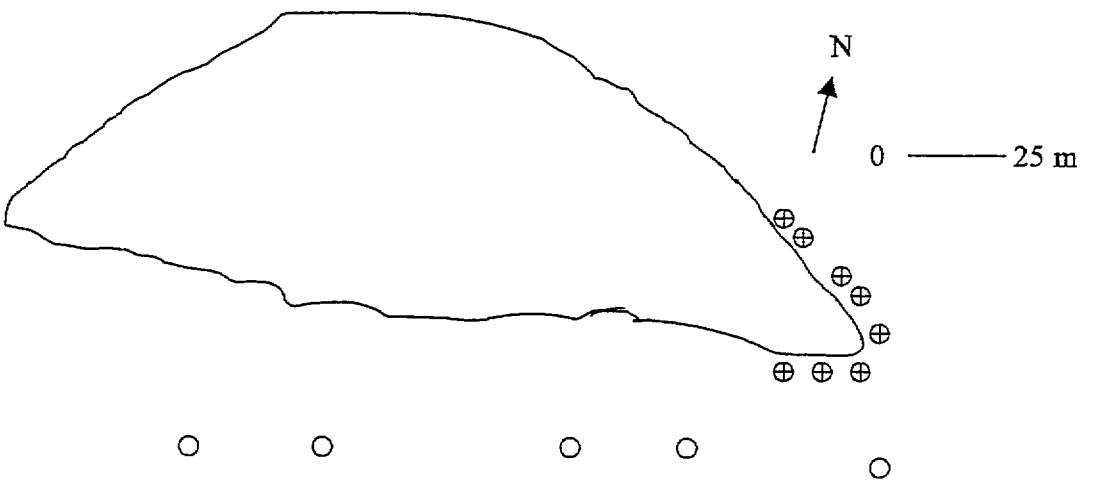
RAPID UNDERWATER ASSESSMENT DATA SHEET

GENERAL DATA

Site	Tobia Kebir	Date	08/11/98
Coordinates	26° 48 206 N 33° 59 640 E	Dive Site Rating	3
Air Temp	23 C	Coral Diversity	
Water Temp	23 C	Number of Boats	3
Current	Weak	Number of Anch	0
Wave height	25 CM	Number of Divers	24+18
Reef Zone	Slope	Number of Buoys	5

AERIAL VIEW (Showing location of Quadrants numbered and mooring buoys)

⊕ = Quadrant ○ = Mooring Buoy



LOCATION OF QUADRANTS

Quadrant #	1996 monitoring date	1998 monitoring Date	Remarks
1	3/11/96	8/11/98	Old
2	3/11/96	8/11/98	Old
3	3/11/96	8/11/98	Old
4	3/11/96	8/11/98	New
5	3/11/96	8/11/98	New
6	3/11/96	8/11/98	New
7	3/11/96	8/11/98	New
8	3/11/96	8/11/98	New
9	---	---	---
10	---	---	---

TOBIA KEBIR 1998

ABUNDANT GENERA (In order of Abundance)

	Hard Corals		Soft Corals
1	*Porites*	1	*Sarcophytum*
2	*Millipora*	2	*Lobophytum*
3	Acropora	3	*Nephthea*
4	*Montipora*	4	*Xenia*
5	*Pocillipora*	5	*Lithophyton*
6	*Favites*	6	
7	*Fungia*	7	
8	*Dendrophilia*	8	
9		9	
10			

SUBSTRATE % COVER (2mX2m quadrant at 4 m depth)

Category/Quadrants	1	2	3	4	5	6	7	8	9
Hard Corals	30	65	60	70	60	85	45	45	--
Soft Corals	0	0	0	0	5	0	35	0	--
Sponge	0	0	0	0	0	0	0	0	--
Rock	70	25	40	30	35	10	20	55	--
Rubbles	0	0	0	0	0	0	0	0	--
Dead Corals	0	0	0	0	0	0	5	0	--
Sand	0	0	0	0	0	0	0	0	--
Algae > 1 cm height	0	0	0	0	0	0	0	0	--
Total (≈ 100%)									
Hard Corals w/Disease	0	0	0	0	0	0	0	0	--
Hard Corals W/Bleaching	0	0	0	0	0	0	0	0	--

Other groups
Echinodermata
Echinus (*Echinothrix diadema*)
Mollusca
Bivalvia (*Tridacna spp*)

RAPID UNDERWATER ASSESSMENT DATA SHEET

GENERAL DATA

Site	Tobia Kebir	Date	08/11/98
Coordinates	26° 48 206 N 33° 59 640 E	Dive Site Rating	3
Air Temp	23 C	Coral Diversity	
Water Temp	23 C	Number of Boats	3
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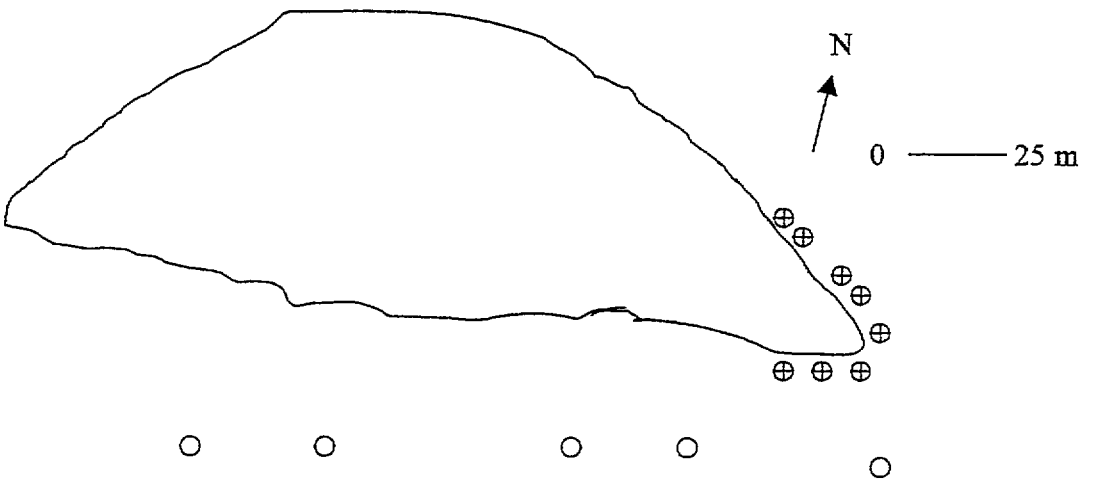
Wave height	25 CM	Number of Divers	24+18
Reef Zone	Slope	Number of Buoys	5

AERIAL VIEW (Showing location of Quadrants numbered and mooring buoys)

⊕ = Quadrant ○ = Mooring Buoy



LOCATION OF QUADRANTS

Quadrant #	1996 monitoring date	1998 monitoring Date	Remarks
1	3/11/96	8/11/98	Old
2	3/11/96	8/11/98	Old
3	3/11/96	8/11/98	Old
4	3/11/96	8/11/98	New
5	3/11/96	8/11/98	New
6	3/11/96	8/11/98	New
7	3/11/96	8/11/98	New
8	3/11/96	8/11/98	New
9	---	---	---
10	---	---	---

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TOBIA KEBIR 1998

ABUNDANT GENERA (In order of Abundance)

	Hard Corals		Soft Corals
1	*Porites*	1	*Sarcophytum*
2	*Millipora*	2	*Lobophytum*
3	Acropora	3	*Nephthea*
4	*Montipora*	4	*Xenia*
5	*Pocillipora*	5	*Lithophyton*
6	*Favites*	6	
7	*Fungia*	7	
8	*Dendrophilia*	8	
9		9	
10			

SUBSTRATE % COVER (2mX2m quadrant at 4 m depth)

Category/Quadrants	1	2	3	4	5	6	7	8	9
Hard Corals	30	65	60	70	60	85	45	45	--
Soft Corals	0	0	0	0	5	0	35	0	--
Sponge	0	0	0	0	0	0	0	0	--
Rock	70	25	40	30	35	10	20	55	--
Rubbles	0	0	0	0	0	0	0	0	--
Dead Corals	0	0	0	0	0	0	5	0	--
Sand	0	0	0	0	0	0	0	0	--
Algae > 1 cm height	0	0	0	0	0	0	0	0	--
Total (≈ 100%)									
Hard Corals w/Disease	0	0	0	0	0	0	0	0	--
Hard Corals W/Bleaching	0	0	0	0	0	0	0	0	--

Other groups
Echinodermata
Echinus (*Echinothrix diadema*)
Mollusca
Bivalvia (*Tridacna spp*)

SAFAGA
SITE LOG **TOBIA SEGIR**

1998

DATE	8 Nov 98 Noon dive (11 30 depart, return 5 30 pm)
DIVERS	H.Mansour &Y Ibranim
BOAT	Heros
DIVE TIME	60 minutes
TASK	Seek old sites, locate 8 quads and place two corner markers (with a small yellow tie wrap as this year s indicator), and acquire the coral cover and minimal RUA data

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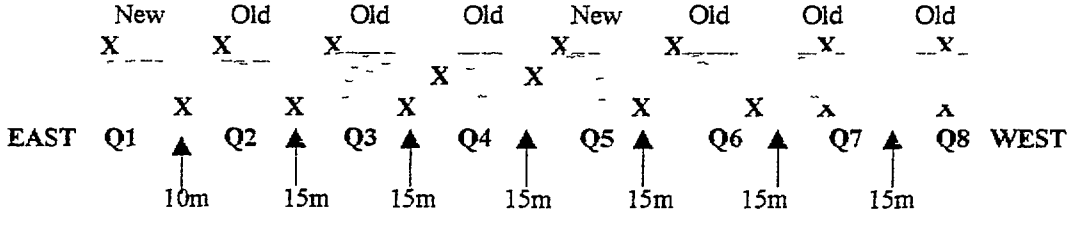

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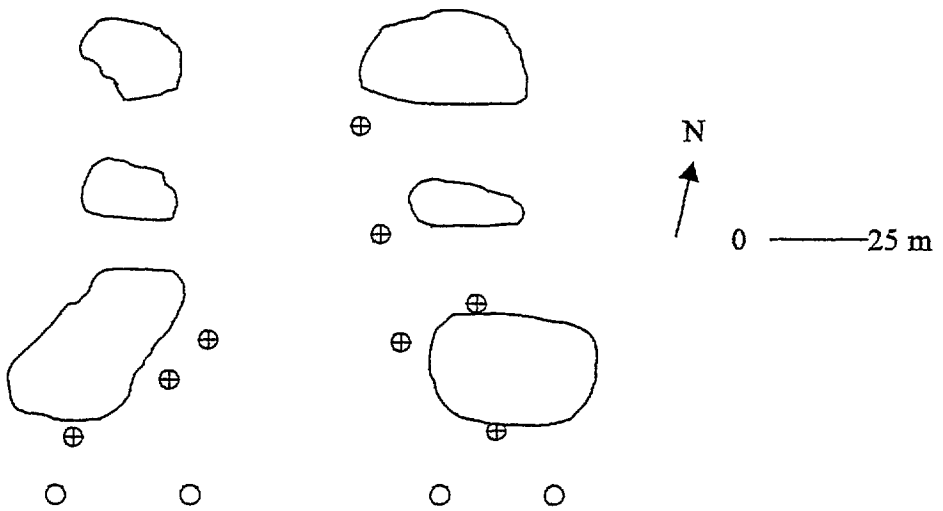
RAPID UNDERWATER ASSESSMENT DATA SHEET

GENERAL DATA

Site	**Tobia Sagir**	**Date**	08/11/98
Coordinates	26° 48 531 N 33° 59 767 E	**Dive Site Rating**	3
Air Temp	23 C	**Coral Diversity**	
Water Temp.	23 C	**Number of Boats**	4
Current	Weak	**Number of Anch**	0
Wave height	25 CM	**Number of Divers**	32+16
Reef Zone	Submerged Eruks	**Number of Buoys**	4

AERIAL VIEW (Showing location of Quadrants numbered and mooring buoys)

⊕ **= Quadrant** ○ **= Mooring Buoy**



LOCATION OF QUADRANTS

Quadrant #	1996 monitoring date	1998 monitoring Date	Remarks
1	3/11/96	8/11/98	New
2	3/11/96	8/11/98	Old
3	3/11/96	8/11/98	Old
4	3/11/96	8/11/98	Old
5	3/11/96	8/11/98	New
6	3/11/96	8/11/98	Old
7	3/11/96	8/11/98	Old
8	3/11/96	8/11/98	Old
9	---	---	---
10	---	---	---

SAFAGA
SITE LOG : **TOBIA SEGIR**

1998

DATE	8 Nov 98 Noon dive (11 30 depart, return 5 30 pm)
DIVERS	H Mansour &Y Ibranim
BOAT	Heros
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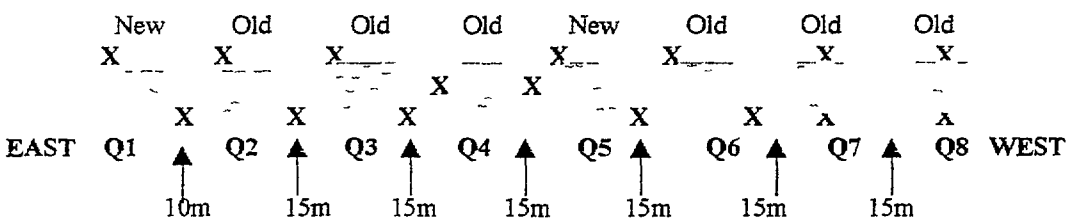

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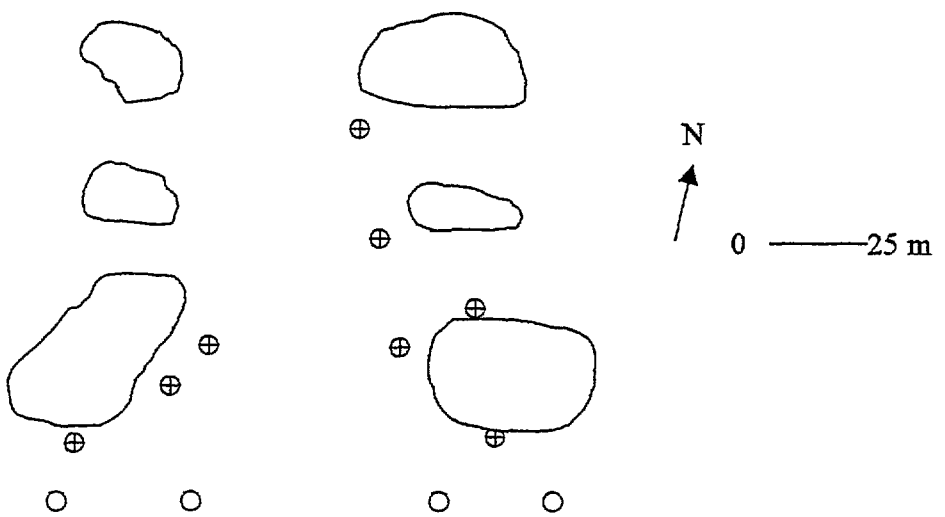
RAPID UNDERWATER ASSESSMENT DATA SHEET

GENERAL DATA

Site	**Tobia Sagir**	**Date**	08/11/98
Coordinates	26° 48 531 N 33° 59 767 E	**Dive Site Rating**	3
Air Temp	23 C	**Coral Diversity**	
Water Temp	23 C	**Number of Boats**	4
Current	Weak	**Number of Anch**	0
Wave height	25 CM	**Number of Divers**	32+16
Reef Zone	Submerged Eruks	**Number of Buoys**	4

AERIAL VIEW (Showing location of Quadrants numbered and mooring buoys)

⊕ = **Quadrant** ○ = **Mooring Buoy**



LOCATION OF QUADRANTS

Quadrant #	1996 monitoring date	1998 monitoring Date	Remarks
1	3/11/96	8/11/98	New
2	3/11/96	8/11/98	Old
3	3/11/96	8/11/98	Old
4	3/11/96	8/11/98	Old
5	3/11/96	8/11/98	New
6	3/11/96	8/11/98	Old
7	3/11/96	8/11/98	Old
8	3/11/96	8/11/98	Old
9	---	---	---
10	---	---	---

TOBIA SEGIR 1998

ABUNDANT GENERA (In order of Abundance)

	Hard Corals		Soft Corals
1	Acropora	1	*Sinularia*
2	*Millipora*	2	*Sarcophytum*
3	*Porites*	3	*Lobophytum*
4	*Pocillipora*	4	*Xenia*
5	*Turbinaria*	5	
6	*Montipora*	6	
7	*Favites*	7	
8	*Fungia*	8	
9	*Dendrophilia*	9	
10			

SUBSTRATE % COVER (2mX2m quadrant at 4 m depth)

Category/Quadrants	1	2	3	4	5	6	7	8	9
Hard Corals	65	40	65	35	45	55	75	55	--
Soft Corals	15	0	0	20	10	10	5	10	--
Sponge	0	0	0	0	0	0	0	0	--
Rock	10	45	25	35	45	30	15	25	--
Rubbles	5	5	0	0	0	0	5	0	--
Dead Corals	10	10	10	10	0	5	5	10	--
Sand	0	0	0	0	0	0	0	0	--
Algae > 1 cm height	0	0	0	0	0	0	0	0	--
Total (≈ 100%)									
Hard Corals w/Disease	0	0	0	0	0	0	0	0	--
Hard Corals W/Bleaching	0	0	0	0	0	0	0	0	--

Other groups
Echinodermata
Echinus (*Echinothrix diadema*)
Mollusca
Bivalvia (*Tridacna spp*)
Sea anemone *Entacmae quadricolor*

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ANNEX 8:

Crown-of-Thorns Starfish Control Program Reports

This Annex presents the program summary, data and formal policy statement generated during 1998, and the reports from the EEAA Program for activities in 1999

ANNEX 8A Compiled Field Reports and Briefing Documents Created by the PMG Project Staff or the EEAA Rangers During 1998 and 1999 Concerning the Crown-of-Thorns Starfish Control Program in the Red Sea Most of these reports have already been submitted to USAID or EEAA/Cairo independently **18 Pages**

ANNEX 8B Data from the 1998 Crown-of-Thorns Starfish Red Sea Program. This includes

- Records of the Operations (Dive Days, names and participation of diving centers and volunteers during the program, numbers of animals removed and numbers measured, etc)
- Size Measurements of the animals removed from 2 Hurghada Sites, with some simple Size-Frequency Analysis and Statistics Calculated on the Data.
- 4 Figures One each for the Average Diameter of the Animals Collected over time at Shabrour Umm Gamar and Carless Sites, and One each for the Normalized Size-Frequency of the COTS Collected at the two sites in 1998 This information indicates that most of the animals collected and measured were from the 16-25cm size range, suggesting that these were predominately 2nd (or possibly 3rd) year class animals As the COTS are not easily observed on the reefs until their second year, and as there were no few or no COTS alarms in 1997, these animals were probably in their second year **24 Pages**

TOBIA SEGIR 1998

ABUNDANT GENERA (In order of Abundance)

	Hard Corals		Soft Corals
1	Acropora	1	*Sinularia*
2	*Millipora*	2	*Sarcophytum*
3	*Porites*	3	*Lobophytum*
4	*Pocillipora*	4	*Xenia*
5	*Turbinaria*	5	
6	*Montipora*	6	
7	*Favites*	7	
8	*Fungia*	8	
9	*Dendrophilia*	9	
10			

SUBSTRATE % COVER (2mX2m quadrant at 4 m depth)

Category/Quadrants	1	2	3	4	5	6	7	8	9
Hard Corals	65	40	65	35	45	55	75	55	--
Soft Corals	15	0	0	20	10	10	5	10	--
Sponge	0	0	0	0	0	0	0	0	--
Rock	10	45	25	35	45	30	15	25	--
Rubbles	5	5	0	0	0	0	5	0	--
Dead Corals	10	10	10	10	0	5	5	10	--
Sand	0	0	0	0	0	0	0	0	--
Algae > 1 cm height	0	0	0	0	0	0	0	0	--
Total (≈ 100%)									
Hard Corals w/Disease	0	0	0	0	0	0	0	0	--
Hard Corals W/Bleaching	0	0	0	0	0	0	0	0	--

Other groups
Echinodermata
Echinus (*Echinothrix diadema*)
Mollusca
Bivalvia (*Tridacna spp*)
Sea anemone *Entacmae quadricolor*

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ANNEX 8:

Crown-of-Thorns Starfish Control Program Reports

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➢ ITEM 1 Preface

The following items are the compiled, unaltered reports created by the EEAA Rangers and the PMG staff during the project relating to the Crown-of-Thorns Starfish Congregations in the Red Sea in 1998 and 1999

➢ ITEM 2 Overview Informational Sheet Drafted by Tighe and Afifi for General Response to Inquires July 1999

Crown-Of-Thorns Starfish Infestations A Management Issue

What is an Outbreak? Simply defined, an outbreak is an unusually large number of animals in a small space Since 1 to approximately 10-15 animals per hectare (100m x 100m area) is normal an outbreak would constitute more than 25 or so animals per hectare Over large areas of reef, an outbreak could consist of thousands, or tens of thousands of animals that cause high coral mortality within isolated areas They are classified as **Incipient Outbreaks** (high number of juveniles likely to reach maturity in 1-2 years) **Spot Outbreaks** (high densities of starfish in a few areas of the site, but nothing elsewhere) and **Active Outbreaks** (More than 30 starfish/hectare over large areas of the reef) Although visually alarming, the most significant impact seems to be in the minds and exaggerated reports of divers who state the reef is 'finished' Most reports have been due to a small amount of coral bleaching, coral disease a white encrusting sponge, or a spot outbreak at a favorite place A real outbreak is very dramatic

Are COTS Outbreaks Normal? They are natural phenomena, similar to smaller-scale pattern of other echinoderms (Black Urchin outbreaks in Caribbean) They have been reported for more than 50 years and occur world-wide (Indio-Pacific) There are more than 26 countries reporting them last year some with mild infestations some severe Even the international center for COTS studies in Australia, admit that there is insufficient scientific information to answer many of the questions reef managers are asking. Is this a natural part of the reef's cycle? How often do outbreaks occur? Are these numbers normal or something to worry about? Are the infestations a result of some man-made impact or a global climate change? Does removing the starfish from the reef help the situation, harm some ecological process or have any impact at all? How much effort should go into removing the starfish from the reefs?

What Causes an Outbreak? Outbreaks are either **Primary or Secondary Primary Outbreaks** that are due to some combination of biological and physical factors that permit the animals to spawn successfully and survive through their first year **Secondary Outbreaks** are caused by infestations of new larvae/recruits from the spawning of starfish at nearby infected reefs

- Biological factors Egg and Sperm finding each other Number and effectiveness of predators (either of the larvae or of the juveniles no difference seen regarding removal of the few adult predators) Amount of algae in water during larval stages (can depend on algal blooms, runoff), Whether the larvae lands on a reef with the right kinds of corals for survival Whether there are lots of other COTS or a few for competition for food during years 2-5
- Physical Factors The currents and the temperature of the water The types of reef-bottom available for hiding in the first 1-2 years Floods (?)
- Human Factors Overfishing (fish and mollusks—5-20 snapper per 100m of reef-front), Bad Fishing Practices (dynamiting) runoff of nutrients (less in Arabia than elsewhere) from sewage Global Warming? NOTHING HAS BEEN PROVEN!

What is the Life-Cycle of a Crown-of-Thorns Starfish? Mature starfish release eggs and sperm into the water column (called spawning) a) when they are stressed, b) when they detect another starfish near them spawning, c) during the warmest months of the year

- Day 1 Egg and Sperm join, and within 1 day a small larvae is hatched that lives in the water-column. It eats tiny single-celled algae and changes larval form a few times It is a food source for larval fish and other plankton eaters. It can not swim, but moves with the currents.
- 3 Weeks The larvae settles' onto a reef and looks for a place to transform into a starfish (takes 1-2 days) Likes rubble coraline algae and crevices Have been known to settle on reef tops but others

must settle near reef base because they often start an infestation by rising from the deeper parts of the reef

- 3 weeks to 6 months From 2-10 mm in size the starfish has 5 arms, toxins but no spines Toxin is a Saponin (a detergent-like substance) that tastes terrible and causes irritation to wounds but is not poisonous to fish. Small COTS hide in the coral rubble (hard to find) Eats coraline (hard, encrusting) algae Is eaten by Triton Trumpets, Wrasses Snappers, Shrimps, and other animals Few like it, but will eat them if they encounter them.
- 1 year old 5cm in size Has spines and has begun eating coral (near the bottom of branching corals), grows more arms Still hidden from view from predator fish during the day Prefers branching corals with few crabs or shrimps Like most starfish, can go 9 months without eating.
- Does not travel far or fast from original place it settled (a couple of hundred meters?) A disease was seen to wipe-out 90% of the juvenile population in a few weeks on a reef in Fiji Hard animals to find or study
- 2 years old. 20 cm in diameter Just became sexually mature, but has relatively low number of eggs released each time Predators include Triton Trumpets, some triggerfish, wrasses, snappers, pufferfish, but experiments show that COTS is **NOT** a preferred food for most. Lives on the deeper reef during the winter rises to reeftop in the summer Lives under the tabletop corals it prefers (rather than slow-growing head corals) while feeding. It can detect the presence of other COTS through chemoreception and so tries to get together for spawning. Can die due to starvation (competition—to many starfish) or injury or possibly disease Spends most of its energy for spawning, balance to store as energy until next year
- 3 years old. 30 cm in diameter or more Peak sexual maturity (can release 10s of millions of eggs per spawning) Can consume 5-13 square meters of coral per year per animal In Guam over 90% of the fringing reef was destroyed at a rate of 1 kilometer per month in 1969
- 5 years old. Stops growing at 30-40 cm, and probably stops spawning. Still migrates and eats as usual.
- 8 years old. They are usually dead, although there are records of some that are 10-12 years old. (Age is determined by the rings on the spines) When they die (injury, starvation, disease) it usually takes 4-5 days for them to rot away No case of massive numbers of rotting animals has been noted. Largest animals seen are about 70 cm diameter

How Long to Outbreaks Last? They can last 1-2 years, through 4-5 years There are a couple of bad cases (Japan, Australia) where they have lasted for 20 years Some of this longer period is probably due to Secondary Infestations and unsuccessful control measures Australia sees a 10-12 year cycle of infestations that is repeated. Research is too young to understand the parameters.

Does the Coral Recover? Although COTS can damage widespread areas, the damage is usually patchy, with healthy corals next to a totally consumed, very white coral For instance, on one of the worst infested reefs in the Hurghada area, less than 10% of the reef of approximately 60 000square meters had any signs of the starfish or any damage done by them. In the area where their presence was obvious far less than 50% of the reef was impacted after even one month's time of their presence Large aggregations of COTS may eat most of the hard corals on a local reef, although remnants often remain which can regenerate and after coral spawning in the fall, other corals can start to recolonize the reef along with algae, sponges and burrowing worms Within 10-20 years reefs can have good coral cover again, although mostly of the faster-growing branching corals species Some scientists believe that the COTS infestations allow the reefs to increase their diversity, give head corals a chance to grow, and are a good, healthy part of reef success Some reefs that were affected by COTS twenty years ago are now major tourist attractions

How Should We Manage COTS Outbreaks? Since COTS are not a pest introduced to the environment, most reef managers have a policy of not interfering in the natural process Numerous studies have shown that it is not practical, nor desirable to remove ALL of the COTS from the reefs particularly in large reef areas like the Great Barrier Reef and the Red Sea. ***Because of the uncertainty about the possible role of human activities, controls of the population of COTS are limited to areas that are important to research or tourism*** Selective cleaning is too small to really alter the natural process (Mother Nature will always win!) But improper management can make the problem worse (If you take half the starfish away from an infested reef the rest of the COTS will have plenty of food to survive another year!! And to make

➢ ITEM 1. Preface

The following items are the compiled, unaltered reports created by the EEAA Rangers and the PMG staff during the project relating to the Crown-of-Thorns Starfish Congregations in the Red Sea in 1998 and 1999

➢ ITEM 2 Overview Informational Sheet Drafted by Tighe and Afifi for General Response to Inquires July 1999

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lots of eggs to spawn!!) It is important, however to survey and monitor the outbreaks scientifically when and where feasible and to clear small areas that are of high economic value Various types of controls have been used over the years each has its good and bad points ALL require a long-term commitment (more than 1 year)

- Removal and Burial On-Shore Labor-intensive but inexpensive Beware of stressing (injuring) the starfish so that it releases its eggs/sperm. Don t cause more coral-loss through breakage than the COTS through eating!
- Injection with Poison (Sodium Bisulphate) Has been done successfully Is faster, reduces injuries to humans. But requires training, and money ($70/unit) DON'T EXPERIMENT WITH YOUR OWN POISONS You could do more damage to reef than the COTS!
- Build Underwater Fences Requires lots of money, is ugly, and does not stop recruitment of the juveniles
- Cut Them Up Labor intensive, and causes injuries to divers Leaves the biomass on the reef for the ecosystem, though.
- Pay a Bounty for Them. Requires money verification and payment systems It instills no sense of stewardship of the reef It will cause the collection of animals from dense areas (even if not important to diving industry) but will not removal them all from a site because it is no longer cost-effective, which can make the problem linger
- Other Methods Many have been suggested, most are ecologically unfeasible A few include Remove the corals that the COTS like to eat so they will starve Release a poison when and where the eggs and sperm are released. Collect the eggs and sperm from spawning. Stop all fishing on predators Stop dynamiting of reefs

The best management practices could include using the people who care and those who are most affected (called stakeholders), to contribute what resources they have (time money, a boat, food) to a focussed control program that is scientifically adequate to solve the crisis but not damage the environment. The marine scientists and coral reef managers around the world are sharing information to study these outbreaks and to locate them early

Dos

- Do survey the areas and decide which reefs are important to save
- Do use information and the support of the stakeholders at all stages of the process
- Do assign small areas of high economic or scientific value to be cleared by stakeholders who promise to commit one year or more to the effort
- Do use a method of control that fits the size of the problem and the kind of resources you have available
- Do require repeated visits to the sites for clearing
- Do collect information on the amount of effort, size and locations of the controls for study
- Do exchange information with other countries etc
- Do recognize those who participate and those who do a good job

DON'Ts

- Don t try to hide the situation or let the media make it into a monster if it is not
- Don t try to save reefs that are already too-far gone or are of low value
- Don't ask or tell people who don t have a stake in the solution to help
- Don t make the job too big for a single stakeholder to handle

COTS IN THE RED SEA

Since early 1998 there has been a very noticeable increase in the numbers of the coral-eating Crown-of-Thorns Starfish (COTS) in the Red Sea. Localized infestations or outbreaks have been noted in at least 5-10 dive sites along the Hurghada-Marsa Alam reefs and several other sites have been reported in the Gulf of Aqaba. Their presence in large numbers has alarmed the recreational divers and is seen as a threat to the

dive industry if international tourist think the reefs are damaged, regardless of whether the damage is significant or not The work in the Hurghada area is the first ever on record to survey control or monitor COTS in the region.

Our view, in summary is that the Crown-of-Thorns Starfish outbreak is an interesting phenomenon that should be monitored. Some focussed cleaning efforts on favorite and economically valuable dive sites is worth the effort to involve and protect the industry and to promote awareness of the environment to visiting divers This effort should be shared by the stakeholders in the dive industry who want to protect the cosmetic value of dive sites for their guests and to protect the image of quality diving in the Red Sea. The research and monitoring efforts of the infested sites within the Protectorate should be executed by the EEAA staff and their supporting international projects, in collaboration with interested academic researchers and reported to the international COTS research institute in Australia. A broad-based, well-organized public information campaign could have been (and still can be) implemented to calm the worries of potential visiting divers and the dive industry, and to promote awareness and participation in the marine environment and its management.

The assistance and cooperation of the dive centers, investors and public are welcomed in this effort, indeed, it is their interests which are served most by any efforts in this regard. The goals of the EEAA and those who care about the health of the reefs should be

- To monitor the reefs, both before during and after outbreaks occur to learn of any local patterns
- To reduce the damage done to the reefs at economically critical areas by collecting and destroying, if possible before they spawn, COTS that are congregating in large numbers
- To leave 'normal' populations of COTS on the reefs for a balanced ecosystem
- To use the data collected to better understand the patterns and cycles of the COTS for improved management of the marine ecosystems and coral reefs

1998 COTS CONTROL PROGRAM IN THE RED SEA

- 20 dive sites were surveyed in Hurghada, Safaga and the south
- Over 7500 COTS were collected from 10 infested sites (Hurghada Carless Reef Shabrour Um Gamar, Abu Makagdig, Southern Area. Erg Monika, Erg Malek, Torfa Tany, Abu Dabab 1, 2, and 6, Shaab Naba) Several other sites have had COTS present, but not in the large densities that are considered an infestation. There are still a few safari sites in the south that have not yet been surveyed due to lack of resources
- 21 dive centers, one private party HEPCA and EEAA contributed boats and divers
- There were more than 40 days of surveying and collection
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1999 Red Sea COTS Control Program

Expedition	# Boats/ # Total Divers	# Animals Collected	Dive Sites Cleaned	Contributors
Survey Safari 1 (June)	1 Boat/ 12 Divers	2280	Al Asel Makek (Some) Abu Dabab (Some) Marsa Alam (Some) Neckarie (Some) Ghadera (Done) Wadi Gemel Is (Done)	EEAA Rangers (6) USAID/EST (1) NIOF (3) Volunteers (2)
Expedition	**# Boats/ # Total Divers**	**# Animals Collected**	**Dive Sites Cleaned**	**Contributors**
Safari 2 (July 10-16)	2 Boats/ 23 Divers	6548	Neckarie (Done) Abu Dabab (Some) Erg Lassel (Done) Malek (Done)	EEAA Rangers (6) Nautilus DC (9) Easy Diver DC (2) USAID (1) Seahorse DC (1) Divers Int I (1) Master DC (1) VIP DC (1) Sinegra (?) DC (1)
Safari 3 (July 18-24)	1 Boat/ 14 Divers	??	Abu Dabab Marsa Alam	EEAA Rangers (3) Nautilus DC Divers Int I
Safari 4 (July26-Aug 1)	1 Boat/ ?? Divers	??	Abu Nuhas ?	3 EEAA Rangers ??

(Note This presentation was given before the last safaris had returned, so blanks were left in the distributed papers)

ITEM 3 November 26, 1998, Townsville Australia Conference Statement of COTS

ITMEMS' Statement on the Crown-of-Thorn Starfish (COTS) Issue

At the International Tropical Marine Ecosystems Management Symposium (ITMEMS), a meeting of over 200 marine managers and scientists, management options with regard to the Crown-of-Thorns Starfish issue were reviewed. The following states the conclusions and recommendations for the management of the COTS

Acanthaster planci is a naturally occurring reef inhabitant. Over the last two years (1996-8), 26 Indo-Pacific nations have reported some level of COTS outbreak. Understanding the causes of the periodic outbreaks of COTS is critical to the effective management of the reef ecosystems. To date, scientific studies into the most commonly suggested possible causes of the outbreaks have been unable to produce adequate evidence implicating human activities in this periodic phenomenon. A precautionary approach involving strategically directed monitoring, research and management activities is required to ensure that any possible long term deleterious effects of COTS outbreaks (should they occur) can be identified and appropriate responses be initiated. Currently, the recommended policy with regard to COTS outbreaks is not to interfere with starfish populations on a large scale unless it can be shown that outbreaks are caused or exacerbated by human activity. In the absence of adequate proof to establish the suggested causal links there is no justification for attempting large-scale controls of what could be an entirely natural cycle. The current recommended policy on controls of *Acanthaster planci* is that

- Local-scale controls of COTS may be permitted in areas important to tourism or science. Such controls by any method must be consistent with management plans of the relevant environmental authority and must be approved by them.

- Local-scale controls using injection of toxic substances have been shown to be effective in protecting small areas of reef. Recent research has identified sodium bisulphate or 'Dry Acid' (a common swimming pool additive) as an effective and environmentally acceptable agent for locally controlling COTS. The compound is biodegradable and does not affect other reef biota. The injection technique is currently being used on numerous reefs worldwide, including in the Great Barrier Reef. The Great Barrier Reef Marine Park Authority and the CRC Reef Research Center are the center for information exchange on this issue

- If the injection tools or materials are not available to managers the preferred alternative method of control is to physically remove the entire animal from affected reefs and dispose of them properly on land.

- There are potentially high risks associated with certain control measures. Therefore, research or implementation using untried biological and chemical controls of crown-of-thorns starfish should not be supported other than in identifying potential agents whose application is consistent with the policy above

- Sufficient effort should be committed to ensure that the controls are effective in reducing COTS populations to sustainable densities. Incomplete efforts may result in prolonged infestations with subsequent greater loss of coral cover

- In the event a causal relationship between human activity and crown-of-thorns starfish outbreaks is established, the management authorities should use all their power and influence to regulate that activity. The goal should be minimizing the activity s effects on crown-of-thorns starfish populations and the ecological effects of outbreaks

Both ongoing monitoring and targeted research into the causes of outbreaks are essential for providing the necessary short and long-term information upon which effective management can be based. Management and research results should be increasingly shared among the international reef community through

1999 Red Sea COTS Control Program

Expedition	# Boats/ # Total Divers	# Animals Collected	Dive Sites Cleaned	Contributors
Survey Safari 1 (June)	1 Boat/ 12 Divers	2280	Al Asel Makek (Some) Abu Dabab (Some) Marsa Alam (Some) Neckarie (Some) Ghadera (Done) Wadi Gemel Is (Done)	EEAA Rangers (6) USAID/EST (1) NIOF (3) Volunteers (2)
Expedition	**# Boats/ # Total Divers**	**# Animals Collected**	**Dive Sites Cleaned**	**Contributors**
Safari 2 (July 10-16)	2 Boats/ 23 Divers	6548	Neckarie (Done) Abu Dabab (Some) Erg Lassel (Done) Malek (Done)	EEAA Rangers (6) Nautilus DC (9) Easy Diver DC (2) USAID (1) Seahorse DC (1) Divers Int l (1) Master DC (1) VIP DC (1) Sinegra (?) DC (1)
Safari 3 (July 18-24)	1 Boat/ 14 Divers	??	Abu Dabab Marsa Alam	EEAA Rangers (3) Nautilus DC Divers Int'l
Safari 4 (July26-Aug 1)	1 Boat/ ?? Divers	??	Abu Nuhas ?	3 EEAA Rangers ??

(Note This presentation was given before the last safaris had returned, so blanks were left in the distributed papers)

ITEM 3 November 26, 1998, Townsville Australia Conference Statement of COTS

ITMEMS Statement on the Crown-of-Thorn Starfish (COTS) Issue

At the International Tropical Marine Ecosystems Management Symposium (ITMEMS), a meeting of over 200 marine managers and scientists, management options with regard to the Crown-of-Thorns Starfish issue were reviewed. The following states the conclusions and recommendations for the management of the COTS

Acanthaster planci is a naturally occurring reef inhabitant. Over the last two years (1996-8), 26 Indo-Pacific nations have reported some level of COTS outbreak. Understanding the causes of the periodic outbreaks of COTS is critical to the effective management of the reef ecosystems To date, scientific studies into the most commonly suggested possible causes of the outbreaks have been unable to produce adequate evidence implicating human activities in this periodic phenomenon. A precautionary approach involving strategically directed monitoring, research and management activities is required to ensure that any possible long term deleterious effects of COTS outbreaks (should they occur) can be identified and appropriate responses be initiated. Currently, the recommended policy with regard to COTS outbreaks is not to interfere with starfish populations on a large scale unless it can be shown that outbreaks are caused or exacerbated by human activity In the absence of adequate proof to establish the suggested causal links there is no justification for attempting large-scale controls of what could be an entirely natural cycle The current recommended policy on controls of *Acanthaster planci* is that

- Local-scale controls of COTS may be permitted in areas important to tourism or science Such controls by any method must be consistent with management plans of the relevant environmental authority and must be approved by them.

- Local-scale controls using injection of toxic substances have been shown to be effective in protecting small areas of reef Recent research has identified sodium bisulphate or 'Dry Acid' (a common swimming pool additive) as an effective and environmentally acceptable agent for locally controlling COTS The compound is biodegradable and does not affect other reef biota. The injection technique is currently being used on numerous reefs worldwide, including in the Great Barrier Reef. The Great Barrier Reef Marine Park Authority and the CRC Reef Research Center are the center for information exchange on this issue

- If the injection tools or materials are not available to managers, the preferred alternative method of control is to physically remove the entire animal from affected reefs and dispose of them properly on land.

- There are potentially high risks associated with certain control measures Therefore, research or implementation using untried biological and chemical controls of crown-of-thorns starfish should not be supported other than in identifying potential agents whose application is consistent with the policy above

- Sufficient effort should be committed to ensure that the controls are effective in reducing COTS populations to sustainable densities Incomplete efforts may result in prolonged infestations with subsequent greater loss of coral cover

- In the event a causal relationship between human activity and crown-of-thorns starfish outbreaks is established, the management authorities should use all their power and influence to regulate that activity The goal should be minimizing the activity s effects on crown-of-thorns starfish populations and the ecological effects of outbreaks

Both ongoing monitoring and targeted research into the causes of outbreaks are essential for providing the necessary short and long-term information upon which effective management can be based. Management and research results should be increasingly shared among the international reef community through

existing organizations and networks These efforts will aid management and understanding of this critical global phenomenon.

In the absence of satisfactory evidence implicating human activities in the causation of starfish outbreaks this consensual policy of limited intervention remains a logical and realistic approach to managing this issue

ITEM 4 Submitted and Presented Report on 1998 COTS Program Status Tighe/Afifi Joint Effort

CROWN OF THORNS STARFISH PROGRAM SUMMARY
As of September 30, 1998
Hurghada-Quseir Regions

SUMMARY

This summer there has been a very noticeable increase in the numbers of the coral-eating Crown-of-Thorns Starfish (COTS) in the Red Sea. While small numbers of COTS are normal and can be found at any time along many Red Sea reefs and throughout the global tropical areas, large concentrations of COTS usually occurring during their spawning season can badly damage areas of the reef Since COTS are not a pest introduced to the environment, most reef managers have a policy of not interfering in the natural process Numerous studies have shown that it is not practical, nor desirable to remove ALL of the COTS from the reefs, particularly in large reef areas like the Great Barrier Reef and the Red Sea. It is important, however, to survey and monitor the outbreaks scientifically when and where feasible, and to clear small areas that are of high economic value

Localized infestations or outbreaks have been verified in at least 9 dive sites along the Hurghada-Marsa Alam. When detailed reports of the number and occurrence were received, an EEAA team went to the site to verify and locate the outbreaks, (sometimes with USAID-sponsored EST Project staff support) As the on-going operation was seen to need more assistance from the community, a COTS Coordinating Committee was established at the request of the Red Sea Governor with the operational lead still remaining with the EEAA Rangers

Between July and Sept 30th,

- 20 dive sites have been surveyed in Hurghada, Safaga and the south (See Table 1 Attached)
- Over 7500 COTS have been collected from 10 infested sites (Hurghada. Carless Reef Shabrour Um Gamar Abu Makagdig; Southern Area. Erg Monika, Erg Malek, Torfa Tany, Abu Dabab 1 2 and 6 Shaab Naba) Several other sites have had COTS present, but not in the large densities that are considered an infestation. There are still a few safari sites in the south that have not yet been surveyed due to lack of resources
- 21 dive centers, one private party, HEPCA and EEAA have contributed boats and divers
- There have been more than 40 days of surveying and collection
- Over 100 different divers have volunteered and participated, as well as 6 EEAA Rangers 4 HEPCA divers and 2 USAID/EST staff members

Currently, the collections at the 2 Hurghada major sites are on going, and a minor site in Abu Makadig has been identified and cleaned. All the areas are being re-visited to check for recurrent infestations (the animals seem to prefer a few specific reefs to gather) One to two dives are now departing each week to continue the program in Hurghada and Safaga, depending on weather and boat availability, and we are preparing another safari trip in the south as well The contribution and cooperation of the community despite the limitations of word-of-mouth and the lack of available resources at this peak part of the season, has been responsive and supportive

On July 12 1998 the first collection dives were made and a general plan including the dive centers and HEPCA was developed. Dive centers would be requested to provide boats experienced divers and tanks for the collection. HEPCA would provide the collecting tools, the collecting bags, and occasionally divers and their boat. EEAA Rangers would provide the leadership and scientific program, supported by the EST project. The COTS Coordinating Committee, chaired by a member of the Red Sea Investors includes representatives from EEAA Protectorate Rangers, HEPCA, NIOF, the Governorate and several dive centers. This Committee selected individual dive centers to coordinate the contribution of the volunteers and dive centers in 4 different areas along the coast to liaison with the EEAA operational center and continues to meet every few weeks to consider the status of the problem.

An analysis of the magnitude of the areas affected along the Red Sea coast indicates that only 2 sites out of almost 50 in Hurghada/Safaga are affected, totaling less than 1% of the reefs None of these are the most popular economically-important dive sites Other areas (the south, the Gulf of Aqaba) are seeing similar focussed but low levels of COTS infestations A few critical areas have been identified and are being dealt

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with at the appropriate level of effort. The infestation does not appear to be spreading, and the primary spawning season (summer) is winding down, which will hopefully reduce the problem further Continued cooperation between the EEAA, dive centers HEPCA and others are welcomed until the COTS control program is completed. General summary lists and statistics follow

TABLE 1 Dive Sites Reported to Have COTS Infestations

LOCATION of Report	SURVEYED?	INFESTED?	ACTION/COMMENTS
Hurghada			
Shabrour Um Gamar	Yes	Yes	Repeated Cleaning 2552 (29 Sept)
Carless	Yes	Yes	Repeated Cleaning 2076 (30 Sept)
Abu Nugar	Yes	No	Checked in July
Umm Gamar North	Yes	No	Checked in July
Erg Sabina	Yes	No	Checked in July
Abu Galawa North	Yes	No	Checked in July
Fanous	Yes	No	Checked in Aug and Sept
Abu Makagdig	Yes	Moderate	Single Cleaning 151 (19 Sept)
Abu Hashish	Yes	No	Checked in July & September
Safaga			
Tobia Sahir	Yes	No	7 collected in Sept
Gamul Saghir	Yes	No	16 collected in Sept
Southern Areas			
Erg Monica	Yes	Yes	~800 (Sept 30)
Erg Lassal	Yes	No	Checked in August
Erg Malek	Yes	Moderate	229 cleaned in Aug, recheck soon
Torfa Tany	Yes	Moderate	340 (Sept 13)
Abu Dabbab 1 2 6	Yes	Yes	~1900,Repeated cleanings,Sept 30
Elephinstone	Yes	No	Checked in Sept
Shaab Naba	Yes	Moderate	120 (Sept 15)
4 Other offshore Sites	No	?	Survey planned for Nov after High Season (safari boats not available)

COLLECTION AND SURVEY STATISTICS (complete as of Sept 30)

	Hurghada/Safaga	Southern Area	Total
Number of Collection Sites	5	7	12
Number of Dive Centers Assisting	17	5	21 (1 Duplicate)
Number of Dive Days	25	19	44
Number of Group Survey & Collection Dives Made	48	23	71
Number of Individual Dives Made			367
Number of Dif Volunteer- Divers			100
Number of COTS Collected	4802	2741	7543

COLLECTION SITE STATISTICS

COLLECTION SITE	# Group Dives	# Individual Dives	# COTS Collected	# COTS/Indiv Dive Effort
HURGHADA				
Carless Reef	17	131	2076	15 8
Shabrour Um Gamar	19	118	2552	21 6
Abu Makagdig	3	12	151	12 5
SAFAGA				
Tobia Saghir	1	4	7	1 7
Gamul Saghir	1	4	16	4 0

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COLLECTION SITE	# Group Dives	# Individual Dives	# COTS Collected	# COTS/Indiv Dive Effort
SOUTHERN AREAS				
Abu Dabab 1.2 6	~12	~100	1422	14 2
Erg Malek	2	4	229	57 3
Erg Monika	~8	28	750	26 8
Torfa Tany	~4	6	340	56 7
TOTALS	**67**	**407**	**7543**	**1 7 - 57.3**

October COTS collections as of the 15th include 3 days of effort and 500 animals from Hurghada.

CONTRIBUTING DIVE CENTER (as of Sept 24, 1998)	# Days of Boat Time	# Dives From Their Volunteers
HURGHADA/SAFAGA		
Arrabia	1	0
Barakuda (Marriott)	1	0
Coral Beach	0	2
Divers International (Hilton Plaza)	0	31
Divers Lodge (Hurghada & El Gouna)	3	4
Easy Divers	2	14
Emperor Divers	1	28
Extra Diver	0	8
Golden Turtle	1	10
Menaville	1	2
Orca Dive Center	1	4
Paradise	3	7
Pirates Club	1	0
Sea Horse	0	9
Sub-Aqua Club	1	6
Subex	1	2
The Pro	0	2
Free-Lancers	1	31
NIOF	0	8
Sub-Total	**18**	**168**
SOUTHERN AREA		
Ducks Dive Center	Shared	
Hermes	Shared	
Nautilus DC (from Cairo)	0	~30
Sub-Aqua Dive Center	Shared	
Red Sea Diving Safari	Shared	
Sub-Total	**~14**	**145**
TOTAL	**32**	**313**

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Paradise	3	7
Pirates Club	1	0
Sea Horse	0	9
Sub-Aqua Club	1	6
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TOTAL	**32**	**313**

ITEM 5A Field Reports from the Rangers Work in 1999, Translated but unedited.

Report on
Escorting the South Safari with the EEAA Scientific Team
June 18-30, 99

Safari goals
To survey the confined coastal areas between Halayeb and Shalateen to see the coral reef and the general system of environment extended, as well as locate the COTS at these areas

Safari members
The researching team of Suez Canal University and Al Azhar University escorted by a ranger of EEAA

Safari duration
June 18-30 1999

Areas surveyed.
Areas have been located by GPS
There were stops at every 10km along the mentioned coastal area.
The confined area between Halayeb and Shalateen including marinas and bays is about 140km.
The near islands facing along the coast (Syal – Rowabil – Debia – Makowa)

Observations and survey results
All surveyed areas have a variety of coral species in excellent conditions
There was nothing refers to an increase of COTS numbers Very few of COTS have been found in certain areas that cause no problem at all. Scars were rarely found.
A lot of COTS natural enemies (Puffer fish, Trigger fish, Gastropods) are found in these areas
Some of the islands surveyed is considered a shelter for variety of birds marine life wild (seagull – Falcon) and turtles
Some marinas have Mangrove This area is one of the most important Mangrove areas along the coast (Marsa Shab – Sharm Abu Madfa)

P S attached please find a list of the stops locations

Escort
Yasser Saied
Red Sea National Park, Hurghada

Area	*GPS*	
Abu Ramad Coast	22 20 52 N	36 28 01 E
Eroug Debia	22 23 27 N	36 29 38 E
The coast in front of Rowabil island	22 34 11 N	36 17 33 E
Syal Island	22 47 14 N	36 14 58 E
Syal Island	22 45 56 N	36 04 16 E
Abu Ramad coast –Shalateen	22 47 18 N	36 04 17 E
Gotta Abu La'af	22 45 56 N	36 04 17 E
Marsa Shab	22 51 04 N	35 47 30 E
Marsa Abu Madfa	22 57 47 N	35 41 07 E
Shaab Maria Island	23 06 43 N	35 40 53 E
Shaab Maria Island	23 05 44 N	35 39 25 E
Shaab Maria Island	23 09 00 N	35 48 26 E
Makowa island (Semaka)	23 49 46 N	35 48 37 E

ITEM 5B Field Reports from the Rangers Work in 1999, Translated but unedited

Report on
Red Sea Survey South Safari to
Identify the Locations of the Effected Areas of COTS
June 23-26 99

Introduction

As per red Sea governor the safari started on Wednesday 23/6/99 at 1 00 PM toward the south area of the Red Sea. The safari took off from Hilton Plaza.

Safari goals

1 Survey a number of dive sites in south Qusier and Marsa Alam that some dive centers and safari boats reported that COTS effected these sites
2 Zone the existing of COTS in every site
3 Numbers and density of COTS in every site
4 Expected future status for each effected area
5 Coral reef condition in each effected area
6 Suggestions and recommendations to remain the natural treasures

Members of the safari

1	Biologist Essam Saad El Din	Aqaba Gulf National Park.
2	Geologist Ayman Afifi	Red Sea National Park.
3	Biologist Abdalla Eliwa	Red sea National Park
4	Biologist Yasser Awadalla	Aqaba Gulf National Park.
5	Biologist Ali Sallam	Red sea National Park
6	Biologist Yasser Sadek	Aqaba Gulf National Park.
7	Skipper Salah Soliman	Red sea National Park
8	Dr Saber Abdel Reahman	NIOF
9	Dr Mohamed Abdel Wahab	NIOF
10	Dr Hesham Abbass Madkour	NIOF
11	Mr Mohamed Habib	EUSF
12	Mr Samih Wahba	Volunteer Diver

Essam Saadalla, Abdalla Eliwa Dr Mohamed Abdel Wahab and Dr Hesham Abbass have been appointed for doing the required survey, collecting information, underwater photography & video The other people have been appointed for collecting

12 dive sites have been surveyed.

1	Lassal	2	Erg Malek
3	Abu Dabbab 1 2,3	4	Abu Dabbab El Nabie
5	Eroug Marsa Alam	6	Shaab Nakari
7	El Ghadira	8	El Ghadira
9	Um Helhela	10	Abu Dabbab 6
11	Wadi El Gimal	12	Wadi El Gemal Umm Helhela

The result of the survey was as follows

1 Shaab Lassal has very high density of the animal up to 700 animal/hectare (1 hectare = 10000 sqrm.) and the percentage of destroyed coral reef is very high at 17-25 m depth. The animal goes toward the shallow ergs 331 animals have been collected in one dive by 8 divers (the average is 45 minutes/diver)
2 The density of the animal at Shaab Nakari is up to 750 animal/hectare distributed on different depth (5-30 m) and high percentage of the animal was concentrated at the western side 1150 have been collected in 3 dives

ITEM 5A Field Reports from the Rangers Work in 1999, Translated but unedited.

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Escorting the South Safari with the EEAA Scientific Team
June 18-30, 99

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Identify the Locations of the Effected Areas of COTS
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12 dive sites have been surveyed.

1	Lassal	2	Erg Malek
3	Abu Dabbab 1 2,3	4	Abu Dabbab El Nabie
5	Eroug Marsa Alam	6	Shaab Nakari
7	El Ghadira	8	El Ghadira
9	Um Helhela	10	Abu Dabbab 6
11	Wadi El Gimal	12	Wadi El Gemal Umm Helhela

The result of the survey was as follows

1 Shaab Lassal has very high density of the animal up to 700 animal/hectare (1 hectare = 10000 sqrm.) and the percentage of destroyed coral reef is very high at 17-25 m depth. The animal goes toward the shallow ergs 331 animals have been collected in one dive by 8 divers (the average is 45 minutes/diver)
2 The density of the animal at Shaab Nakari is up to 750 animal/hectare distributed on different depth (5-30 m) and high percentage of the animal was concentrated at the western side 1150 have been collected in 3 dives

3 Eroug Marsa Alam. 360 animal/hectare distributed on all the eroug at 12-17 m depth.
4 Erg Malek. it is a coastal area has the animal up to 175 animal/hectare distributed on 8-15 m depth. The area from 6m depth is in a good condition.
5 Abu Dabbab 5 the animal is existed there in a very high density up to 200 animal/hectare The area from 10-25 m depth is 50% destroyed (old distortion by COTS) The animal started to go toward the shallow reef (5 m depth)
6 Abu Dabbab 2 3 there are destroyed areas especially at 10-27 m depth. The animal percentage is very low (probably the animal started attacking the other areas, as there are a number of eroug around)

Places was surveyed and no COTS appeared.

1 Wad ElGemal
2 Umm Helela
3 El Ghadir
4 Umm Helhela El Ghadir
5 Abu Dabbab El Nabie
6 Abu Dabbab 1

Recommendations

1 COTS is existed with a high density at Lassal – Nakari – Erg Malek – Eroug Marsa – Abu Dabbab
- The animals are getting ready to lay eggs in a month time
- The effected diving sites are considered as important diving sites in the Red Sea

2 We see to collect and inject the animal manually during the moth of July 1999 To go to these areas we need boats with 10-15 qualified divers in addition to some of EEAA people to work during one month in average 2-3 dives/daily
3 It is possible to control the situation.
4 Monitoring the coral reef every 6-12 months in regular basis providing the qualified persons and all needed facilities
5 Coordinating with the dive centers – as what happened in Sharm El Sheikh – to have positive participation with volunteers and equipment.

Member of the committee

1 Essam Saadalla
2 Ayman Afifi
3 Abdallah Eliwa
4 Yasser Awadalla
5 Ali Sallam
6 Yasser Sadek
7 Salah Soliman
8 Dr Naser Abdel Rahman
9 Dr Mohamed abdel Wahab
10 Dr Hesham Abbas
11 Mohamed Habib
12 Samih Wahba

ITEM 5C Field Reports from the Rangers Work in 1999, Translated but unedited

Report on
Red Sea Survey South Safari to
Control the COTS
July 10-16 99

Introduction

- As per the plan to control the COTS 2 safaris have gone toward Qusier and Marsa Alam on Saturday 10/7/99
- The 2 safaris left on the boats Karim 2 from Intercontinental Marina – and Conquest from Marriott Marina

Safari goals

7 Collecting the COTS from the effected areas (Lassal – Erg Malek – Shaab Abu Dabbab – Shaab Marsa Alam – Shaab Nakari)
8 Assessing the effected coral reef condition
9 The expected future condition of each effected area and working on a plan for it
10 Recommendations and suggestions to conserve the coral reef

Members of the safari on the boat Karim 2

13	Saied El Sayed	Red Sea National Park
14	Tamer Kamal El Din	Red Sea National Park
15	Mohamed Abdel Ghani	Red Sea National Park
16	Mohamed Habib	EST/EUSF
17	Omar El Bendary	Volunteer diver (Nautilus dive center - Cairo)
18	Motaz Ragab	Volunteer diver (Nautilus dive center - Cairo)
19	Mohamed Hosni	Volunteer diver (Nautilus dive center - Cairo)
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21	Ahmed Gaber	Volunteer diver (Masters dive center – Hurghada)
22	Hassaan Haroun	Volunteer diver (VIP dive center – Hurghada)
23	John francois	Volunteer diver (Divers International dive center – Hurghada)
24	Falk Herman	Volunteer diver (Sea Horse dive cente – Hurghada)

Sites surveyed

Lassal - Erg Malek - Abu Dabbab 3 4 5 6

The results of the survey was as follows

Site	Area (*1000 sqrm)	# of animals/hectare	# Collected	Site condition after the trip
Shaab Lassal (Erg Lassal – Eroug Monika)	18-20	450 550	927	The area is cleaned and empty of COTS up to 35 m depth and needs to be monitored
Shaab Malek (Sahili – Eroug)	30-40	220 150	608	The area is cleaned and empty of COTS and needs to be monitored
Shaab Abu Dabbab (3 4 5 6)	200-400	150 100	2001	The area is cleaned and empty of COTS and needs to be monitored
Total			3536	

3 Eroug Marsa Alam, 360 animal/hectare distributed on all the eroug at 12-17 m depth.
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Total			3536	

Problems faced the safari

One of the boat engines was broken which stopped us for one day
Food and drinking water were insufficient We finished with them on the fifth day of the safari
The zodiac was not suitable for south safari that made the divers feel insecure

Members of the safari on the boat Conquest

Hesham Mostafa	Red Sea National Park
Ali Sallam	Red Sea National Park
Mohamed Abbass	Red Sea National Park
Mohamed M El Kalaawi	Volunteer diver (Nautilus dive center - Cairo)
Omar M Nagi	Volunteer diver (Nautilus dive center Cairo)
Chad Hope	Volunteer diver (Nautilus dive center - Cairo)
Rafik El Nowir	Volunteer diver (Nautilus dive center - Cairo)
Ayman Nassar	Volunteer diver (Nautilus dive center - Cairo)
Mohamed Hassan	Volunteer diver (Nautilus dive center - Cairo)
Nil Folger	Volunteer diver (Easy divers dive center – Hurghada)
Steven Heart	Volunteer diver (Easy divers dive center – Hurghada)

Sites surveyed

Shaab Nakari – Shaab Marsa Alam - Abu Dabbab 7 El Nabie

The results of the survey was as follows

Site	Area (*1000 sqrm)	# of animals/hectare	# Collected	Site condition after the trip
Shaab Nakari	40-50	500	1486	The area is cleaned and empty of COTS up to 30 m depth and needs to be monitored
Shaab Marsa Alam (Gotta – Eroug)	150-160	650	1465	The percentage of affection is high in the shallow depth and needs manual collecting
Shaab Abu Dabbab 7 (El Nabie)	20-30	250	171	The percentage of affection is fair and needs manual collecting
Total			3122	

Recommendations

As a result of the surveying and collecting done during the 2 safaris it is suggested to send one boat only (with enough number of qualified volunteer) during this week to the areas of high percentage of affection (Shaab Marsa Alam – Abu Dabbab 7 El Nabie
About the areas cleaned up to 35m depth it is suggested to follow them up in regular basis It is better to have enough time-period for the animal to reach the shallow water to collect it because it is difficult to collect the animal in the deep water
About the areas completely cleaned follow up in regular basis
About the rest of the effected areas in Hurghada (Carlos reef – Shabrour Umm Gamar) and Safaga (Shaab Shahr) we rather cooperate with the dive centers in the region to have a team of volunteers and offer a boat escorted by a ranger to organize the collecting and assessing this areas
Northern areas reported (Shaab abu Nahas) might need a safari to collect the animals after finishing the current operations That trip will be arranged through the safari schedule

Thanks for your cooperation Red Sea National Park

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ITEM 5D Field Reports from the Rangers Work in 1999, Translated but unedited

Report on
South Safari to Control COTS
July 19-25, 99

As it was planned to control COTS, there was a safari to the south on 19/7/99
The safari was by the boat Conquest

Safari goals

1 Collecting COTS from the effected areas (Shaab Nakari – Shaab Marsa Alam – Erouk Marsa Alam – Shaab Abu Dabbab – Erouk El Nabie)
2 Coral reef survey in the effected areas
3 The expected condition for each area in future and work plan for the coming period
4 Having recommendations and suggestions to protect the coral reef

Safari members on conquest

Hesham Mostafa Mohamed	EEAA -Hurghada Sector
Mohamed abbass El Sayed	EEAA -Hurghada Sector
Saleh Soliman Mohamed	EEAA -Hurghada Sector
Ahmed Mohamed Abdel Monem	Volunteer – Nutelis Dive center - Cairo
Shadi Mohamed Alaa El Din	Volunteer – Nutelis Dive center - Cairo
Ashraf Sobhi Emam	Volunteer – Nutelis Dive center - Cairo
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Karim Magdi Khaled	Volunteer – Aquarius Dive center - Hurghada
Gaafar Mohamed El Reda	Volunteer – Hamada Dive center - Hurghada

Areas surveyed and cleaned
(Shaab Nakari – Shaab Marsa Alam – Erouk Marsa Alam – Erouk El Nabei – Shaab Abu Dabbab 1 2 3 4 5 6)

Safari result

Area	*Landscape (1000 sqm)*	*# collected*	*Area Condition after the safari*
Nakari	40 50	240	Completely cleaned till 35m depth
Marsa Alam	150-160	825	Completely cleaned till 35m depth
Erouk Marsa Alam	10 15	70	Completely cleaned till 35m depth
Erouk El Nabei	20 30	460	Completely cleaned till 35m depth
Abu Dabbab 1 2 3 4 5 6	300 400	844	Completely cleaned till 35m depth

Recommendations

1 Upon the results of the last 3 safaris all the areas were 90% cleaned
2 We suggest sending a boat in 2 months as of today for assessment and following up and we will decide if we need more safaris up on the result of this safari

Red Sea Park Rangers Hesham Mostafa

Problems faced the safari

One of the boat engines was broken which stopped us for one day
Food and drinking water were insufficient We finished with them on the fifth day of the safari
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Report on
COTS Status in the Red Sea Governorate
August 1999

Introduction
The increase of COTS numbers is considered an international natural phenomenon. COTS have been reported in more than 25 countries last year The normal # of the COTS is 15/hectare If it is more than 30/hectare so this is considered effected. COTS is considered one of the most invertebrate inhabit the coral reef Recently a lot of scientists national parks management and divers care about COTS as it causes environmental damages and effects the ecological systems Scientifically there is no explanation for COTS number increase They agreed that the increase is definitely related to natural factors caused by human interfering (fishing or organic pollution)

Subject
The recent status of COTS and the efforts achieved during the year of 1998-1999

Study
COTS control plan for the year 1998

1 In April 1998 the Red Sea national park was reported that big numbers of COTS animal have been noticed in Shabrour Umm Gamar and Carlos reef sites as well as in Abu Dabbab and Malek in the south. This was matching the time of COTS increase in Sharm El Sheikh.
2 Immediate situation was under control in two access
   - Report form was made as the one in the Great Barrier Reef in Australia and was distributed to the dive centers and safari boats to report the animal wherever it is.
   - A biological survey was made to locate the animal increase using international scientific ways
3 Reports have been made to the of the Red Sea Governor as well as Program Management unit – EEAA who decided collecting the animal.
4 Meetings with the dive centers were held under the Governor supervision to participate in COTS control.
5 8350 animal were collected from the effected areas – total of divers 145 and 336 dives in 35 working days

The work plan to control the COTS in 1999
The Red Sea was divided into 4 sectors
One) Hurghada and North
Two) Safaga
Three) Qusier Marsa Alam, Wadi El Gemal
Four) Ras Banas, Halayeb Shalatin.

90 dive sites were surveved in the Red Sea.
The COTS control was discussed in a conference on July 4 99 The conference recommended to send5 safaris to the effected areas in the south.

Control results
A) & b)Hurghada and Safaga

1 6 dive sites from 57 in Hurghada and Safaga sector are handled and cleaned as a result of the cooperation between the Red Sea governorate coast guard intelligence and 6 dive centers each dive center was responsible to clean one of the 6 sites

2 *The 6-dive site status is as follows*

No	Place	# of dives	# collected	Present status	Notes
1	Umm Gamar	20	350	Needs 2 trips to clean	
2	Shabrour Umm Gamar	25	400	Clean	
3	Carlos reef	15	225	Clean	
4	Abu Nahass	20	97	Clean	
5	El Shahr	20	40	Clean	
6	Abu Soma	50	790	Clean	

3 The mentioned dive sites have been visited and checked to make sure that it is clean except for Umm Gamar (needs a trip every 2 weeks with 10 divers)
4 The Red Sea rangers visit these dive sites once a month to check.

C) Qusier – Wadi El Gemal sector

This sector is the most effected one that made the Governor instructed the follows

1 Expedition trip to the effected areas from the period June 23 to 29 13 dive sites have been already surveyed, 5 of the m were effected and we cleaned it (3000 animals collected)
2 On July 10 there were 2 safaris to the effected areas for one week. 6658 animals were collected
3 There was another safari on July 19 for one week. 5239 animals were collected.
4 The sector is clean to 35m depth. Needs a check trip in September 99

D) Ras Banas – Shalatin Sector

1 This sector has been surveyed by the rangers cooperated by Suez Canal University on June 20 to 30 99
2 13 stations are taken included the coast and Halayeb and Shalatin Islands
3 Survey result insured that the sector is totally clean and there was no affection.

Recommendations

1 EEAA rangers survey the close sites to Hurghada using the Patrolling boat.
2 The EEAA rangers cooperate the coast guards intelligence and dive centers to survey the far sites from Hurghada and Safaga at once a month.
3 We suggest a safari to the south area from Qusier to Wadi El Gemal to check.
4 We suggest distributing the south 5 dive sites to 5 dive centers to visit them once a month and report to the EEAA.

Red Sea Protectorates
Geologist/Ayman Afifi

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Red Sea Protectorates
Geologist/Ayman Afifi

ANNEX 8B-1 1998 Red Sea Crown-of-Thorns Starfish Control Program
Monthly Summary

	#COTS Collected at Red Sea Sites				
DATE OF COTS TRIP	July	August	September	October	Total
Carless Reef	575	437	1064	0	2076
Shabrour Umm Gamar	2002	302	248	23	2575
Tobia Saghir	0	0	7	0	7
Gamul Saghir	0	0	16	0	16
Abu Makahdeg	0	0	151	0	151
Erq Monica	0	750	0	0	750
Erq Malek	0	229	0	0	229
Torfa Tany	0	0	340	0	340
Abu Dabab	0	1422	0	0	1422
TOTAL COLLECTED	**2577**	**3140**	**1826**	**23**	**7566**

	#COTS Measured at Red Sea Sites				
DATE OF COTS TRIP	July	August	September	October	Total
Careless Reef	71	375	414	0	860
Shabrour Umm Gamar	780	162	163	23	1128
Tobia Saghir	0	0	7	0	7
Gamul Saghir	0	0	16	0	16
Abu Makahdeg	0	0	91	0	91
Erq Monica	0	0	0	0	0
Erq Malek	0	0	0	0	0
Torfa Tany	0	0	0	0	0
Abu Dabab	0	0	0	0	0
TOTAL # of COTS MEASURED	**851**	**537**	**691**	**23**	**2102**

ANNEX 8B-1 1998 Red Sea Crown-of-Thorns Starfish Control Program
Monthly Summary

	# COTS Collection Dives by Red Sea Group				
DATE OF COTS TRIP	July	August	September	October	Total
#VOLUNTEERS Total Dives	76	119	46	1	242
# EEAA Total Dives	31	33	31	2	97
# EST Total Dives	14	7	10	0	31
TOTAL # of Dives ("Tanks")	**121**	**159**	**87**	**3**	**370**

	# of Individual Dives ("Tanks") per Dive Center				
DATE OF COTS TRIP	July	August	September	October	Total
Arabia	0	0	0	0	0
Barrakuda (Marriott)	0	0	0	0	0
Coral Beach	0	2	0	0	2
Divers International	28	1	4	0	33
Divers Lodge (Hurgh & El Gouna)	0	2	10	0	12
Easy Divers	5	9	0	0	14
Emperor	0	28	0	0	28
Golden Turtle	2	4	4	0	10
Orca	4	0	0	0	4
Pirates Club	0	0	0	0	0
Sea Horse	9	0	0	0	9
SubAqua Club	6	9	0	0	15
Subex	2	0	0	0	2
The Pro	2	0	0	0	2
Free-Lance	10	15	10	1	36
NIOF	8	0	0	0	8
EST	14	7	10	0	31
EEAA	31	33	31	2	97
Menaville	0	0	2	0	2
Paradise	0	0	10	0	10
HEPCA	0	0	4	0	4
Ducks	0	16	2	0	18
Nautilus	0	27	0	0	27
Hermis	0	6	0	0	6
Total # of "Tanks" per Month	**121**	**159**	**87**	**3**	**370**

Dive Centers with a 0 Total contributed a boat, not divers

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ANNEX 8B-1 1998 Red Sea Crown-of-Thorns Starfish Control Program
Monthly Summary

	#COTS Collected at Red Sea Sites				
DATE OF COTS TRIP	July	August	September	October	Total
Carless Reef	575	437	1064	0	2076
Shabrour Umm Gamar	2002	302	248	23	2575
Tobia Saghir	0	0	7	0	7
Gamul Saghir	0	0	16	0	16
Abu Makahdeg	0	0	151	0	151
Erq Monica	0	750	0	0	750
Erq Malek	0	229	0	0	229
Torfa Tany	0	0	340	0	340
Abu Dabab	0	1422	0	0	1422
TOTAL COLLECTED	**2577**	**3140**	**1826**	**23**	**7566**

	#COTS Measured at Red Sea Sites				
DATE OF COTS TRIP	July	August	September	October	Total
Careless Reef	71	375	414	0	860
Shabrour Umm Gamar	780	162	163	23	1128
Tobia Saghir	0	0	7	0	7
Gamul Saghir	0	0	16	0	16
Abu Makahdeg	0	0	91	0	91
Erq Monica	0	0	0	0	0
Erq Malek	0	0	0	0	0
Torfa Tany	0	0	0	0	0
Abu Dabab	0	0	0	0	0
TOTAL # of COTS MEASURED	**851**	**537**	**691**	**23**	**2102**

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ANNEX 8B-1 1998 Red Sea Crown-of-Thorns Starfish Control Program
Monthly Summary

	# COTS Collection Dives by Red Sea Group				
DATE OF COTS TRIP	July	August	September	October	Total
#VOLUNTEERS Total Dives	76	119	46	1	242
# EEAA Total Dives	31	33	31	2	97
# EST Total Dives	14	7	10	0	31
TOTAL # of Dives ("Tanks")	**121**	**159**	**87**	**3**	**370**

	# of Individual Dives ("Tanks") per Dive Center				
DATE OF COTS TRIP	July	August	September	October	Total
Arabia	0	0	0	0	0
Barrakuda (Marriott)	0	0	0	0	0
Coral Beach	0	2	0	0	2
Divers International	28	1	4	0	33
Divers Lodge (Hurgh & El Gouna)	0	2	10	0	12
Easy Divers	5	9	0	0	14
Emperor	0	28	0	0	28
Golden Turtle	2	4	4	0	10
Orca	4	0	0	0	4
Pirates Club	0	0	0	0	0
Sea Horse	9	0	0	0	9
SubAqua Club	6	9	0	0	15
Subex	2	0	0	0	2
The Pro	2	0	0	0	2
Free-Lance	10	15	10	1	36
NIOF	8	0	0	0	8
EST	14	7	10	0	31
EEAA	31	33	31	2	97
Menaville	0	0	2	0	2
Paradise	0	0	10	0	10
HEPCA	0	0	4	0	4
Ducks	0	16	2	0	18
Nautilus	0	27	0	0	27
Hermis	0	6	0	0	6
Total # of "Tanks" per Month	**121**	**159**	**87**	**3**	**370**

Dive Centers with a 0 Total contributed a boat, not divers

ANNEX 8B 1998 Red Sea Crown-of-Thorns Starfish Control Program Operational Details

#COTS Collected at Site (S= No Collection only Survey Dives)

AREA	LOCATION/Date	12-Jul	13-Jul	15-Jul	16-Jul	17-Jul	18-Jul	22-Jul	23-Jul	24-Jul	26-Jul	27-Jul	1 Aug	2 Aug	3-Aug	6-Aug	7 Aug	8-Aug	9-Aug	11 Aug	12 Aug	18-Aug
Hurg	Careless Reef	–	–	–	320	S	255	–	–	–	–	–	–	–	–	–	–	112	–	48	222	55
Hurg	Shabrour Umm Gamar	360	218	543	243	S	284	–	196	116	–	42	–	–	–	–	–	–	–	–	–	–
Saf	Tobia Saghir	–	–	–	–	S	–	–	–	–	–	–		–	–	–	–	–	–			–
Saf	Gamul Saghir	–	–	–	–	S	–	–	–	–	–	–	–	–	–	–	–	–	–		–	–
Saf	Abu Makahdeg	–	–	–	–	S	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
South	Erg Monica	–	–	–	–	S	–	–	–	–	–	–	40	225	400	–	86	–	–	–	–	–
South	Erg Malek	–	–	–	–	S	–	–	–	–	–	–	–	–	–	229	–	–	–		–	–
South	Torfa Tony	–	–	–	–	S	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
South	Abu Debab	–	–	–	–	S	–	–	–	–	–	–	–	–	–	–	–	–	425	–	–	–
	TOTAL COLLECTED	**360**	**218**	**543**	**563**	**0**	**539**	**0**	**196**	**116**	**0**	**42**	**40**	**225**	**400**	**229**	**86**	**112**	**425**	**48**	**222**	**55**

#COTS Measured from Site (Bold Box indicates missing or non-matching number)

AREA	LOCATION/Date	12-Jul	13-Jul	15-Jul	16-Jul	17-Jul	18-Jul	22-Jul	23-Jul	24-Jul	26-Jul	27-Jul	1 Aug	2 Aug	3 Aug	6-Aug	7 Aug	8 Aug	9-Aug	11 Aug	12 Aug	18 Aug
Hurg	Careless	–	–	–	51	–	20	–	–	–	–	–	–	–	–	–	–	50	–	48	222	55
Hurg	Shabrour Umm Gamar	108		90	60	–	184	–	196	116	–	28	–	–	–	–	–	–	–		–	
Saf	Tobia Saghir	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–		–	–		–	–
Saf	Gamul Saghir	–	–	–	–	–	–	–	–	–	–	–		–	–	–		–	–		–	
Saf	Abu Makahdeg	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–		–
South	Erg Monica	–	–	–	–	–	–	–	–	–		–	1	1	1	–	1	–	–		–	–
South	Erg Malek	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1		–	–	–	–	–
South	Abu Debab	–	–	–	–	–	–	–	–	–	–	–		–	–	–	–		0	–	–	–
	TOTAL MEASURED	**108**	**0**	**90**	**111**	**0**	**204**	**0**	**196**	**116**	**0**	**28**	**1**	**1**	**1**	**1**	**1**	**50**	**0**	**48**	**222**	**55**

ANNEX 8B 1998 Red Sea Crown-of-Thorns Starfish Control Program Operational Details

AREA	LOCATION/Date	21-Aug	22 Aug	23-Aug	1-Sep	3-Sep	13-Sep	15-Sep	16-Sep	19-Sep	23-Sep	29-Sep	30-Sep	3-Oct	TOTAL #	# of DIVES	EFFORT (#COTS/#Dives)
Hurg	Careless Reef	--	--	--	220	--	--	327	331	--	--	--	186	--	2076	132	15 7
Hurg	Shabrour Umm Gamar	--	--	302	--	77	--	--	--	--	--	171	--	23	2575	113	22 8
Saf	Tobia Saghir	--	--	--	--	--	--	--	--	--	7	--	--	--	7	4	1 8
Saf	Gamul Saghir	--	--	--	--	--	--	--	--	--	16	--	--	--	16	4	4 0
Saf	Abu Makahdeg	--	--	--	--	--	--	--	--	151	--	--	--	--	151	12	12 6
South	Erg Monica	--	--	--	--	--	--	--	--	--	--	--	--	--	750	31	24.2
South	Erg Malek	--	--	--	--	--	--	--	--	--	--	--	--	--	229	4	57 3
South	Torfa Tany	--	--	--	--	--	340	--	--	--	--	--	--	--	340	6	56 7
South	Abu Dabab	333	332	332	--	--	--	--	--	--	--	--	--	--	1422	43	33 1
	TOTAL COLLECTED	333	332	634	220	77	340	327	331	151	23	171	186	23	7566	349	21 7

AREA	LOCATION/Date	21 Aug	22-Aug	23-Aug	1-Sep	3-Sep	13-Sep	15-Sep	16-Sep	19-Sep	23-Sep	29-Sep	30-Sep	3-Oct	Count	% MEASURED
Hurg	Careless	--	--	--	51	--	--	172	51	--	--	--	140	--	860	41 4
Hurg	Shabrour Umm Gamar	--	--	162	--	77	--	--	--	--	--	88	--	23	1128	43 8
Saf	Tobia Saghir	--	--	--	--	--	--	--	--	--	7	--	--	--	7	100 0
Saf	Gamul Saghir	--	--	--	--	--	--	--	--	--	16	--	--	--	16	100 0
Saf	Abu Makahdeg	--	--	--	--	--	--	--	--	91	--	--	--	--	91	60 3
South	Erg Monica	--	--	--	--	--	--	--	--	--	--	--	--	--	4	0 5
South	Erg Malek	--	--	--	--	--	1	--	--	--	--	--	--	--	2	0 9
South	Abu Dabab	1	1	1	--	--	--	--	--	--	--	--	--	--	3	
	TOTAL MEASURED	1	1	163	51	77	1	172	51	91	23	88	140	23	2111	27.9
															2111	(Checksum)

ANNEX 8B 1998 Red Sea Crown-of-Thorns Starfish Control Program Operational Details

#COTS Collected at Site (S= No Collection only Survey Dives)

AREA	LOCATION/Date	12-Jul	13-Jul	15-Jul	16-Jul	17-Jul	18-Jul	22-Jul	23-Jul	24-Jul	26-Jul	27-Jul	1 Aug	2 Aug	3 Aug	6-Aug	7 Aug	8 Aug	9-Aug	11 Aug	12 Aug	18-Aug
Hurg	Careless Reef	–	–	–	320	S	255	–	–	–	–	–	–	–	–	–	–	112	–	48	222	55
Hurg	Shabrour Umm Gamar	360	218	543	243	S	284	–	196	116	–	42	–	–	–	–	–	–	–	–	–	–
Saf	Tobia Saghir	–	–	–	–	S	–	–	–	–	–	–		–	–	–	–	–	–	–		–
Saf	Gamul Saghir	–	–	–	–	S	–	–	–	–	–	–	–	–	–	–	–	–			–	–
Saf	Abu Makahdeg	–	–	–	–	S	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
South	Erg Monica	–	–	–	–	S	–	–	–	–	–	–	40	225	400	–	85	–	–	–	–	–
South	Erg Malek	–	–	–	–	S	–	–	–	–	–	–	–	–	–	229	–	–	–		–	–
South	Torfa Terry	–	–	–	–	S	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
South	Abu Dabab	–	–	–	–	S	–	–	–	–	–	–	–	–	–	–	–	–	425		–	–
	TOTAL COLLECTED	**360**	**218**	**543**	**563**	**0**	**539**	**0**	**196**	**116**	**0**	**42**	**40**	**225**	**400**	**229**	**85**	**112**	**425**	**48**	**222**	**55**

#COTS Measured from Site (Bold Box Indicates missing or non-matching number)

AREA	LOCATION/Date	12-Jul	13-Jul	15-Jul	16-Jul	17-Jul	18-Jul	22-Jul	23-Jul	24-Jul	26-Jul	27-Jul	1 Aug	2 Aug	3 Aug	6-Aug	7 Aug	8 Aug	9-Aug	11 Aug	12 Aug	18-Aug
Hurg	Careless	–	–	–	51	–	20	–	–	–	–	–	–	–	–	–	–	50	–	48	222	55
Hurg	Shabrour Umm Gamar	108		90	60	–	184	–	196	116	–	26	–	–	–	–	–	–	–		–	
Saf	Tobia Saghir	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–		–	–		–	–
Saf	Gamul Saghir	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–			–
Saf	Abu Makahdeg	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–		–
South	Erg Monica	–	–	–	–	–	–	–	–	–		–	1	1	1	–	1	–	–	–	–	–
South	Erg Malek	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–
South	Abu Dabab	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0	–	–	–
	TOTAL MEASURED	**108**	**0**	**90**	**111**	**0**	**204**	**0**	**196**	**116**	**0**	**26**	**1**	**1**	**1**	**1**	**1**	**50**	**0**	**48**	**222**	**55**

ANNEX 8B 1998 Red Sea Crown-of-Thorns Starfish Control Program Operational Details

AREA	LOCATION/Date	21 Aug	22 Aug	23-Aug	1-Sep	3-Sep	13-Sep	15-Sep	16-Sep	19-Sep	23-Sep	29-Sep	30-Sep	3-Oct	TOTAL #	# of DIVES	EFFORT (#COTS/#Dives)
Hurg	Carless Reef	--	--	--	220	--	--	327	331	--	--	--	186	--	2076	132	15 7
Hurg	Shabrour Umm Gamar	--	--	302	--	77	--	--	--	--	--	171	--	23	2575	113	22 8
Saf	Tobia Saghir	--	--	--	--	--	--	--	--	--	7	--	--	--	7	4	1 8
Saf	Gamul Saghir	--	--	--	--	--	--	--	--	--	16	--	--	--	16	4	4 0
Saf	Abu Makahdeg	--	--	--	--	--	--	--	--	151	--	--	--	--	151	12	12 6
South	Erg Monica	--	--	--	--	--	--	--	--	--	--	--	--	--	750	31	24.2
South	Erg Malek	--	--	--	--	--	--	--	--	--	--	--	--	--	229	4	57 3
South	Torfa Tany	--	--	--	--	--	340	--	--	--	--	--	--	--	340	6	56 7
South	Abu Dabab	333	332	332	--	--	--	--	--	--	--	--	--	--	1422	43	33 1
	TOTAL COLLECTED	333	332	634	220	77	340	327	331	151	23	171	186	23	7568	349	21 7

AREA	LOCATION/Date	21 Aug	22-Aug	23-Aug	1-Sep	3-Sep	13-Sep	15-Sep	16-Sep	19-Sep	23-Sep	29-Sep	30-Sep	3-Oct	Count	% MEASURED
Hurg	Careless	--	--	--	51	--	--	172	51	--	--	--	140	--	860	41 4
Hurg	Shabrour Umm Gamar	--	--	162	--	77	--	--	--	--	--	86	--	23	1128	43 8
Saf	Tobia Saghir	--	--	--	--	--	--	--	--	--	7	--	--	--	7	100 0
Saf	Gamul Saghir	--	--	--	--	--	--	--	--	--	16	--	--	--	16	100 0
Saf	Abu Makahdeg	--	--	--	--	--	--	--	--	91	--	--	--	--	91	60 3
South	Erg Monica	--	--	--	--	--	--	--	--	--	--	--	--	--	4	0 5
South	Erg Malek	--	--	--	--	--	1	--	--	--	--	--	--	--	2	0 9
South	Abu Dabab	1	1	1	--	--	--	--	--	--	--	--	--	--	3	
	TOTAL MEASURED	1	1	163	51	77	1	172	51	91	23	86	140	23	2111	27.9
															2111	(Checksum)

ANNEX 8B 1998 Red Sea Crown-of-Thorns Starfish Control Program Operational Details

Individual Dives per Organization

(Bold # or box = Organization Contributed Boat for that day)

DC #	DATE OF TRIP	12-Jul	13-Jul	15-Jul	16-Jul	17-Jul	18-Jul	22-Jul	23-Jul	24-Jul	26-Jul	27-Jul	1 Aug	2 Aug	3-Aug	6 Aug	7 Aug	8 Aug	9-Aug	11 Aug	12 Aug	18-Aug
1	Aratia	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--	--	--	--
2	Barracuda (Marriott)	--		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3	Coral Beach	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--	--	--	2
4	Divers International	4	4	4	4	4	4	--	2	--	1	1	--	--		--		1	--		--	--
5	Divers Lodge (Hurgh & El Gouna)		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6	Easy Divers	--	--	--	4	1	--	--	--	--	--	--	--	--	--	--		--	--	--	9	--
7	Emperor		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6	18	--
8	Golden Turtle	--	--	--	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4	--	--
9	Orca	2	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10	Pirates Club		--	--	--	--	--	--	--		--	--	--	--	--	--	--	--	--		--	--
11	Sea Horse		--	2	4	1	2	--	--	--		--	--	--		--	--	--	--	--	--	--
12	SubAqua Club	4	--	--	--	--	2	--	--	--	--	--	--	9	--	--		--	--	--	--	--
13	Subex	--	--	--	--	--	--	--	2	--	--	--	--	--	--	--	--	--	--	--	--	--
14	The Pro	--	2	--	--	--	--	--	--	--	--	--	--		--		--	--	--	--	--	--
15	Free-Lance	--	4	--	2	--	--	2	--	--	2	--	--	--	--	--	--	1	--	--	6	8
16	NIOF	8	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--	--	--	--
17	EST	2	2	2	2	2	2	--	--	--	1	1	--	--	--	--	--	--	--	2	3	2
18	EEAA	4	2	2	2	4	4	2	4	6	1	--	2	2	2	2	2	2	4	2	3	2
19	Menaville	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--	--	--	--	--
20	Paradise	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--	--	--	--	--
22	HEPCA	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--	--	--	--	--
23	Ducks	--	--	--	--	--	--	--	--	--	--	--	--		14	2	--	--	--	--	--	--
24	Nautilus	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
25	Hermis	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6	--	--	--
	Total # of Dive/Day	24	16	10	20	12	14	4	8	6	5	2	2	11	16	4	2	4	10	14	39	14

Individual Dives per Organization

(Bold # or box = Organization Contributed Boat for that day)

	DATE OF TRIP	12-Jul	13-Jul	15-Jul	16-Jul	17-Jul	18-Jul	22-Jul	23-Jul	24-Jul	26-Jul	27-Jul	1 Aug	2 Aug	3 Aug	6-Aug	7 Aug	8-Aug	9 Aug	11 Aug	12 Aug	18 Aug
EEAA																						
	Ayman Afifi	2	2	2	2	2	2	1	--	1	1	--	--	--	--	--		1	--	2	3	2
	Yasser Ibrahim	2	--	--	--	2	2	1	2	1	--	--	--	--	--	--	--	1	--	--	--	--
	Abdallah Eliwa	--	--	--	--	--	--	--	2	2	--	--	1	1	1	1	1	--	--	--	--	--
	Saied El Sayed	--	--	--	--	--	--	--	--	2	--	--	1	1	1	1	1	--	2	--	--	--
	Mohamed Salem	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Hesham Mostafa	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Waeel Abdel Fatah	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	2	--	--	--
	SUB-TOTAL EEAA	4	2	2	2	4	4	2	4	6	1	0	2	2	2	2	2	2	4	2	3	2
EST																						
	Dr Hesham Mansour	2	2	2	2	2	2	--	--	--	1	1	--	--	--	--	--	--	--	2	3	2
	Dr Stacey Tighe	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	SUB-TOTAL EST	2	2	2	2	2	2	0	0	0	1	1	0	0	0	0	0	0	0	2	3	2
	TOTAL # DIVES/DAY	24	16	10	20	12	14	4	8	6	5	2	2	11	16	4	2	4	10	14	39	14

ANNEX 8B 1998 Red Sea Crown-of-Thorns Starfish Control Program Operational Details

DC #	DATE OF TRIP	21 Aug	22 Aug	23-Aug	1-Sep	3-Sep	13-Sep	15-Sep	16-Sep	19-Sep	23-Sep	29-Sep	30-Sep	3-Oct	# Dives /DC
1	Arabia	–	–	–	–	–	–	–	–	–	–	–	–	–	0
2	Barracuda (Marriott)	–	–	–	–	–	–	–	–	–	–	–	–	–	0
3	Coral Beach	–	–	–	–	–	–	–	–	–	–	–	–	–	2
4	Divers International	–	–	–	–	–	–	2	2	–	–	–	–	–	33
5	Divers Lodge (Hurgh & El Gou	–	–	2	2	–	–	–	8	–	–	–	–	–	12
6	Easy Divers	–	–	–	–	–	–	–	–	–	–	–	–	–	14
7	Emperor	–	–	4	–	–	–		–	–	–	–	–	–	28
8	Golden Turtle	–	–	–	–	–	–	4	–	–	–	–	–	–	10
9	Orca	–	–	–	–	–	–	–	–	–	–	–	–	–	4
10	Pirates Club	–	–	–	–	–	–	–	–	–	–	–	–	–	0
11	Sea Horse	–	–	–	–	–	–		–	–	–	–	–	–	9
12	SubAqua Club	–	–	–	–	–	–	–	–	–	–	–	–	–	16
13	Subex	–	–	–	–	–	–	–	–	–	–	–	–	–	2
14	The Pro	–	–	–	–	–	–	–	–	–	–	–	–	–	2
15	Free-Lance	–	–	–	–	6	–	–	–	–	–	2	2	1	36
16	NIOF	–	–	–	–	–	–		–	–	–	–	–	–	8
17	EST	–	–	–	2	–	–	4	–	–	2	2	–	–	31
18	EEAA	2	2	6	2	–	4	4	4	2	4	5	6	2	97
19	Menaville	–	–	–	–	–	–	–	–	–	2	–	–	–	2
20	Paradise	–	–	–	–	–	–	–	–	10	–	–	–	–	10
22	HEPCA	–	–	–	–	–	–	–	–	–	–	2	2	–	4
23	Ducks	–	–	–	–	–	2		–	–	–	–	–	–	18
24	Nautilus	9	9	9	–	–	–		–		–	–	–	–	27
25	Hermis	–	–	–	–	–	–	–	–	–	–	–	–	–	6
	Total # of Dive/Day	11	11	15	6	6	6	14	14	12	8	11	10	3	370

	DATE OF TRIP	21-Aug	22-Aug	23-Aug	1-Sep	3-Sep	13-Sep	15-Sep	16-Sep	19-Sep	23-Sep	29-Sep	30-Sep	3-Oct	# Dives /DC	
EEAA																
	Aymen Afifi	–	–	–	–	–	–	2	–	–	2	2	–	–	29	
	Yasser Ibrahim	–	–	2	2	–	–	2	2	–	–	1	2	–	22	
	Abdellah Elwa	1	1	1	–	–	2	–	–	–	–	–	–	–	14	
	Saied El Sayed	–	–	–	–	–	2	–	–	–	–	–	–	–	11	
	Mohamed Salem	–	–	2	–	–	–	–	–	–	–	–	–	–	2	
	Hesham Mostafa	1	1	1	–	–	–	–	2	2	2	–	2	1	12	
	Waeel Abdel Fatah	–	–	–	–	–	–	–	–	–	–	2	2	1	7	
	SUB-TOTAL EEAA	2	2	6	2	0	4	4	4	2	4	5	6	2	97	
EST																
	Dr Hesham Mansour	–	–	–	2	–	–	2	–	–	2	2	–	–	29	
	Dr Stacey Tighe	–	–	–	–	–	–	2	–	–	–	–	–	–	2	
	SUB-TOTAL EST	0	0	0	2	0	0	4	0	–	2	2	–	–	31	
																Checksum
	TOTAL # DIVES/DAY	11	11	21	6	6	6	14	14	12	8	11	10	3	370	370

ANNEX 8B 1998 Red Sea Crown-of-Thorns Starfish Control Program Operational Details

Individual Dives per Organization (Bold # or box = Organization Contributed Boat for that day)

DC #	DATE OF TRIP	12-Jul	13-Jul	15-Jul	16-Jul	17-Jul	18-Jul	22-Jul	23-Jul	24-Jul	26-Jul	27-Jul	1 Aug	2 Aug	3-Aug	6 Aug	7 Aug	8-Aug	9-Aug	11 Aug	12 Aug	18-Aug
1	Arabia	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–		–	–	–	–	–
2	Barracuda (Marriott)	–		–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
3	Coral Beach	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–		–	–	–	–	2
4	Divers International	4	4	4	4	4	4	–	2	–	1	1	–	–	–	–		1	–		–	–
5	Divers Lodge (Hurgh & El Gouna)		–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
6	Easy Divers	–	–	–	4	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	9	–
7	Emperor		–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	6	18	–
8	Golden Turtle	–	–	–	2	–	–		–	–	–	–	–	–	–	–	–	–	–	4	–	–
9	Giza	2	2	–	–	–	–	–	–	–	–	–	–	–		–	–	–	–	–	–	–
10	Pirates Club		–	–	–	–	–	–	–		–	–	–	–	–	–	–	–	–		–	–
11	Sea Horse		–	2	4	1	2	–	–	–		–	–	–		–	–	–	–	–	–	–
12	SubAqua Club	4	–	–	–	–	2	–	–	–	–	–	–	9	–	–		–	–	–	–	–
13	Subex	–	–	–	–	–	–	–	2	–	–	–	–	–	–	–		–	–	–	–	–
14	The Pro	–	2	–	–	–	–	–	–	–	–	–	–	–	–			–	–	–	–	–
15	Free-Lance	–	4	–	2	–	–	2	–	–	2	–	–	–	–	–		1	–	–	6	8
16	NIOF	8	–	–	–	–	–	–	–	–	–	–	–	–		–		–	–		–	–
17	EST	2	2	2	2	2	2	–	–	–	1	1	–	–	–	–	–	–	–	2	3	2
18	EEAA	4	2	2	2	4	4	2	4	6	1	–	2	2	2	2	2	2	4	2	3	2
19	Menaville	–	–	–	–	–	–	–	–		–	–	–	–	–	–	–	–	–	–	–	–
20	Paradise	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–		–	–	–	–	–
22	HEPCA	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–		–	–	–	–	–
23	Ducks	–	–	–	–	–	–	–	–	–	–		–		14	2	–	–	–	–	–	–
24	Nautilus	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–		–	–
25	Hermis	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–		–	6	–	–	–
	Total # of Dive/Day	24	16	10	20	12	14	4	8	6	5	2	2	11	16	4	2	4	10	14	39	14

Individual Dives per Organization (Bold # or box = Organization Contributed Boat for that day)

	DATE OF TRIP	12-Jul	13-Jul	15-Jul	16-Jul	17-Jul	18-Jul	22-Jul	23-Jul	24-Jul	26-Jul	27-Jul	1 Aug	2 Aug	3 Aug	6-Aug	7 Aug	8-Aug	9 Aug	11 Aug	12 Aug	18 Aug
EEAA																						
	Aymen Afifi	2	2	2	2	2	2	1	–	1	1	–	–	–	–	–		1	–	2	3	2
	Yasser Ibrahim	2	–	–	–	2	2	1	2	1	–	–	–	–	–	–	–	1	–	–	–	–
	Abdallah Eliwa	–	–	–	–	–	–	–	2	2	–	–	1	1	1	1	1	–	–		–	–
	Saied El Sayed	–	–	–	–	–	–	–	–	2	–	–	1	1	1	1	1	–	2	–	–	–
	Mohamed Salem	–	–	–	–	–	–	–	–		–	–	–	–	–	–	–	–	–	–	–	–
	Hesham Mostafa	–	–	–	–	–	–	–	–	–	–	–	–	–	–		–	–	–	–	–	–
	Waeel Abdel Fatah	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–		–	2	–	–	–
	SUB-TOTAL EEAA	4	2	2	2	4	4	2	4	6	1	0	2	2	2	2	2	2	4	2	3	2
EST																						
	Dr Hesham Mansour	2	2	2	2	2	2	–	–	–	1	1	–	–	–	–	–	–	–	2	3	2
	Dr Stacey Tighe	–	–	–	–	–	–	–	–	–		–	–	–	–	–	–	–	–	–	–	–
	SUB-TOTAL EST	2	2	2	2	2	2	0	0	0	1	1	0	0	0	0	0	0	0	2	3	2
	TOTAL # DIVES/DAY	24	16	10	20	12	14	4	8	6	5	2	2	11	16	4	2	4	10	14	39	14

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ANNEX 8B 1998 Red Sea Crown-of-Thorns Starfish Control Program Operational Details

DC #	DATE OF TRIP	21-Aug	22 Aug	23-Aug	1-Sep	3-Sep	13-Sep	15-Sep	16-Sep	19-Sep	23-Sep	29-Sep	30-Sep	3-Oct	# Dives /DC
1	Arabia	–		–	–	–	–	–	–	–	–	–	–	–	0
2	Barracuda (Marriott)	–	–	–	–	–	–	–	–	–	–	–	–	–	0
3	Coral Beach	–	–	–	–	–	–	–	–	–	–	–	–	–	2
4	Divers International	–	–	–	–	–	–	2	2	–	–	–	–	–	33
5	Divers Lodge (Hurgh & El Gou	–	–	2	2	–	–	–	8	–	–	–	–	–	12
6	Easy Divers	–	–	–	–	–	–	–	–	–	–	–	–	–	14
7	Emperor	–	–	4	–	–	–	–	–	–	–	–	–	–	28
8	Golden Turtle	–	–	–	–	–	–	4	–	–	–	–	–	–	10
9	Orca	–	–	–	–	–	–		–	–	–	–	–	–	4
10	Pirates Club	–	–	–	–	–	–		–	–	–	–	–	–	0
11	Sea Horse	–	–	–	–	–	–		–		–	–	–	–	9
12	SubAqua Club	–	–	–	–	–	–	–	–	–	–	–	–	–	16
13	Subex	–	–	–	–	–	–	–	–	–	–	–	–	–	2
14	The Pro	–	–	–	–	–	–	–	–	–	–	–	–	–	2
15	Free-Lance	–	–	–	–	6	–	–	–	–	–	2	2	1	36
16	NIOF	–	–	–	–	–	–		–	–	–	–	–	–	8
17	EST	–	–	–	2	–	–	4	–	–	2	2	–	–	31
18	EEAA	2	2	6	2	–	4	4	4	2	4	5	6	2	97
19	Menmvile	–	–	–	–	–	–	–	–	–	2	–	–	–	2
20	Paradise	–	–	–	–	–	–	–	–	10	–	–	–	–	10
22	HEPCA	–	–	–	–	–	–	–	–	–	–	2	2	–	4
23	Ducks	–	–	–	–	–	2		–	–	–	–	–	–	18
24	Nautilus	9	9	9	–	–	–	–	–		–	–	–	–	27
25	Hermis	–	–	–	–	–	–	–	–	–	–	–	–	–	9
	Total # of Dive/Day	11	11	15	6	6	6	14	14	12	8	11	10	3	370

	DATE OF TRIP	21-Aug	22-Aug	23-Aug	1-Sep	3-Sep	13-Sep	15-Sep	16-Sep	19-Sep	23-Sep	29-Sep	30-Sep	3-Oct	# Dives /DC	
EEAA																
	Aymen Afifi	–	–	–	–	–	–	2	–	–	2	2	–	–	29	
	Yasser Ibrahim	–	–	2	2	–	–	2	2	–	–	1	2	–	22	
	Abdellah Elwa	1	1	1	–	–	2	–	–	–	–	–	–	–	14	
	Saied El Sayed	–	–	–	–	–	2	–	–	–	–	–	–	–	11	
	Mohamed Salem	–	–	2	–	–	–	–	–	–	–	–	–	–	2	
	Hesham Mostafa	1	1	1	–	–	–		2	2	2	–	2	1	12	
	Waeel Abdel Fatah	–	–	–	–	–	–	–	–	–	–	2	2	1	7	
	SUB-TOTAL EEAA	2	2	6	2	0	4	4	4	2	4	5	6	2	97	
EST																
	Dr Hesham Mansour	–	–	–	2	–	–	2	–	–	2	2	–	–	29	
	Dr Stacey Tighe	–	–	–	–	–	–	2	–	–	–	–	–	–	2	
	SUB-TOTAL EST	0	0	0	2	0	0	4	0	–	2	2	–	–	31	
																Checksum
	TOTAL # DIVES/DAY	11	11	21	6	6	6	14	14	12	8	11	10	3	370	370

ANNEX 8B 1998 Red Sea Crown-of-Thorns Starfish Control Program Operational Details

Individual Dives per Volunteer

DC #	DATE OF TRIP	12-Jul	13-Jul	15-Jul	16-Jul	17-Jul	18-Jul	22-Jul	23-Jul	24-Jul	26-Jul	27-Jul	1 Aug	2 Aug	3-Aug	6-Aug	7 Aug	8-Aug	9-Aug	11 Aug	12 Aug	18 Aug
																			–			
9	Angelika Petts	2	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
4	Michael Eisenger	2	2	2	2	2	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
4	Elena Mistkova	2	2	2	2	2	2	–	2	–	1	1	–	–	–	–	–	1	–	–	–	–
12	Caroline	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–		–	–
12	Ariana Struik	2	–	–	–	–	2	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–
15	Silvia	–	2	–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
15	Pea	–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
14	Harry Farted	–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–		–	–
11	Claudia	–	–	2	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–		–	–
11	Freadie Peaceman	–	–	–	2	1	2	–	–	–	–	–	–	–	–	–	–	–	–		–	–
6	Dieter Dersch	–	–	–	2	1	–	–	–	–	–	–	–	–	–	–		–	–	–	3	–
6	Waleed Husseiny	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
8	Hassen A. Aziz	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
15	Samir	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–
13	Humby	–	–	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	–	–
15	Masha	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–
15	Elena Another One	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–
15	Talaat Azam	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–
7	Mark Andrews	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	–	–
7	Mark Kissen	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	–	–
7	Paul Cuypers	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	–	–
8	Mohamed El Shazly	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	–	–
8	Wael Motaz El Sawy	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	–	–
7	Hans de Orus	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3	–
7	Lauren Van derDonk	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3	–
7	Ayde Meeawesen	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–		3	–
7	Gina Wynen	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–		–	–	–	3	–
7	Patrick Toemer	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3	–
7	Wymand Heuvel	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–		3	–
6	Peter Jonwheer	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3	–
6	Wilma Welden	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3	–
15	Liza Cozens	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3	–
15	Nicole Shach	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–		3	–
15	Reto Mover	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2
5	Ashraf Abdel Hakim	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–		–	2
3	Ernest Pfaff	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2
15	Abdel H. Hamoud	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–		–	2
15	Amro Moder	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2
7	Joanna Booth	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–		–	–
7	Panida Patree	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
5	Sherief	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–		–	–
15	Jane	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–		–	–
15	Dave	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–		–	–
15	Jessica	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
8	Raid Gamal Eldin	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
8	Waleed Nabil Mohamed	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
5	Mohamed Hasen	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–		–	–
5	Peter Lab Mary	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–		–	–
5	Ramon Gefseis	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–		–	–
5	Umberto Ilario	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–		–	–	–	–	–
16	Dr. Ahmed Nawar	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–		–	–

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ANNEX 8B 1998 Red Sea Crown-of-Thorns Starfish Control Program Operational Details

DC #	DATE OF TRIP	21 Aug	22 Aug	23-Aug	1-Sep	3-Sep	13-Sep	15-Sep	16-Sep	19-Sep	23-Sep	29-Sep	30-Sep	3-Oct	Tot # Dives / Person
9	Angelika Pettis	--	--	--	--	--	--	--	--	--	--	--	--	--	4
4	Michael Eisenger	--	--	--	--	--	--	--	--	--	--	--	--	--	12
4	Elena Mistkova	--	--	--	--	--	--	2	2	--	--	--	--	--	21
12	Caroline	--	--	--	--	--	--	--	--	--	--	--	--	--	2
12	Ariana Struik	--	--	--	--	--	--	--	--	--	--	--	--	--	5
15	Silvia	--	--	--	--	--	--	--	--	--	--	--	--	--	4
15	Pea	--	--	--	--	--	--	--	--	--	--	--	--	--	2
14	Harry Farled	--	--	--	--	--	--	--	--	--	--	--	--	--	2
11	Claudia	--	--	--	--	--	--	--	--	--	--	--	--	--	4
11	Freadie Peaceman	--	--	--	--	--	--	--	--	--	--	--	--	--	5
6	Dieter Dersch	--	--	--	--	--	--	--	--	--	--	--	--	--	6
6	Waleed Husseiny	--	--	--	--	--	--	--	--	--	--	--	--	--	2
8	Hassen A. Aziz	--	--	--	--	--	--	--	--	--	--	--	--	--	2
15	Samir	--	--	--	--	--	--	--	--	--	--	--	--	--	1
13	Humby	--	--	--	--	--	--	--	--	--	--	--	--	--	2
15	Masha	--	--	--	--	--	--	--	--	--	--	--	--	--	1
15	Elena Another One	--	--	--	--	--	--	--	--	--	--	--	--	--	1
15	Talaat Azam	--	--	--	--	--	--	--	--	--	--	--	--	--	1
7	Mark Andrews	--	--	--	--	--	--	--	--	--	--	--	--	--	2
7	Mark Kissen	--	--	--	--	--	--	--	--	--	--	--	--	--	2
7	Paul Cuypers	--	--	--	--	--	--	--	--	--	--	--	--	--	2
8	Mohamed El Shazly	--	--	--	--	--	--	--	--	--	--	--	--	--	2
8	Wael Motaz El Sawy	--	--	--	--	--	--	--	--	--	--	--	--	--	2
7	Hans de Orus	--	--	--	--	--	--	--	--	--	--	--	--	--	3
7	Lauren Van derDonk	--	--	--	--	--	--	--	--	--	--	--	--	--	3
7	Ayde Meeawesen	--	--	--	--	--	--	--	--	--	--	--	--	--	3
7	Gina Wynen	--	--	--	--	--	--	--	--	--	--	--	--	--	3
7	Patrick Toemer	--	--	--	--	--	--	--	--	--	--	--	--	--	3
7	Wymand Heuvel	--	--	--	--	--	--	--	--	--	--	--	--	--	3
6	Petea Jonwheer	--	--	--	--	--	--	--	--	--	--	--	--	--	3
6	Wilma Welden	--	--	--	--	--	--	--	--	--	--	--	--	--	3
15	Liza Cozens	--	--	--	--	--	--	--	--	--	--	--	--	--	3
15	Nicole Shach	--	--	--	--	--	--	--	--	--	--	--	--	--	3
15	Reto Mover	--	--	--	--	--	--	--	--	--	--	--	--	--	2
5	Ashraf Abdel Hakim	--	--	2	--	--	--	--	--	--	--	--	--	--	4
3	Ernest Pfaff	--	--	--	--	--	--	--	--	--	--	--	--	--	2
15	Abdel H Hamoud	--	--	--	--	--	--	--	--	--	--	--	--	--	2
15	Arnro Moder	--	--	--	--	--	--	--	--	--	--	--	--	--	2
7	Joanna Booth	--	--	2	--	--	--	--	--	--	--	--	--	--	2
7	Panida Patres	--	--	2	--	--	--	--	--	--	--	--	--	--	2
5	Sherlef	--	--	--	2	--	--	--	--	--	--	--	--	--	2
15	Jane	--	--	--	--	2	--	--	--	--	--	--	--	--	2
15	Dave	--	--	--	--	2	--	--	--	--	--	--	--	--	2
15	Jessica	--	--	--	--	2	--	--	--	--	--	--	--	--	2
8	Raid Gamal Eldin	--	--	--	--	--	--	2	--	--	--	--	--	--	2
8	Waleed Nabih Mohamed	--	--	--	--	--	--	2	--	--	--	--	--	--	2
5	Mohamed Hasen	--	--	--	--	--	--	--	2	--	--	--	--	--	2
5	Peter Lab Mary	--	--	--	--	--	--	--	2	--	--	--	--	--	2
5	Ramon Geisels	--	--	--	--	--	--	--	2	--	--	--	--	--	2
5	Umberto Ilerio	--	--	--	--	--	--	--	2	--	--	--	--	--	2
16	Dr Ahmed Nawar	--	--	--	--	--	--	--	--	--	--	--	--	--	2

BEST AVAILABLE COPY

ANNEX 8B 1998 Red Sea Crown-of-Thorns Starfish Control Program Operational Details

Individual Dives per Volunteer

DC #	DATE OF TRIP	12-Jul	13-Jul	15-Jul	16-Jul	17-Jul	18-Jul	22-Jul	23-Jul	24-Jul	26-Jul	27-Jul	1 Aug	2 Aug	3-Aug	6-Aug	7 Aug	8-Aug	9-Aug	11 Aug	12 Aug	18 Aug
																			--			
9	Angelika Pettis	2	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4	Michael Eisenger	2	2	2	2	2	2	--	--	--	--	--	--	--	--	--	--	--	--		--	--
4	Elena Mistkova	2	2	2	2	2	2	--	2	--	1	1	--	--	--	--	--	1	--		--	--
12	Caroline	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
12	Ariana Struik	2	--	--	--	--	2	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
15	Silvia	--	2	--	2	--	--	--	--	--	--	--	--	--	--	--		--	--	--	--	--
15	Pea	--	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
14	Harry Farled	--	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11	Claudia	--	--	2	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
11	Freadie Peaceman	--	--	--	2	1	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6	Dieter Dersch	--	--	--	2	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3	--
6	Waleed Husseiny	--	--	--	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8	Hassen A. Aziz	--	--	--	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
15	Samir	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
13	Humby	--	--	--	--	--	--	--	2	--	--	--	--	--	--	--	--	--	--	--	--	--
15	Masha	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--
15	Elena Another One	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--
15	Talaat Azam	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--
7	Mark Andrews	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	--	--
7	Mark Kissen	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	--	--
7	Paul Cuypers	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	--	--
8	Mohamed El Shazly	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	--	--
8	Wael Motaz El Sawy	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	--	--
7	Hans de Orus	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3	--
7	Lauren Van derDonk	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3	--
7	Ayde Meeawesen	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3	--
7	Gina Wynen	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--	--	3	--
7	Patrick Toemer	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3	--
7	Wymand Heuvel	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		3	--
6	Petea Jonwheer		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3	--
6	Wilma Welden	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3	--
15	Liza Cozens	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3	--
15	Nicole Shach	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		3	--
15	Reto Mover	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2
5	Ashraf Abdel Hakim	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	2
3	Ernest Pfaff	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2
15	Abdel H. Hamoud	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	2
15	Amro Moder	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2
7	Joanna Booth	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7	Panida Patree	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
5	Sherief	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
15	Jane	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
15	Dave	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
15	Jessica	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8	Raid Gamal Eldin	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8	Waleed Nabih Mohamed	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5	Mohamed Hasen	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5	Peter Lab Mary	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5	Ramon Gefsels	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5	Umberto Ilario	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--	--	--	--
10	Dr Ahmed Nawar	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

BEST AVAILABLE COPY

ANNEX 8B 1998 Red Sea Crown-of-Thorns Starfish Control Program Operational Details

DC #	DATE OF TRIP	21 Aug	22 Aug	23-Aug	1-Sep	3-Sep	13-Sep	15-Sep	16-Sep	19-Sep	23-Sep	29-Sep	30-Sep	3-Oct	Tot # Dives / Person
9	Angelika Petlis	–	–	–	–	–	–	–	–	–	–	–	–	–	4
4	Michael Eisenger	–	–	–	–	–	–	–	–	–	–	–	–	–	12
4	Elena Mistkova	–	–	–	–	–	–	2	2	–	–	–	–	–	21
12	Caroline	–	–	–	–	–	–	–	–	–	–	–	–	–	2
12	Ariana Strulk	–	–	–	–	–	–	–	–	–	–	–	–	–	6
15	Silvia	–	–	–	–	–	–	–	–	–	–	–	–	–	4
15	Pea	–	–	–	–	–	–	–	–	–	–	–	–	–	2
14	Hany Farfed	–	–	–	–	–	–	–	–	–	–	–	–	–	2
11	Claudia	–	–	–	–	–	–	–	–	–	–	–	–	–	4
11	Freedie Peacemen	–	–	–	–	–	–	–	–	–	–	–	–	–	6
6	Dieter Dersch	–	–	–	–	–	–	–	–	–	–	–	–	–	6
6	Waleed Husseiny	–	–	–	–	–	–	–	–	–	–	–	–	–	2
8	Hassen A. Aziz	–	–	–	–	–	–	–	–	–	–	–	–	–	2
15	Samir	–	–	–	–	–	–	–	–	–	–	–	–	–	1
13	Humby	–	–	–	–	–	–	–	–	–	–	–	–	–	2
15	Masha	–	–	–	–	–	–	–	–	–	–	–	–	–	1
15	Elena Another One	–	–	–	–	–	–	–	–	–	–	–	–	–	1
15	Talaat Azam	–	–	–	–	–	–	–	–	–	–	–	–	–	1
7	Mark Andrews	–	–	–	–	–	–	–	–	–	–	–	–	–	2
7	Mark Kissen	–	–	–	–	–	–	–	–	–	–	–	–	–	2
7	Paul Cuypers	–	–	–	–	–	–	–	–	–	–	–	–	–	2
8	Mohamed El Shazly	–	–	–	–	–	–	–	–	–	–	–	–	–	2
8	Wael Motaz El Sawy	–	–	–	–	–	–	–	–	–	–	–	–	–	2
7	Hans de Crus	–	–	–	–	–	–	–	–	–	–	–	–	–	3
7	Lauren Van derDonk	–	–	–	–	–	–	–	–	–	–	–	–	–	3
7	Ayde Meeswesen	–	–	–	–	–	–	–	–	–	–	–	–	–	3
7	Gina Wynen	–	–	–	–	–	–	–	–	–	–	–	–	–	3
7	Patrick Toemer	–	–	–	–	–	–	–	–	–	–	–	–	–	3
7	Wymand Heuvel	–	–	–	–	–	–	–	–	–	–	–	–	–	3
6	Petea Jonwheer	–	–	–	–	–	–	–	–	–	–	–	–	–	3
6	Wilma Welden	–	–	–	–	–	–	–	–	–	–	–	–	–	3
15	Liza Cozens	–	–	–	–	–	–	–	–	–	–	–	–	–	3
15	Nicole Shach	–	–	–	–	–	–	–	–	–	–	–	–	–	2
15	Reto Mover	–	–	–	–	–	–	–	–	–	–	–	–	–	4
5	Ashraf Abdel Halim	–	–	2	–	–	–	–	–	–	–	–	–	–	2
3	Ernest Pfaff	–	–	–	–	–	–	–	–	–	–	–	–	–	2
15	Abdel H Hamoud	–	–	–	–	–	–	–	–	–	–	–	–	–	2
15	Amro Moder	–	–	–	–	–	–	–	–	–	–	–	–	–	2
7	Joanna Booth	–	–	2	–	–	–	–	–	–	–	–	–	–	2
7	Panida Patree	–	–	2	–	–	–	–	–	–	–	–	–	–	2
5	Sherief	–	–	–	2	–	–	–	–	–	–	–	–	–	2
15	Jane	–	–	–	–	2	–	–	–	–	–	–	–	–	2
15	Dave	–	–	–	–	2	–	–	–	–	–	–	–	–	2
15	Jessica	–	–	–	–	2	–	–	–	–	–	–	–	–	2
8	Raid Gamal Eldin	–	–	–	–	–	–	2	–	–	–	–	–	–	2
8	Waleed Nabih Mohamed	–	–	–	–	–	–	2	–	–	–	–	–	–	2
5	Mohamed Hasen	–	–	–	–	–	–	–	2	–	–	–	–	–	2
5	Peter Lab Mary	–	–	–	–	–	–	–	2	–	–	–	–	–	2
5	Ramon Gefsels	–	–	–	–	–	–	–	2	–	–	–	–	–	2
5	Umberto Marto	–	–	–	–	–	–	–	2	–	–	–	–	–	2
16	Dr Ahmed Nawar	–	–	–	–	–	–	–	–	–	–	–	–	–	

ANNEX 8B 1998 Red Sea Crown-of-Thorns Starfish Control Program Operational Details

	DATE OF TRIP	12-Jul	13-Jul	15-Jul	16-Jul	17-Jul	18-Jul	22-Jul	23-Jul	24-Jul	26-Jul	27-Jul	1 Aug	2 Aug	3 Aug	6-Aug	7 Aug	8-Aug	9-Aug	11 Aug	12-Aug	18 Aug
16	Mohamed A. Wahab	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
16	Abdel Hameid	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
16	Dr Mohamed Shoukry	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
19	Laurenze Gefhscor	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
20	Ralf	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
20	Ahmed	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
20	Anderas	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
20	Achim	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
20	Suzanne Stickl	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
21	Marc Kochzius	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
21	Ilka Pasenau	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
22	Omar Okasha	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
22	Ahmed Abu Rala	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
23	Rontlea Himmel	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--
23	Stephan Himmel	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--
23	Jurgew Markert		--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--		--	--
23	Klaus Heleu	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--
23	Brigitte Heleu	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--
23	Johann Nieychild	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--
23	Dirk Sembritzki	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--
23	Severine Ban	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--
23	Solustion Ban	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--
23	Markus Alchlujer	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--		--	--		--	--
23	Dirk Hoderlu	--	--	--	--	--	--	--		--	--	--	--	--	1	--	--	--	--	--	--	--
23	Ronny Thelaneyau	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--
23	Hecterut Neuber	--	--	--	--	--	--	--	--	--	--	--	--	--	1	1	--	--	--		--	--
23	Angelika Kesler	--	--	--	--	--	--	--	--	--	--	--	--	--	1	1	--	--	--	--	--	--
23	Krucker Stephano	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			--	--
12	Andrea Hanyady	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--		--	--
12	S Jackeman	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--		--	--
12	Nick Jackson	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--
12	Darren Strachaw	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--		--	--
12	Jakie Goad	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--
12	Sue Crelin	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--		--	--
12	Tracey Jackson	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--		--	--	--	--	--
12	Uli Athoff	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--
12	Carola Merkle	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--		--	--	--	--	--
24	Amro Ali	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--	--	--	--
24	Adel Ahmed	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
24	Waleed Ahmed	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
24	Motaz Mohamed	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
24	hashem Rafey	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
24	kareen Nadlem	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
24	Rafeek Nomeer	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
24	Rafeek Kassab	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
24	Amro Kylany	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--		--	--
25	Hamada Abu Hamed	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	2	--	--	--
25	Mohamed Montaser	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	--	--	--
25	Medhat Montaser	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2		--	--
	SUB-TOTAL Volunteers	18	12	6	16	6	8	2	4	0	3	1	0	9	14	2	0	2	6	10	33	10

ANNEX 8B 1998 Red Sea Crown-of-Thorns Starfish Control Program Operational Details

	DATE OF TRIP	21-Aug	22-Aug	23-Aug	1-Sep	3-Sep	13-Sep	15-Sep	16-Sep	19-Sep	23-Sep	29-Sep	30-Sep	3-Oct	# Dives /DC	
16	Mohamed A. Wahab	–	–	–	–	–	–	–	–	–	–	–	–	–	2	
16	Abdel Hamold	–	–	–	–	–	–	–	–	–	–	–	–	–	2	
16	Dr Mohamed Shoukry	–	–	–	–	–	–	–	–	–	–	–	–	–	2	
19	Laurenze Gelhscor	–	–	–	–	–	–	–	–	–	2	–	–	–	2	
20	Ralf	–	–	–	–	–	–	–	–	2	–	–	–	–	2	
20	Ahmed	–	–	–	–	–	–	–	–	2	–	–	–	–	2	
20	Anderas	–	–	–	–	–	–	–	–	2	–	–	–	–	2	
20	Achim	–	–	–	–	–	–	–	–	2	–	–	–	–	2	
20	Suzanne Stickl	–	–	–	–	–	–	–	–	2	–	–	–	–	2	
21	Marc Kochzius	–	–	–	–	–	–	–	–	–	–	1	1	–	2	
21	Ilka Paseneu	–	–	–	–	–	–	–	–	–	–	1	1	–	2	
22	Omar Okasha	–	–	–	–	–	–	–	–	–	–	1	1	–	2	
22	Ahmed Abu Rafa	–	–	–	–	–	–	–	–	–	–	1	1	–	2	
23	Ronitea Himmel	–	–	–	–	–	–	–	–	–	–	–	–	–	1	
23	Stephan Himmel	–	–	–	–	–	–	–	–	–	–	–	–	–	1	
23	Jurgew Markert	–	–	–	–	–	–	–	–	–	–	–	–	–	1	
23	Klaus Haleu	–	–	–	–	–	–	–	–	–	–	–	–	–	1	
23	Brigitte Haleu	–	–	–	–	–	–	–	–	–	–	–	–	–	1	
23	Johann Nierychid	–	–	–	–	–	–	–	–	–	–	–	–	–	1	
23	Dirk Sembritzkl	–	–	–	–	–	–	–	–	–	–	–	–	–	1	
23	Severine Ban	–	–	–	–	–	–	–	–	–	–	–	–	–	1	
23	Solustion Ban	–	–	–	–	–	–	–	–	–	–	–	–	–	1	
23	Markus Alchuler	–	–	–	–	–	–	–	–	–	–	–	–	–	1	
23	Dirk Hoderlu	–	–	–	–	–	–	–	–	–	–	–	–	–	1	
23	Ronny Thelaneyau	–	–	–	–	–	–	–	–	–	–	–	–	–	1	
23	Hacterut Neuber	–	–	–	–	–	–	–	–	–	–	–	–	–	2	
23	Angelika Kesler	–	–	–	–	–	–	–	–	–	–	–	–	–	2	
23	Krucker Stephano	–	–	–	–	–	2	–	–	–	–	–	–	–	2	
12	Andrea Hanyady	–	–	–	–	–	–	–	–	–	–	–	–	–	1	
12	S Jackeman	–	–	–	–	–	–	–	–	–	–	–	–	–	1	
12	Nick Jackson	–	–	–	–	–	–	–	–	–	–	–	–	–	1	
12	Darren Strachew	–	–	–	–	–	–	–	–	–	–	–	–	–	1	
12	Jakie Goad	–	–	–	–	–	–	–	–	–	–	–	–	–	1	
12	Sue Crelin	–	–	–	–	–	–	–	–	–	–	–	–	–	1	
12	Tracey Jackson	–	–	–	–	–	–	–	–	–	–	–	–	–	1	
12	Ull Attpoff	–	–	–	–	–	–	–	–	–	–	–	–	–	1	
12	Carola Merkle	–	–	–	–	–	–	–	–	–	–	–	–	–	1	
24	Amro Ali	1	1	1	–	–	–	–	–	–	–	–	–	–	4	
24	Adel Ahmed	1	1	1	–	–	–	–	–	–	–	–	–	–	3	
24	Waleed Ahmed	1	1	1	–	–	–	–	–	–	–	–	–	–	3	
24	Motaz Mohamed	1	1	1	–	–	–	–	–	–	–	–	–	–	3	
24	hashem Rafey	1	1	1	–	–	–	–	–	–	–	–	–	–	3	
24	kareen Nadem	1	1	1	–	–	–	–	–	–	–	–	–	–	3	
24	Rafeek Nomeer	1	1	1	–	–	–	–	–	–	–	–	–	–	3	
24	Rafeek Kassab	1	1	1	–	–	–	–	–	–	–	–	–	–	3	
24	Amro Kylany	1	1	1	–	–	–	–	–	–	–	–	–	–	3	
25	Hamada Abu Hamed	–	–	–	–	–	–	–	–	–	–	–	–	–	2	
25	Mohamed Montaser	–	–	–	–	–	–	–	–	–	–	–	–	–	2	
25	Medhat Montaser	–	–	–	–	–	–	–	–	–	–	–	–	–	2	Checksum
	SUB-TOTAL Volunteers	9	9	15	2	6	2	6	10	10	2	4	4	1	242	242

ANNEX 8B 1998 Red Sea Crown-of-Thorns Starfish Control Program Operational Details

	DATE OF TRIP	12-Jul	13-Jul	15-Jul	16-Jul	17-Jul	18-Jul	22-Jul	23-Jul	24-Jul	26-Jul	27-Jul	1 Aug	2 Aug	3 Aug	6-Aug	7 Aug	8-Aug	9-Aug	11 Aug	12 Aug	18 Aug
16	Mohamed A. Wahab	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
16	Abdel Hameid	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
16	Dr Mohamed Shoukry	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
19	Laurenze Gefriscor	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
20	Ralf	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
20	Ahmed	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
20	Anderas	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
20	Achim	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
20	Suzanne Sfick	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
21	Marc Kochzius	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
21	Ilka Pasenau	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
22	Omar Okasha	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
22	Ahmed Abu Rala	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
23	Rontlea Himmel	--	--	--	--		--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--
23	Stephan Himmel	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--
23	Jurgew Merkert		--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--		--	--
23	Klaus Halou	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--
23	Brigitte Haleu	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--
23	Johann Nierychlid	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--
23	Dirk Sembritzki	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--
23	Severine Ban	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--
23	Solustion Ban	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--
23	Marius Alchluler	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--		--	--
23	Dirk Hoderlu	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--
23	Ronny Thelaneyau	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--
23	Hacterut Neuber	--	--	--	--	--	--	--	--	--	--	--	--	--	1	1	--	--	--		--	--
23	Angelika Kesler	--	--	--	--	--	--	--	--	--	--	--	--	--	1	1	--	--	--	--	--	--
23	Krucker Stephano	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
12	Andrea Hanyady	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--		--	--
12	S Jackeman	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--		--	--
12	Nick Jackson	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--		--	--	--	--	--
12	Darren Strachaw	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--
12	Jakie Goad	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--		--	--	--	--	--
12	Sue Crelin	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--		--	--
12	Tracey Jackson	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--		--	--	--	--	--
12	Uli Athoff	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--
12	Carola Merkle	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--		--	--	--	--	--
24	Amro Ali	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
24	Adel Ahmed	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
24	Waleed Ahmed	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
24	Motaz Mohamed	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
24	hashem Rafey	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
24	kareen Nadlem	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
24	Rafeek Nomear	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
24	Rafeek Kassab	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
24	Amro Kylany	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--	--	--	--
25	Hamada Abu Hamed	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	2		--	--
25	Mohamed Montaser	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	--	--	--
25	Mediat Montaser	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2		--	--
	SUB-TOTAL Volunteers	18	12	6	16	6	8	2	4	0	3	1	0	9	14	2	0	2	6	10	33	10

ANNEX 8B 1998 Red Sea Crown-of-Thorns Starfish Control Program Operational Details

	DATE OF TRIP	21-Aug	22-Aug	23-Aug	1-Sep	3-Sep	13-Sep	15-Sep	16-Sep	19-Sep	23-Sep	29-Sep	30-Sep	3-Oct	# Dives /DC	
16	Mohamed A. Wahab	–	–	–	–	–	–	–	–	–	–	–	–	–	2	
16	Abdel Hameid	–	–	–	–	–	–	–	–	–	–	–	–	–	2	
16	Dr Mohamed Shoukry	–	–	–	–	–	–	–	–	–	–	–	–	–	2	
19	Laurenze Gelhscor	–	–	–	–	–	–	–	–	–	2	–	–	–	2	
20	Ralf	–	–	–	–	–	–	–	–	2	–	–	–	–	2	
20	Ahmed	–	–	–	–	–	–	–	–	2	–	–	–	–	2	
20	Anderas	–	–	–	–	–	–	–	–	2	–	–	–	–	2	
20	Achim	–	–	–	–	–	–	–	–	2	–	–	–	–	2	
20	Suzanne Sticki	–	–	–	–	–	–	–	–	2	–	–	–	–	2	
21	Marc Kochzius	–	–	–	–	–	–	–	–	–	–	1	1	–	2	
21	Ilka Paseneu	–	–	–	–	–	–	–	–	–	–	1	1	–	2	
22	Omar Okasha	–	–	–	–	–	–	–	–	–	–	1	1	–	2	
22	Ahmed Abu Raia	–	–	–	–	–	–	–	–	–	–	1	1	–	2	
23	Ronitea Himmel	–	–	–	–	–	–	–	–	–	–	–	–	–	1	
23	Stephan Himmel	–	–	–	–	–	–	–	–	–	–	–	–	–	1	
23	Jurgew Merkert	–	–	–	–	–	–	–	–	–	–	–	–	–	1	
23	Klaus Haleu	–	–	–	–	–	–	–	–	–	–	–	–	–	1	
23	Brigitte Heleu	–	–	–	–	–	–	–	–	–	–	–	–	–	1	
23	Johann Nierychid	–	–	–	–	–	–	–	–	–	–	–	–	–	1	
23	Dirk Sembritzid	–	–	–	–	–	–	–	–	–	–	–	–	–	1	
23	Severine Ben	–	–	–	–	–	–	–	–	–	–	–	–	–	1	
23	Solustion Ben	–	–	–	–	–	–	–	–	–	–	–	–	–	1	
23	Markus Alchuler	–	–	–	–	–	–	–	–	–	–	–	–	–	1	
23	Dirk Hoderlu	–	–	–	–	–	–	–	–	–	–	–	–	–	1	
23	Ronny Thelaneyau	–	–	–	–	–	–	–	–	–	–	–	–	–	1	
23	Hacterut Neuber	–	–	–	–	–	–	–	–	–	–	–	–	–	2	
23	Angelika Kesler	–	–	–	–	–	–	–	–	–	–	–	–	–	2	
23	Krucker Stephano	–	–	–	–	–	2	–	–	–	–	–	–	–	2	
12	Andrea Hanyady	–	–	–	–	–	–	–	–	–	–	–	–	–	1	
12	S Jackeman	–	–	–	–	–	–	–	–	–	–	–	–	–	1	
12	Nick Jackson	–	–	–	–	–	–	–	–	–	–	–	–	–	1	
12	Darren Strachaw	–	–	–	–	–	–	–	–	–	–	–	–	–	1	
12	Jakie Goad	–	–	–	–	–	–	–	–	–	–	–	–	–	1	
12	Sue Crelin	–	–	–	–	–	–	–	–	–	–	–	–	–	1	
12	Tracey Jackson	–	–	–	–	–	–	–	–	–	–	–	–	–	1	
12	Uli Altnoff	–	–	–	–	–	–	–	–	–	–	–	–	–	1	
12	Carola Merkle	–	–	–	–	–	–	–	–	–	–	–	–	–	1	
24	Amro Ali	1	1	1	–	–	–	–	–	–	–	–	–	–	4	
24	Adel Ahmed	1	1	1	–	–	–	–	–	–	–	–	–	–	3	
24	Waleed Ahmed	1	1	1	–	–	–	–	–	–	–	–	–	–	3	
24	Motaz Mohamed	1	1	1	–	–	–	–	–	–	–	–	–	–	3	
24	hashem Rafey	1	1	1	–	–	–	–	–	–	–	–	–	–	3	
24	kareen Nadiem	1	1	1	–	–	–	–	–	–	–	–	–	–	3	
24	Rafeek Nomear	1	1	1	–	–	–	–	–	–	–	–	–	–	3	
24	Rafeek Kassab	1	1	1	–	–	–	–	–	–	–	–	–	–	3	
24	Amro Kylany	1	1	1	–	–	–	–	–	–	–	–	–	–	3	
25	Hamada Abu Hamed	–	–	–	–	–	–	–	–	–	–	–	–	–	2	
25	Mohamed Montaser	–	–	–	–	–	–	–	–	–	–	–	–	–	2	
25	Medhat Montaser	–	–	–	–	–	–	–	–	–	–	–	–	–	2	Checksum
	SUB-TOTAL Volunteers	9	9	15	2	6	2	6	10	10	2	4	4	1	242	242

ANNEX 8B Data from the Red Sea EEAA Crown-of-Thorns Starfish Control Program (1998)

Site	Carless Reef		(Daily Data Sorted by Size)							
Date	7/18/98	8/8/98	8/11/98	8/12/98	8/18/98	9/1/98	9/15/98	9/16/98	9/30/98	TOTAL
Total #	255	112	48	222	55	220	327	320	186	1745
Depth	0-30m	0-15m	0-15m	0-15m	0-15m	0-15m	20m	20m	20m	
Sample #	Dia (cm)	Dia	Dia	Dia	Dia	Dia	Dia	Dia	Dia	
1	13	12	12	10	14	14	13	10	12	
2	13	13	12	11	14	15	13	11	13	
3	14	14	12 5	12	15	15	13	13	14	
4	14	14	15	12	15	15	13	13	14	
5	15	16	15	12	15	16	13	14	14	
6	15	16	15	12	16	16	13	14	15	
7	15	16	15	12	16	16	13	14	15	
8	15	16	15	13	16	16	13	15	15	
9	16	16	16	13	16	17	13	15	15	
10	16	16	16	13	16	17	14	15	15	
11	16	17	16	13	17	17	14	15	15	
12	20	17	16	13	17	18	14	15	15	
13	21	17	16	13	17	18	14	15	15	
14	22	17	17	13	17	18	14	15	15	
15	23	17	17	14	17	18	14	15	15	
16	24	17	17	14	18	19	15	15	16	
17	24	17	17	14	18	19	15	15	16	
18	25	17	17	14	18	19	15	16	16	
19	27	17	17	14	18	19	15	16	16	
20	29	17	17	14	18	19	15	16	16	
21		17 5	17	14	19	20	15	16	16	
22		18	17 5	14	19	20	15	16	16	
23		18	18	14	19	20	15	16	16	
24		18	18	14	19	20	15	16	16	
25		18	18	14	20	20	15	17	16	
26		18 5	18	15	20	20	16	17	16	
27		19	19	15	20	20	16	18	16	
28		19	19	15	21	20	16	18	17	
29		19	19	15	21	20	16	18	17	
30		19	19	15	21	20	16	18	17	
31		19	19 5	15	21	21	16	19	17	
32		20	20	15	21	21	16	19	17	
33		20	20	15	21	21	16	19	17	
34		20	20	15	21	23	16	19	17	
35		20	21	15	22	23	16	20	17	
36		20	21	15	22	23	17	20	17	
37		20	21	16	22	24	17	21	17	
38		21	23	16	22	25	17	22	17	
39		21	23	16	22	25	17	22	17	
40		21	24	16	23	25	17	23	18	
41		21	24	16	23	25	17	24	18	
42		22	24	16	24	25	17	25	18	
43		22	25	16	24	26	17	25	18	
44		23	26	16	24	27	17	27	18	
45		24	26	16	24	28	17	28	18	
46		24	27	16	24	28	17	28	18	
47		25	27	16	26	29	17	28	18	
48		25	30	16	27	29	17	28	18	
49		27		16	27	29	17	29	18	
50		28		16	27	29	17	29	18	
51				16	28	30	17	30	18	

4.6

ANNEX 8B Data from the Red Sea EEAA Crown-of-Thorns Starfish Control Program (1998)

Site	Carless Reef		(Daily Data Sorted by Size)							
Date	7/18/98	8/8/98	8/11/98	8/12/98	8/18/98	9/1/98	9/15/98	9/16/98	9/30/98	TOTAL
Total #	255	112	48	222	55	220	327	320	186	1745
Depth	0-30m	0-15m	0-15m	0-15m	0-15m	0-15m	20m	20m	20m	
52				16	28		17		18	
53				16	28		18		18	
54				16	28		18		19	
55				16	30		18		19	
56				17			18		19	
57				17			18		19	
58				17			18		19	
59				17			18		19	
60				17			18		19	
61				17			18		19	
62				17			18		19	
63				17			18		19	
64				17			18		19	
65				17			18		19	
66				17			18		19	
67				17			18		19	
68				17			18		20	
69				17			18		20	
70				17			18		20	
71				17			19		20	
72				17			19		20	
73				17			19		20	
74				17			19		20	
75				17			19		20	
76				17			19		20	
77				17			19		20	
78				17			19		20	
79				17			19		20	
80				17			19		20	
81				17			19		20	
82				18			19		20	
83				18			19		20	
84				18			19		20	
85				18			19		20	
86				18			19		20	
87				18			19		20	
88				18			19		20	
89				18			19		20	
90				18			19		20	
91				18			20		21	
92				18			20		21	
93				18			20		21	
94				18			20		21	
95				18			20		21	
96				18			20		21	
97				18			20		21	
98				18			20		21	
99				18			20		21	
100				18			20		21	
101				18			20		21	
102				18			20		21	
103				18			20		22	

ANNEX 8B Data from the Red Sea EEAA Crown-of-Thorns Starfish Control Program (1998)

Site	Carless Reef		(Daily Data Sorted by Size)							
Date	7/18/98	8/8/98	8/11/98	8/12/98	8/18/98	9/1/98	9/15/98	9/16/98	9/30/98	TOTAL
Total #	255	112	48	222	55	220	327	320	186	1745
Depth	0-30m	0-15m	0-15m	0-15m	0-15m	0-15m	20m	20m	20m	
Sample #	Dia (cm)	Dia	Dia	Dia	Dia	Dia	Dia	Dia	Dia	
1	13	12	12	10	14	14	13	10	12	
2	13	13	12	11	14	15	13	11	13	
3	14	14	12 5	12	15	15	13	13	14	
4	14	14	15	12	15	15	13	13	14	
5	15	16	15	12	15	16	13	14	14	
6	15	16	15	12	16	16	13	14	15	
7	15	16	15	12	16	16	13	14	15	
8	15	16	15	13	16	16	13	15	15	
9	16	16	16	13	16	17	13	15	15	
10	16	16	16	13	16	17	14	15	15	
11	16	17	16	13	17	17	14	15	15	
12	20	17	16	13	17	18	14	15	15	
13	21	17	16	13	17	18	14	15	15	
14	22	17	17	13	17	18	14	15	15	
15	23	17	17	14	17	18	14	15	15	
16	24	17	17	14	18	19	15	15	16	
17	24	17	17	14	18	19	15	15	16	
18	25	17	17	14	18	19	15	16	16	
19	27	17	17	14	18	19	15	16	16	
20	29	17	17	14	18	19	15	16	16	
21		17 5	17	14	19	20	15	16	16	
22		18	17 5	14	19	20	15	16	16	
23		18	18	14	19	20	15	16	16	
24		18	18	14	19	20	15	16	16	
25		18	18	14	20	20	15	17	16	
26		18 5	18	15	20	20	16	17	16	
27		19	19	15	20	20	16	18	16	
28		19	19	15	21	20	16	18	17	
29		19	19	15	21	20	16	18	17	
30		19	19	15	21	20	16	18	17	
31		19	19 5	15	21	21	16	19	17	
32		20	20	15	21	21	16	19	17	
33		20	20	15	21	21	16	19	17	
34		20	20	15	21	23	16	19	17	
35		20	21	15	22	23	16	20	17	
36		20	21	15	22	23	17	20	17	
37		20	21	16	22	24	17	21	17	
38		21	23	16	22	25	17	22	17	
39		21	23	16	22	25	17	22	17	
40		21	24	16	23	25	17	23	18	
41		21	24	16	23	25	17	24	18	
42		22	24	16	24	25	17	25	18	
43		22	25	16	24	26	17	25	18	
44		23	26	16	24	27	17	27	18	
45		24	26	16	24	28	17	28	18	
46		24	27	16	24	28	17	28	18	
47		25	27	16	26	29	17	28	18	
48		25	30	16	27	29	17	28	18	
49		27		16	27	29	17	29	18	
50		28		16	27	29	17	29	18	
51				16	28	30	17	30	18	

ANNEX 8B Data from the Red Sea EEAA Crown-of-Thorns Starfish Control Program (1998)

Site	Carless Reef		(Daily Data Sorted by Size)							
Date	7/18/98	8/8/98	8/11/98	8/12/98	8/18/98	9/1/98	9/15/98	9/16/98	9/30/98	TOTAL
Total #	255	112	48	222	55	220	327	320	186	1745
Depth	0-30m	0-15m	0-15m	0-15m	0-15m	0-15m	20m	20m	20m	
52				16	28		17		18	
53				16	28		18		18	
54				16	28		18		19	
55				16	30		18		19	
56				17			18		19	
57				17			18		19	
58				17			18		19	
59				17			18		19	
60				17			18		19	
61				17			18		19	
62				17			18		19	
63				17			18		19	
64				17			18		19	
65				17			18		19	
66				17			18		19	
67				17			18		19	
68				17			18		20	
69				17			18		20	
70				17			18		20	
71				17			19		20	
72				17			19		20	
73				17			19		20	
74				17			19		20	
75				17			19		20	
76				17			19		20	
77				17			19		20	
78				17			19		20	
79				17			19		20	
80				17			19		20	
81				17			19		20	
82				18			19		20	
83				18			19		20	
84				18			19		20	
85				18			19		20	
86				18			19		20	
87				18			19		20	
88				18			19		20	
89				18			19		20	
90				18			19		20	
91				18			20		21	
92				18			20		21	
93				18			20		21	
94				18			20		21	
95				18			20		21	
96				18			20		21	
97				18			20		21	
98				18			20		21	
99				18			20		21	
100				18			20		21	
101				18			20		21	
102				18			20		21	
103				18			20		22	

ANNEX 8B Data from the Red Sea EEAA Crown-of-Thorns Starfish Control Program (1998)

Site	Carless Reef		(Daily Data Sorted by Size)							
Date	7/18/98	8/8/98	8/11/98	8/12/98	8/18/98	9/1/98	9/15/98	9/16/98	9/30/98	TOTAL
Total #	255	112	48	222	55	220	327	320	186	1745
Depth	0-30m	0-15m	0-15m	0-15m	0-15m	0-15m	20m	20m	20m	
104				18			21		22	
105				18			21		22	
106				18			21		22	
107				18			21		22	
108				19			21		22	
109				19			21		22	
110				19			21		22	
111				19			21		23	
112				19			21		23	
113				19			21		23	
114				19			21		23	
115				19			21		24	
116				19			21		24	
117				19			21		24	
118				19			21		24	
119				19			21		25	
120				19			22		25	
121				19			22		25	
122				19			22		25	
123				19			22		25	
124				19			22		26	
125				19			22		26	
126				19			22		27	
127				20			22		27	
128				20			22		28	
129				20			22		28	
130				20			22		28	
131				20			22		28	
132				20			22		29	
133				20			23		29	
134				20			23		29	
135				20			23		30	
136				20			23		30	
137				20			24		30	
138				20			24		30	
139				20			24		30	
140				20			24		31	
141				20			24			
142				20			24			
143				20			24			
144				21			24			
145				21			25			
146				21			25			
147				21			25			
148				22			25			
149				22			25			
150				22			25			
151				22			25			
152				22			25			
153				22			25			
154				22			25			
155				22			25			

ANNEX 8B Data from the Red Sea EEAA Crown-of-Thorns Starfish Control Program (1998)

Site	Carless Reef		(Daily Data Sorted by Size)							
Date	7/18/98	8/8/98	8/11/98	8/12/98	8/18/98	9/1/98	9/15/98	9/16/98	9/30/98	TOTAL
Total #	255	112	48	222	55	220	327	320	186	1745
Depth	0-30m	0-15m	0-15m	0-15m	0-15m	0-15m	20m	20m	20m	
156				22			25			
157				22			26			
158				22			26			
159				22			26			
160				23			26			
161				23			26			
162				23			26			
163				23			26			
164				23			26			
165				23			26			
166				24			27			
167				24			27			
168				24			27			
169				24			28			
170				24			28			
171				25			30			
172				25			30			
173				25						
174				25						
175				25						
176				25						
177				25						
178				25						
179				25						
180				26						
181				26						
182				26						
183				26						

ANNEX 8B Data from the Red Sea EEAA Crown-of-Thorns Starfish Control Program (1998)

Site	Carless Reef		(Daily Data Sorted by Size)							
Date	7/18/98	8/8/98	8/11/98	8/12/98	8/18/98	9/1/98	9/15/98	9/16/98	9/30/98	TOTAL
Total #	255	112	48	222	55	220	327	320	186	1745
Depth	0-30m	0-15m	0-15m	0-15m	0-15m	0-15m	20m	20m	20m	
104				18			21		22	
105				18			21		22	
106				18			21		22	
107				18			21		22	
108				19			21		22	
109				19			21		22	
110				19			21		22	
111				19			21		23	
112				19			21		23	
113				19			21		23	
114				19			21		23	
115				19			21		24	
116				19			21		24	
117				19			21		24	
118				19			21		24	
119				19			21		25	
120				19			22		25	
121				19			22		25	
122				19			22		25	
123				19			22		25	
124				19			22		26	
125				19			22		26	
126				19			22		27	
127				20			22		27	
128				20			22		28	
129				20			22		28	
130				20			22		28	
131				20			22		28	
132				20			22		29	
133				20			23		29	
134				20			23		29	
135				20			23		30	
136				20			23		30	
137				20			24		30	
138				20			24		30	
139				20			24		30	
140				20			24		31	
141				20			24			
142				20			24			
143				20			24			
144				21			24			
145				21			25			
146				21			25			
147				21			25			
148				22			25			
149				22			25			
150				22			25			
151				22			25			
152				22			25			
153				22			25			
154				22			25			
155				22			25			

ANNEX 8B Data from the Red Sea EEAA Crown-of-Thorns Starfish Control Program (1998)

Site	Carless Reef		(Daily Data Sorted by Size)							
Date	7/18/98	8/8/98	8/11/98	8/12/98	8/18/98	9/1/98	9/15/98	9/16/98	9/30/98	TOTAL
Total #	255	112	48	222	55	220	327	320	186	1745
Depth	0-30m	0-15m	0-15m	0-15m	0-15m	0-15m	20m	20m	20m	
156				22			25			
157				22			26			
158				22			26			
159				22			26			
160				23			26			
161				23			26			
162				23			26			
163				23			26			
164				23			26			
165				23			26			
166				24			27			
167				24			27			
168				24			27			
169				24			28			
170				24			28			
171				25			30			
172				25			30			
173				25						
174				25						
175				25						
176				25						
177				25						
178				25						
179				25						
180				26						
181				26						
182				26						
183				26						

ANNEX 8B Data from the Red Sea EEAA Crown-of-Thorns Starfish Control Program (1998)

Site	Carless Reef		(Daily Data Sorted by Size)							
Date	7/18/98	8/8/98	8/11/98	8/12/98	8/18/98	9/1/98	9/15/98	9/16/98	9/30/98	TOTAL
Total #	255	112	48	222	55	220	327	320	186	1745
Depth	0-30m	0-15m	0-15m	0-15m	0-15m	0-15m	20m	20m	20m	
184				26						
185				26						
186				26						
187				26						
188				26						
189				26						
190				26						
191				27						
192				27						
193				27						
194				27						
195				27						
196				27						
197				27						
198				27						
199				27						
200				28						
201				28						
202				28						
203				28						
204				28						
205				28						
206				28						
207				28						
208				29						
209				30						
210				30						
211				30						
212				30						
213				30						
214				30						
215				30						
216				30						
217				30						
218				30						
219				30						
220				30						
221				32						
222				32						
Date	7/18/98	8/8/98	8/11/98	8/12/98	8/18/98	9/1/98	9/15/98	9/16/98	9/30/98	
AvgDia	19	19	19	20	21	21	20	19	20	

ANNEX 8B Data from the Red Sea EEAA Crown-of-Thorns Starfish Control Program (1998)

Site	Carless Reef		(Daily Data Sorted by Size)							
Date	7/18/98	8/8/98	8/11/98	8/12/98	8/18/98	9/1/98	9/15/98	9/16/98	9/30/98	TOTAL
Total #	255	112	48	222	55	220	327	320	186	1745
Depth	0-30m	0-15m	0-15m	0-15m	0-15m	0-15m	20m	20m	20m	

Size-Frequency Count

Date	7/18/98	8/8/98	8/11/98	8/12/98	8/18/98	9/1/98	9/15/98	9/16/98	9/30/98
0-10 cm	0	0	0	1	0	0	0	1	0
11-15 cm	8	4	8	35	5	4	25	16	15
16-20 cm	4	33	26	107	22	26	78	19	75
21-25 cm	6	11	9	36	19	12	53	7	33
26-30 cm	2	2	5	41	9	9	16	8	16
> 30 cm	0	0	0	2	0	0	0	0	1
Total	20	50	48	222	55	51	172	51	140

Size-Freq % Normalized

Bin Size	7/18/98	8/8/98	8/11/98	8/12/98	8/18/98	9/1/98	9/15/98	9/16/98	9/30/98
0-10 cm	0	0	0	0	0	0	0	2	0
11-15 cm	40	8	17	16	9	8	15	31	11
16-20 cm	20	66	54	48	40	51	45	37	54
21-25 cm	30	22	19	16	35	24	31	14	24
26-30 cm	10	4	10	18	16	18	9	16	11
> 30 cm	0	0	0	1	0	0	0	0	1
Total	100	100	100	100	100	100	100	100	100

Statistics for groups/date

Date	7/18/98	8/8/98	8/11/98	8/12/98	8/18/98	9/1/98	9/15/98	9/16/98	9/30/98
Mean	18 9	18 9	19 1	20 0	20 7	21 1	19 8	18 9	20 1
Standard Error	1 1	0 5	0 6	0 3	0 6	0 6	0 3	0 7	0 4
Median	16 0	18 3	18 0	19 0	21 0	20 0	19 0	17 0	20 0
Mode	15 0	17 0	17 0	17 0	21 0	20 0	19 0	15 0	20 0
Standard Deviation	5 1	3 4	4 1	5 0	4 2	4 4	3 9	5 2	4 2
Minimum	13 0	12 0	12 0	10 0	14 0	14 0	13 0	10 0	12 0
Maximum	29 0	28 0	30 0	32 0	30 0	30 0	30 0	30 0	31 0
Count	20 0	50 0	48 0	222 0	55 0	51 0	172 0	51 0	140 0

Statistics for all data/collection

Date	7/18/98	8/8/98	8/11/98	8/12/98	8/18/98	9/1/98	9/15/98	9/16/98	9/30/98
Mean	18 9	18 9	19 1	20 0	20 7	21 1	19 8	18 9	20 1
Standard Error	1 1	0 5	0 6	0 3	0 6	0 6	0 3	0 7	0 4
Median	16 0	18 3	18 0	19 0	21 0	20 0	19 0	17 0	20 0
Mode	15 0	17 0	17 0	17 0	21 0	20 0	19 0	15 0	20 0
Standard Deviation	5 1	3 4	4 1	5 0	4 2	4 4	3 9	5 2	4 2
Minimum	13 0	12 0	12 0	10 0	14 0	14 0	13 0	10 0	12 0
Maximum	29 0	28 0	30 0	32 0	30 0	30 0	30 0	30 0	31 0
Count	20 0	50 0	48 0	222 0	55 0	51 0	172 0	51 0	140 0

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ANNEX 8B Data from the Red Sea EEAA Crown-of-Thorns Starfish Control Program (1998)

Site	Carless Reef		(Daily Data Sorted by Size)							
Date	7/18/98	8/8/98	8/11/98	8/12/98	8/18/98	9/1/98	9/15/98	9/16/98	9/30/98	TOTAL
Total #	255	112	48	222	55	220	327	320	186	1745
Depth	0-30m	0-15m	0-15m	0-15m	0-15m	0-15m	20m	20m	20m	
184				26						
185				26						
186				26						
187				26						
188				26						
189				26						
190				26						
191				27						
192				27						
193				27						
194				27						
195				27						
196				27						
197				27						
198				27						
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200				28						
201				28						
202				28						
203				28						
204				28						
205				28						
206				28						
207				28						
208				29						
209				30						
210				30						
211				30						
212				30						
213				30						
214				30						
215				30						
216				30						
217				30						
218				30						
219				30						
220				30						
221				32						
222				32						
Date	7/18/98	8/8/98	8/11/98	8/12/98	8/18/98	9/1/98	9/15/98	9/16/98	9/30/98	
AvgDia	19	19	19	20	21	21	20	19	20	

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ANNEX 8B Data from the Red Sea EEAA Crown-of-Thorns Starfish Control Program (1998)

Site	Carless Reef		(Daily Data Sorted by Size)							
Date	7/18/98	8/8/98	8/11/98	8/12/98	8/18/98	9/1/98	9/15/98	9/16/98	9/30/98	TOTAL
Total #	255	112	48	222	55	220	327	320	186	1745
Depth	0-30m	0-15m	0-15m	0-15m	0-15m	0-15m	20m	20m	20m	

Size-Frequency Count

Date	7/18/98	8/8/98	8/11/98	8/12/98	8/18/98	9/1/98	9/15/98	9/16/98	9/30/98
0-10 cm	0	0	0	1	0	0	0	1	0
11-15 cm	8	4	8	35	5	4	25	16	15
16-20 cm	4	33	26	107	22	26	78	19	75
21-25 cm	6	11	9	36	19	12	53	7	33
26-30 cm	2	2	5	41	9	9	16	8	16
> 30 cm	0	0	0	2	0	0	0	0	1
Total	20	50	48	222	55	51	172	51	140

Size-Freq % Normalized

Bin Size	7/18/98	8/8/98	8/11/98	8/12/98	8/18/98	9/1/98	9/15/98	9/16/98	9/30/98
0-10 cm	0	0	0	0	0	0	0	2	0
11-15 cm	40	8	17	16	9	8	15	31	11
16-20 cm	20	66	54	48	40	51	45	37	54
21-25 cm	30	22	19	16	35	24	31	14	24
26-30 cm	10	4	10	18	16	18	9	16	11
> 30 cm	0	0	0	1	0	0	0	0	1
Total	100	100	100	100	100	100	100	100	100

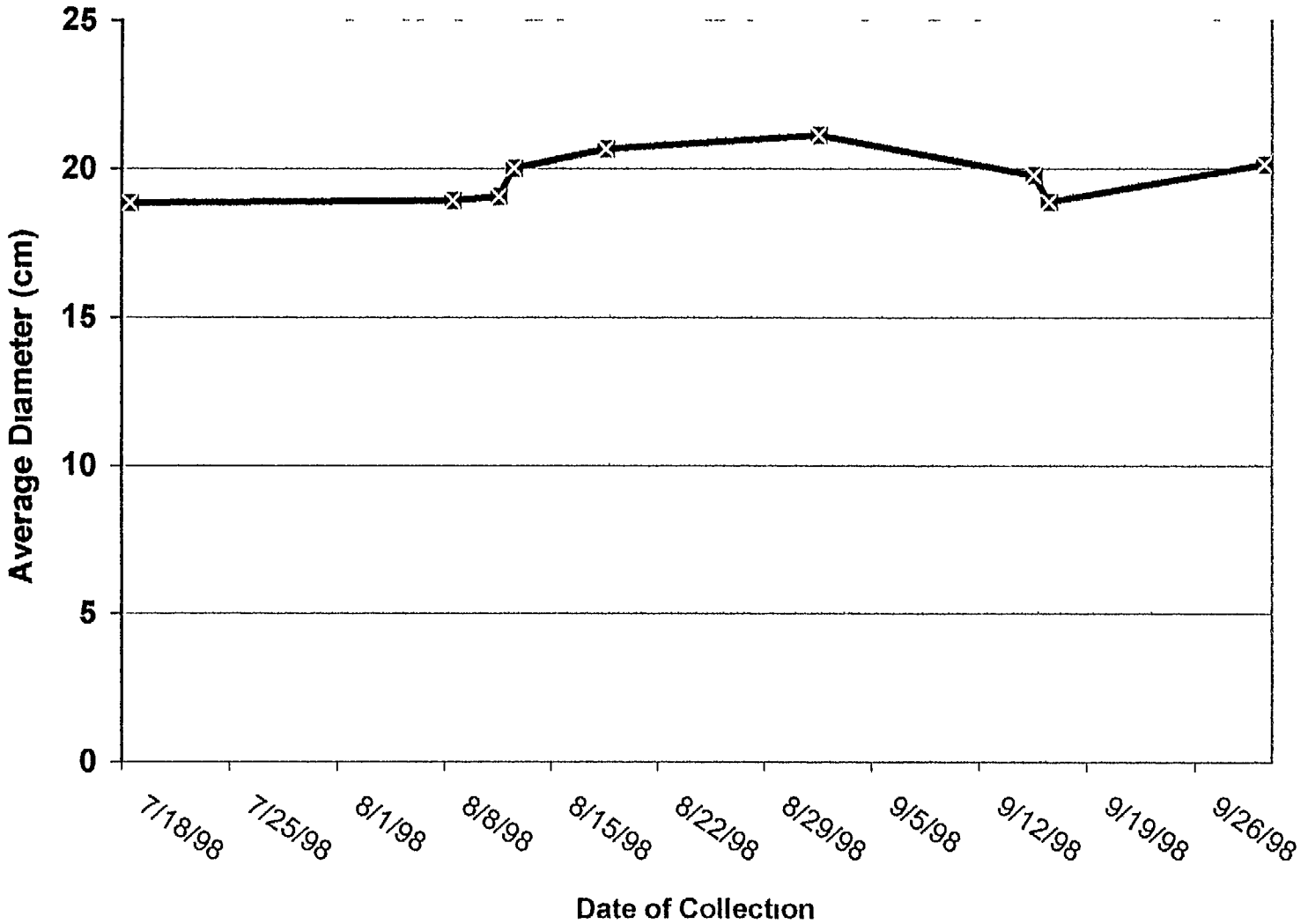
Statistics for groups/date

Date	7/18/98	8/8/98	8/11/98	8/12/98	8/18/98	9/1/98	9/15/98	9/16/98	9/30/98
Mean	18 9	18 9	19 1	20 0	20 7	21 1	19 8	18 9	20 1
Standard Error	1 1	0 5	0 6	0 3	0 6	0 6	0 3	0 7	0 4
Median	16 0	18 3	18 0	19 0	21 0	20 0	19 0	17 0	20 0
Mode	15 0	17 0	17 0	17 0	21 0	20 0	19 0	15 0	20 0
Standard Deviation	5 1	3 4	4 1	5 0	4 2	4 4	3 9	5 2	4 2
Minimum	13 0	12 0	12 0	10 0	14 0	14 0	13 0	10 0	12 0
Maximum	29 0	28 0	30 0	32 0	30 0	30 0	30 0	30 0	31 0
Count	20 0	50 0	48 0	222 0	55 0	51 0	172 0	51 0	140 0

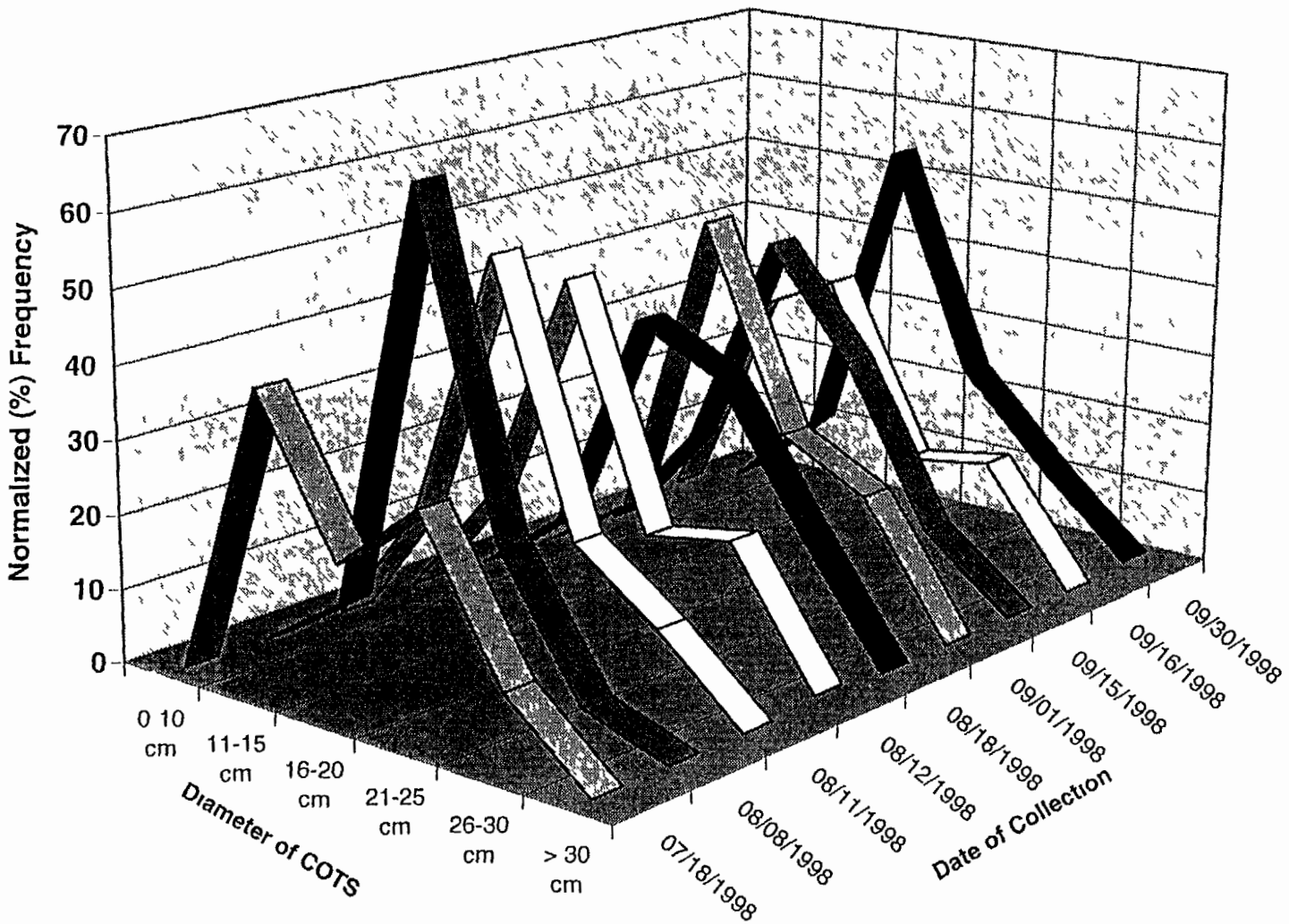
Statistics for all data/collection

Date	7/18/98	8/8/98	8/11/98	8/12/98	8/18/98	9/1/98	9/15/98	9/16/98	9/30/98
Mean	18 9	18 9	19 1	20 0	20 7	21 1	19 8	18 9	20 1
Standard Error	1 1	0 5	0 6	0 3	0 6	0 6	0 3	0 7	0 4
Median	16 0	18 3	18 0	19 0	21 0	20 0	19 0	17 0	20 0
Mode	15 0	17 0	17 0	17 0	21 0	20 0	19 0	15 0	20 0
Standard Deviation	5 1	3 4	4 1	5 0	4 2	4 4	3 9	5 2	4 2
Minimum	13 0	12 0	12 0	10 0	14 0	14 0	13 0	10 0	12 0
Maximum	29 0	28 0	30 0	32 0	30 0	30 0	30 0	30 0	31 0
Count	20 0	50 0	48 0	222 0	55 0	51 0	172 0	51 0	140 0

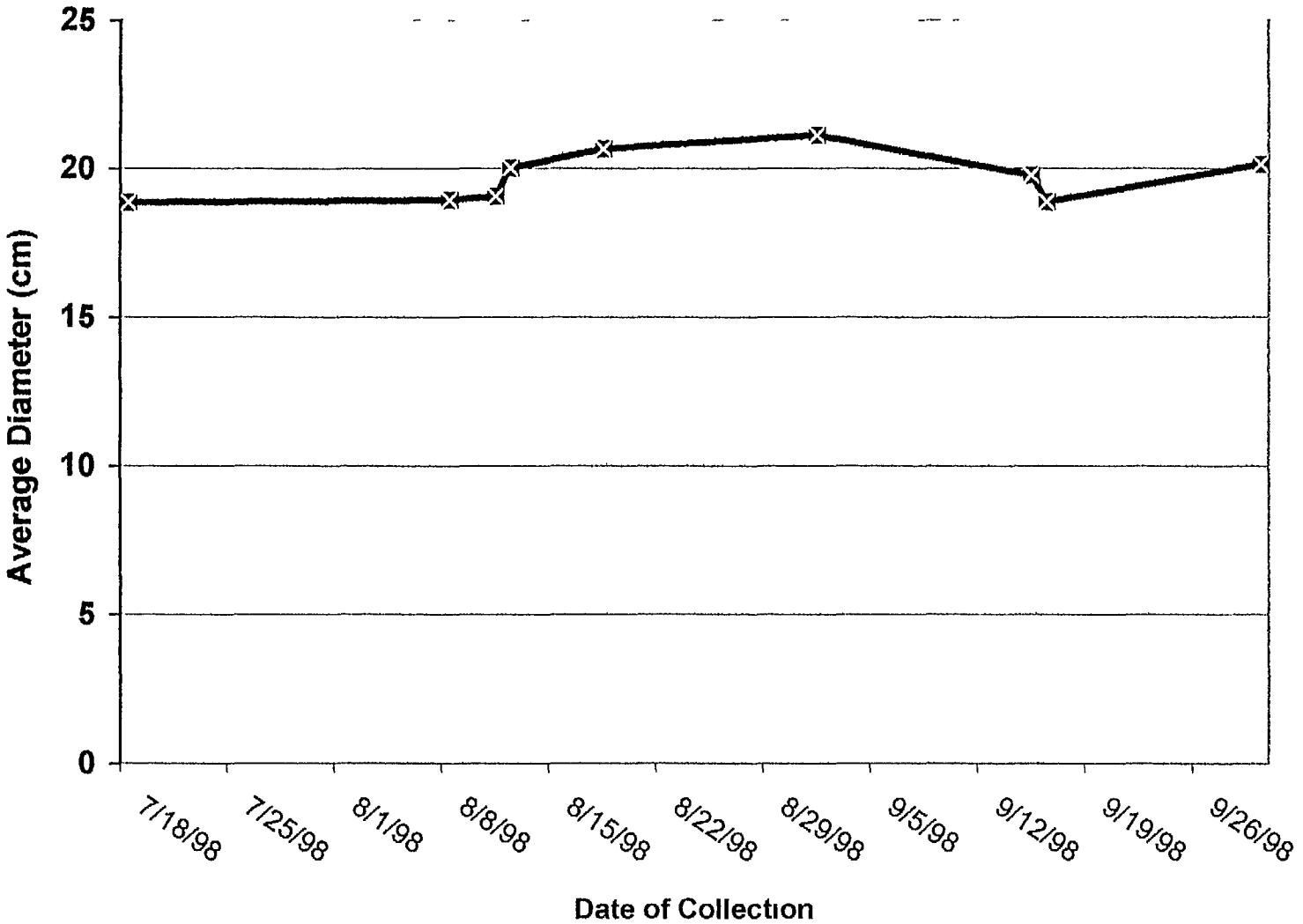
Average COTS Diameter from Carless Reef in 1998 Collections



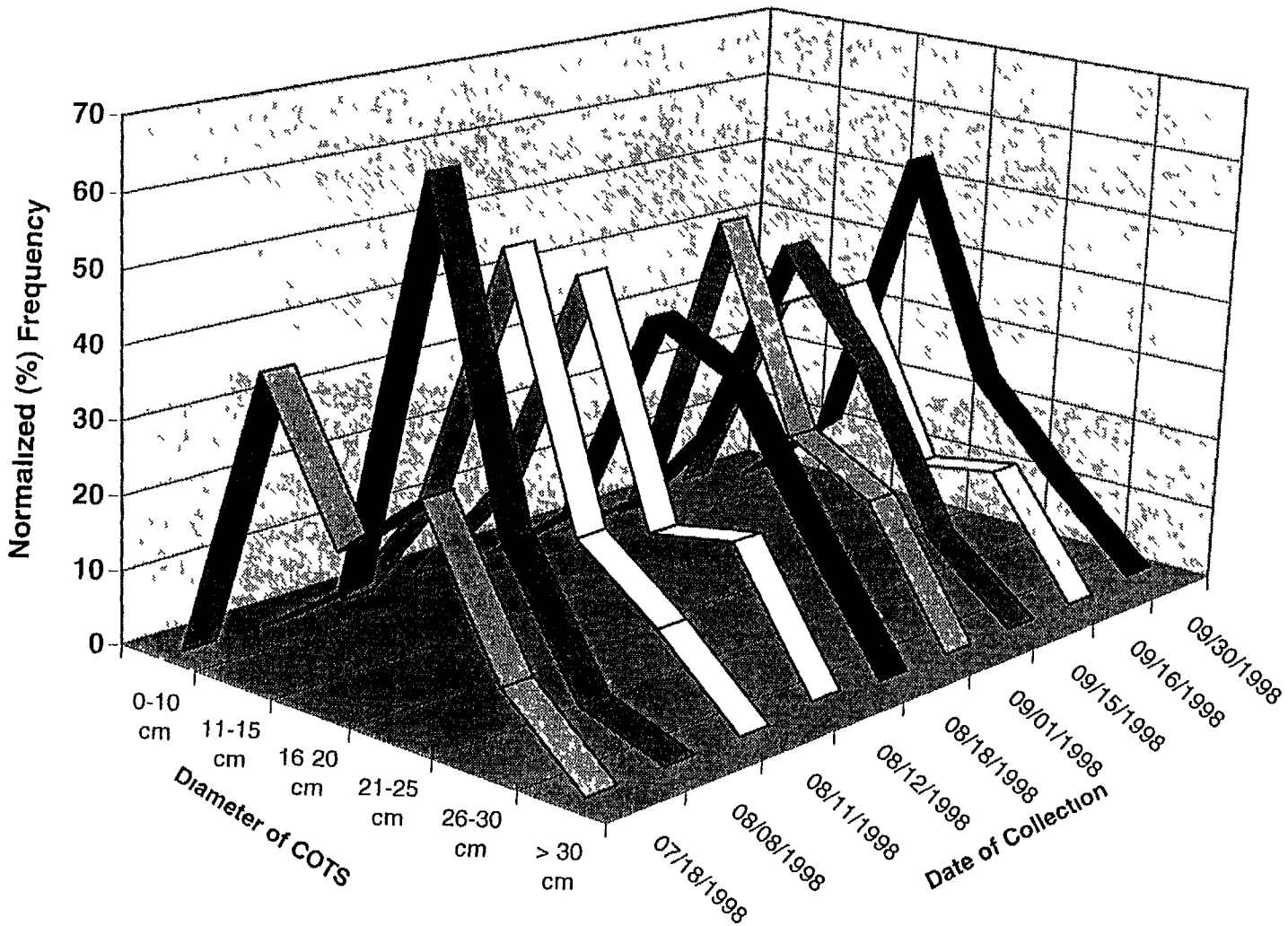
1998 Carless Reef COTS Size-Frequency Distribution



Average COTS Diameter from Carless Reef in 1998 Collections



1998 Carless Reef COTS Size-Frequency Distribution



ANNEX 8B Data from the Red Sea EEAA Crown-of-Thorns Starfish Control Prgogram (1998)

Site	Shabrour Umm Gamar			(Daily Data Sorted by Size)							
Date	7/12/98	7/15/98	7/18/98	7/23/98	7/24/98	7/27/98	8/23/98	9/3/98	9/29/98	10/3/98	TOTAL
Total #	360	543	284	196	116	42	302	77	171	23	2114
Depth	4-20 m	0-10m	0-10m	20 m	0-20m	12-19 m	0-15m	7-15m	0-18m	9-12m	
Sample #	Dia (cm)	Dia	Dia	Dia	Dia	Dia	Dia	Dia	Dia	Dia	
1	11	10	10	11	10	12	10	12	10	13	
2	12	11	10	12	10	12	10	12	10	13	
3	12	11	11	12	12	12	11	12	10	14	
4	13	12	11	12	12	12	11	13	10	14	
5	13	12	11	12	12	13	11	14	11	14	
6	13	13	11	12	12	13	11	14	11	14	
7	13	13	11	13	13	14	11	14	11	14	
8	14	13	11	13	13	14	11	15	11	14	
9	14	14	11	13	13	16	11	15	11	14	
10	14	14	11	13	13	17	11	15	12	15	
11	14	14	12	13	13	17	11	15	12	15	
12	15	14	12	14	13	17	11	15	12	17	
13	15	14	12	14	14	19	12	16	12	18	
14	15	14	12	14	14	21	12	16	13	18	
15	16	14	12	14	14	22	12	16	13	19	
16	16	14	12	14	14	23	12	16	13	19	
17	16	15	12	14	14	23	12	16	13	19	
18	17	15	12	14	14	23	12	16	13	21	
19	17	15	12	14	14	24	12	17	13	23	
20	17 5	16	12	14	14	24	12	17	13	24	
21	18	16	12	14	14	25	12	17	13	24	
22	18	16	12	14	14	25	12	17	13	27	
23	18	16	12	14	14	25	12	18	14	28	
24	18	16	12	15	14	25	12	19	14		
25	18	16	12	15	15	26	12	19	14		
26	18	17	13	15	15	29	12	19	14		
27	18 5	18	13	15	15	14	12	19			
28	19	18	13	15	15	14	12	20			
29	19	18	13	16	15	14	13	20			
30	19	19	13	16	15	14	13	20			
31	19	19	13	16	15	14	13	20			
32	20	19	13	16	16	15	13	21			
33	20	19	13	16	16	15	13	21			
34	20	20	13	16	16	15	13	21			
35	21	20	13	16	16	15	13	21			
36	21	20	13	16	16	15	13	22			
37	21	20	13	16	16	15	13	22			
38	21	20	13	16	16	15	13	22			
39	22	20	13	17	16	16	13	23			
40	22	20	13	17	16	16	13	23			
41	23	20	14	17	16	16	13	23			
42	23	20	14	17	17	16	13	23			
43	23	20	14	17	17	16	13	23			
44	23	20	14	17	17	16	13	23			
45	23	21	14	17	17	17	13	23			
46	23	21	14	17	17	17	13	23			
47	23	21	14	17	17	17	13	23			
48	23	21	14	17	17	17	13	24			
49	24	21	14	17	18	17	13	24			
50	24	21	14	17	18	17	13	24			
51	24	22	14	17	18	18	13	24			
52	24	22	14	17	18	18	14	24			
53	24	22	14	18	18	18	14	24			
54	24	22	14	18	18	18	14	24			
55	25	22	15	18	18	18	14	25			
56	25	23	15	18	18	19	14	25			

ANNEX 8B Data from the Red Sea EEAA Crown-of-Thorns Starfish Control Prgogram (1998)

Site	Shabrour Umm Gamar			(Daily Data Sorted by Size)							
Date	7/12/98	7/15/98	7/18/98	7/23/98	7/24/98	7/27/98	8/23/98	9/3/98	9/29/98	10/3/98	TOTAL
Total #	360	543	284	196	116	42	302	77	171	23	2114
Depth	4-20 m	0-10m	0-10m	20 m	0-20m	12-19 m	0-15m	7-15m	0-18m	9-12m	
57	25	23	15	18	18	19	14	25			
58	25	23	15	18	18	19	14	25			
59	25	23	15	18	19	20	14	25			
60	25	23	15	18	19	20	14	25			
61	25	23	15	18	19	20	14	25			
62	25	23	15	19	19	21	14	25			
63	25	23	15	19	19	21	14	25			
64	25	23	15	19	20	21	14	26			
65	25	23	15	19	20	21	14	26			
66	25	23	15	19	20	22	14	27			
67	25	24	15	19	20	22	14	27			
68	26	24	15	19	20	22	14	27			
69	26	25	15	19	20	22	14	28			
70	26	25	16	19	21	22	14	28			
71	26	25	16	19	21	22	14	28			
72	26	25	16	19	21	22	14	29			
73	26	25	16	19	21	22	14	29			
74	26	25	16	19	21	22	14	31			
75	26	25	16	19	22	23	14	31			
76	26	26	16	19	22	24	14	33			
77	26	26	16	19	22	24	14	36			
78	27	27	16	20	22	25	14				
79	27	27	16	20	22	25	14				
80	27	27	16	20	22	26	15				
81	27	27	16	20	22	27	15				
82	27	27	16	20	22	27	15				
83	27	28	16	20	22	28	15				
84	27	28	16	20	22	30	15				
85	27	28	16	20	22	31	15				
86	27	28	16	21	22	31	15				
87	28	29	16	21	22		15				
88	28	34	16	21	22		15				
89	28	34	17	21	22		15				
90	28	35	17	21	22		15				
91	28		17	21	22		15				
92	29		17	21	22		15				
93	29		17	22	22		15				
94	29		17	22	22		15				
95	29		17	22	22		15				
96	30		17	22	23		15				
97	30		17	22	23		15				
98	30		17	22	23		15				
99	30		17	22	23		15				
100	30		18	22	23		16				
101	30		18	22	23		16				
102	31		18	22	23		16				
103	31		18	22	23		16				
104	31		19	22	23		16				
105	34		19	22	23		16				
106	38		19	22	23		17				
107	39		19	22	23		17				
108	39		19	22	23		17				
109			19	22	23		17				
110			19	22	24		17				
111			19	22	24		17				
112			19	22	24		18				
113			19	22	24		18				
114			19	23	24		18				

ANNEX 8B Data from the Red Sea EEAA Crown-of-Thorns Starfish Control Prgogram (1998)

Site	Shabrour Umm Gamar			(Daily Data Sorted by Size)							
Date	7/12/98	7/15/98	7/18/98	7/23/98	7/24/98	7/27/98	8/23/98	9/3/98	9/29/98	10/3/98	TOTAL
Total #	360	543	284	196	116	42	302	77	171	23	2114
Depth	4-20 m	0-10m	0-10m	20 m	0-20m	12-19 m	0-15m	7-15m	0-18m	9-12m	
Sample #	Dia (cm)	Dia	Dia	Dia	Dia	Dia	Dia	Dia	Dia	Dia	
1	11	10	10	11	10	12	10	12	10	13	
2	12	11	10	12	10	12	10	12	10	13	
3	12	11	11	12	12	12	11	12	10	14	
4	13	12	11	12	12	12	11	13	10	14	
5	13	12	11	12	12	13	11	14	11	14	
6	13	13	11	12	12	13	11	14	11	14	
7	13	13	11	13	13	14	11	14	11	14	
8	14	13	11	13	13	14	11	15	11	14	
9	14	14	11	13	13	16	11	15	11	14	
10	14	14	11	13	13	17	11	15	12	15	
11	14	14	12	13	13	17	11	15	12	15	
12	15	14	12	14	13	17	11	15	12	17	
13	15	14	12	14	14	19	12	16	12	18	
14	15	14	12	14	14	21	12	16	13	18	
15	16	14	12	14	14	22	12	16	13	19	
16	16	14	12	14	14	23	12	16	13	19	
17	16	15	12	14	14	23	12	16	13	19	
18	17	15	12	14	14	23	12	16	13	21	
19	17	15	12	14	14	24	12	17	13	23	
20	17 5	16	12	14	14	24	12	17	13	24	
21	18	16	12	14	14	25	12	17	13	24	
22	18	16	12	14	14	25	12	17	13	27	
23	18	16	12	14	14	25	12	18	14	28	
24	18	16	12	15	14	25	12	19	14		
25	18	16	12	15	15	26	12	19	14		
26	18	17	13	15	15	29	12	19	14		
27	18 5	18	13	15	15	14	12	19			
28	19	18	13	15	15	14	12	20			
29	19	18	13	16	15	14	13	20			
30	19	19	13	16	15	14	13	20			
31	19	19	13	16	15	14	13	20			
32	20	19	13	16	16	15	13	21			
33	20	19	13	16	16	15	13	21			
34	20	20	13	16	16	15	13	21			
35	21	20	13	16	16	15	13	21			
36	21	20	13	16	16	15	13	22			
37	21	20	13	16	16	15	13	22			
38	21	20	13	16	16	15	13	22			
39	22	20	13	17	16	16	13	23			
40	22	20	13	17	16	16	13	23			
41	23	20	14	17	16	16	13	23			
42	23	20	14	17	17	16	13	23			
43	23	20	14	17	17	16	13	23			
44	23	20	14	17	17	16	13	23			
45	23	21	14	17	17	17	13	23			
46	23	21	14	17	17	17	13	23			
47	23	21	14	17	17	17	13	23			
48	23	21	14	17	17	17	13	24			
49	24	21	14	17	18	17	13	24			
50	24	21	14	17	18	17	13	24			
51	24	22	14	17	18	18	13	24			
52	24	22	14	17	18	18	14	24			
53	24	22	14	18	18	18	14	24			
54	24	22	14	18	18	18	14	24			
55	25	22	15	18	18	18	14	25			
56	25	23	15	18	18	19	14	25			

ANNEX 8B Data from the Red Sea EEAA Crown-of-Thorns Starfish Control Prgogram (1998)

Site	Shabrour Umm Gamar			(Daily Data Sorted by Size)							
Date	7/12/98	7/15/98	7/18/98	7/23/98	7/24/98	7/27/98	8/23/98	9/3/98	9/29/98	10/3/98	TOTAL
Total #	360	543	284	196	116	42	302	77	171	23	2114
Depth	4-20 m	0-10m	0-10m	20 m	0-20m	12-19 m	0-15m	7-15m	0-18m	9-12m	
57	25	23	15	18	18	19	14	25			
58	25	23	15	18	18	19	14	25			
59	25	23	15	18	19	20	14	25			
60	25	23	15	18	19	20	14	25			
61	25	23	15	18	19	20	14	25			
62	25	23	15	19	19	21	14	25			
63	25	23	15	19	19	21	14	25			
64	25	23	15	19	20	21	14	26			
65	25	23	15	19	20	21	14	26			
66	25	23	15	19	20	22	14	27			
67	25	24	15	19	20	22	14	27			
68	26	24	15	19	20	22	14	27			
69	26	25	15	19	20	22	14	28			
70	26	25	16	19	21	22	14	28			
71	26	25	16	19	21	22	14	28			
72	26	25	16	19	21	22	14	29			
73	26	25	16	19	21	22	14	29			
74	26	25	16	19	21	22	14	31			
75	26	25	16	19	22	23	14	31			
76	26	26	16	19	22	24	14	33			
77	26	26	16	19	22	24	14	36			
78	27	27	16	20	22	25	14				
79	27	27	16	20	22	25	14				
80	27	27	16	20	22	26	15				
81	27	27	16	20	22	27	15				
82	27	27	16	20	22	27	15				
83	27	28	16	20	22	28	15				
84	27	28	16	20	22	30	15				
85	27	28	16	20	22	31	15				
86	27	28	16	21	22	31	15				
87	28	29	16	21	22		15				
88	28	34	16	21	22		15				
89	28	34	17	21	22		15				
90	28	35	17	21	22		15				
91	28		17	21	22		15				
92	29		17	21	22		15				
93	29		17	22	22		15				
94	29		17	22	22		15				
95	29		17	22	22		15				
96	30		17	22	23		15				
97	30		17	22	23		15				
98	30		17	22	23		15				
99	30		17	22	23		15				
100	30		18	22	23		16				
101	30		18	22	23		16				
102	31		18	22	23		16				
103	31		18	22	23		16				
104	31		19	22	23		16				
105	34		19	22	23		16				
106	38		19	22	23		17				
107	39		19	22	23		17				
108	39		19	22	23		17				
109			19	22	23		17				
110			19	22	24		17				
111			19	22	24		17				
112			19	22	24		18				
113			19	22	24		18				
114			19	23	24		18				

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ANNEX 8B Data from the Red Sea EEAA Crown-of-Thorns Starfish Control Prgogram (1998)

Site	Shabrour Umm Gamar			(Daily Data Sorted by Size)							
Date	7/12/98	7/15/98	7/18/98	7/23/98	7/24/98	7/27/98	8/23/98	9/3/98	9/29/98	10/3/98	TOTAL
Total #	360	543	284	196	116	42	302	77	171	23	2114
Depth	4-20 m	0-10m	0-10m	20 m	0-20m	12-19 m	0-15m	7-15m	0-18m	9-12m	
115			20	23	24		18				
116			20	23	24		18				
117			20	23	24		18				
118			20	23	24		18				
119			20	23	25		18				
120			20	23	25		18				
121			20	23	25		18				
122			20	23	25		18				
123			20	23	25		18				
124			20	23	25		19				
125			20	23	25		19				
126			20	23	25		19				
127			21	23	25		19				
128			21	24	25		20				
129			21	24	25		21				
130			21	24	25		21				
131			21	24	25		21				
132			21	24	25		21				
133			21	24	26		21				
134			21	24	26		21				
135			21	24	26		21				
136			22	24	26		21				
137			22	24	30		22				
138			22	24	30		22				
139			22	24	30		23				
140			22	24	30		23				
141			22	24	32		23				
142			22	24	32		23				
143			22	24	32		23				
144			23	24	34		23				
145			23	24	34		23				
146			23	24	36		23				
147			23	24	36		23				
148			23	24			23				
149			23	25			24				
150			23	25			24				
151			23	25			25				
152			23	25			25				
153			23	25			26				
154			23	25			27				
155			24	25			28				
156			24	25			30				
157			24	25							
158			24	25							
159			24	25							
160			24	25							
161			24	25							
162			24	25							
163			24	25							
164			24	25							
165			24	26							
166			25	26							
167			25	26							
168			25	26							
169			25	26							
170			25	26							
171			25	26							
172			25	26							

ANNEX 8B Data from the Red Sea EEAA Crown-of-Thorns Starfish Control Prgogram (1998)

Site	Shabrour Umm Gamar			(Daily Data Sorted by Size)							
Date	7/12/98	7/15/98	7/18/98	7/23/98	7/24/98	7/27/98	8/23/98	9/3/98	9/29/98	10/3/98	TOTAL
Total #	360	543	284	196	116	42	302	77	171	23	2114
Depth	4-20 m	0-10m	0-10m	20 m	0-20m	12-19 m	0-15m	7-15m	0-18m	9-12m	
173			25	26							
174			26	26							
175			26	27							
176			26	27							
177			27	27							
178			27	27							
179			27	27							
180			27	27							
181			29	27							
182			29	27							
183			31	27							
184			35	28							
185				28							
186				28							
187				28							
188				30							
189				30							
190				31							
191				31							
192				33							
193				33							
194				34							
195				34							
196				36							
	7/12/98	7/15/98	7/18/98	7/23/98	7/24/98	7/27/98	8/23/98	9/3/98	9/29/98	10/3/98	
AVG DIA	23	21	18	21	20	20	16	22	12	18	

ANNEX 8B Data from the Red Sea EEAA Crown-of-Thorns Starfish Control Prgogram (1998)

Site	Shabrour Umm Gamar			(Daily Data Sorted by Size)							
Date	7/12/98	7/15/98	7/18/98	7/23/98	7/24/98	7/27/98	8/23/98	9/3/98	9/29/98	10/3/98	TOTAL
Total #	360	543	284	196	116	42	302	77	171	23	2114
Depth	4-20 m	0-10m	0-10m	20 m	0-20m	12-19 m	0-15m	7-15m	0-18m	9-12m	
115			20	23	24		18				
116			20	23	24		18				
117			20	23	24		18				
118			20	23	24		18				
119			20	23	25		18				
120			20	23	25		18				
121			20	23	25		18				
122			20	23	25		18				
123			20	23	25		18				
124			20	23	25		19				
125			20	23	25		19				
126			20	23	25		19				
127			21	23	25		19				
128			21	24	25		20				
129			21	24	25		21				
130			21	24	25		21				
131			21	24	25		21				
132			21	24	25		21				
133			21	24	26		21				
134			21	24	26		21				
135			21	24	26		21				
136			22	24	26		21				
137			22	24	30		22				
138			22	24	30		22				
139			22	24	30		23				
140			22	24	30		23				
141			22	24	32		23				
142			22	24	32		23				
143			22	24	32		23				
144			23	24	34		23				
145			23	24	34		23				
146			23	24	36		23				
147			23	24	36		23				
148			23	24			23				
149			23	25			24				
150			23	25			24				
151			23	25			25				
152			23	25			25				
153			23	25			26				
154			23	25			27				
155			24	25			28				
156			24	25			30				
157			24	25							
158			24	25							
159			24	25							
160			24	25							
161			24	25							
162			24	25							
163			24	25							
164			24	25							
165			24	26							
166			25	26							
167			25	26							
168			25	26							
169			25	26							
170			25	26							
171			25	26							
172			25	26							

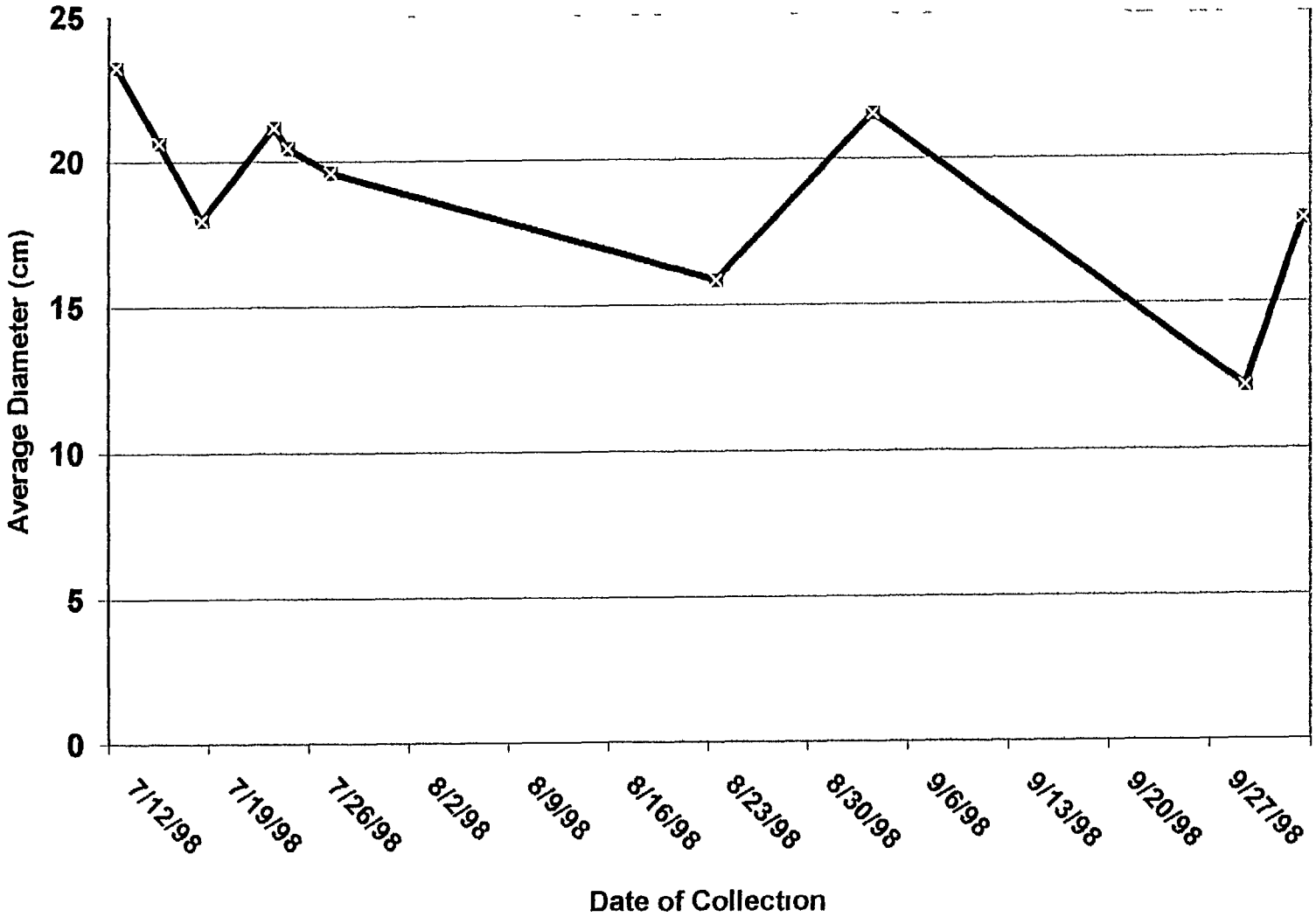
ANNEX 8B Data from the Red Sea EEAA Crown-of-Thorns Starfish Control Prgogram (1998)

Site	Shabrour Umm Gamar			(Daily Data Sorted by Size)							
Date	7/12/98	7/15/98	7/18/98	7/23/98	7/24/98	7/27/98	8/23/98	9/3/98	9/29/98	10/3/98	TOTAL
Total #	360	543	284	196	116	42	302	77	171	23	2114
Depth	4-20 m	0-10m	0-10m	20 m	0-20m	12-19 m	0-15m	7-15m	0-18m	9-12m	
173			25	26							
174			26	26							
175			26	27							
176			26	27							
177			27	27							
178			27	27							
179			27	27							
180			27	27							
181			29	27							
182			29	27							
183			31	27							
184			35	28							
185				28							
186				28							
187				28							
188				30							
189				30							
190				31							
191				31							
192				33							
193				33							
194				34							
195				34							
196				36							
	7/12/98	7/15/98	7/18/98	7/23/98	7/24/98	7/27/98	8/23/98	9/3/98	9/29/98	10/3/98	
AVG DIA	23	21	18	21	20	20	16	22	12	18	

ANNEX 8B Data from the Red Sea EEAA Crown-of-Thorns Starfish Control Prgogram (1998)

Site	Shabrour Umm Gamar			(Daily Data Sorted by Size)							
Date	7/12/98	7/15/98	7/18/98	7/23/98	7/24/98	7/27/98	8/23/98	9/3/98	9/29/98	10/3/98	TOTAL
Total #	360	543	284	196	116	42	302	77	171	23	**2114**
Depth	4-20 m	0-10m	0-10m	20 m	0-20m	12-19 m	0-15m	7-15m	0-18m	9-12m	
Size-Frequency Count											
Bin Size	7/12/98	7/15/98	7/18/98	7/23/98	7/24/98	7/27/98	8/23/98	9/3/98	9/29/98	10/3/98	
0-10 cm	0	1	2	0	2	0	2	0	4	0	
11-15 cm	14	18	67	28	29	8	98	12	34	11	
16-20 cm	20	25	57	57	38	5	29	19	23	6	
21-25 cm	33	31	47	79	63	11	24	32	18	4	
26-30 cm	34	12	9	25	8	2	4	10	5	2	
> 30 cm	7	3	2	7	7	0	0	4	2	0	
Total	**108**	**90**	**184**	**196**	**147**	**26**	**157**	**77**	**86**	**23**	
Size-Freq % (Normalized)											
Bin Size	7/12/98	7/15/98	7/18/98	7/23/98	7/24/98	7/27/98	8/23/98	9/3/98	9/29/98	10/3/98	
0-10 cm	0 0	1 1	1 1	0 0	1 4	0 0	1 3	0	4 7	0	
11-15 cm	13 0	20 0	36 4	14 3	19 7	30 8	62.4	15 6	39 5	47 8	
16-20 cm	18 5	27 8	31 0	29 1	25 9	19 2	18 5	24 7	26 7	26 1	
21-25 cm	30 6	34 4	25 5	40 3	42.9	42.3	15 3	41 6	20 9	17 4	
26-30 cm	31 5	13 3	4 9	12.8	5 4	7 7	2.5	13 0	5 8	8 7	
> 30 cm	6 5	3 3	1 1	3 6	4 8	0 0	0 0	5 2	2.3	0	
Total	**100 0**	**100 0**	**100 0**	**100 0**	**100 0**	**100 0**	**100 0**	**100 0**	**100 0**	**100**	
Statistics for groups/date											
Date	7/12/98	7/15/98	7/18/98	7/23/98	7/24/98	7/27/98	8/23/98	9/3/98	9/29/98	10/3/98	
Mean	18 0	15 0	30 7	32.7	24 5	4 3	26 2	12.8	14 3	3 8	
Standard Error	5 6	4 9	12.1	12.3	9 6	1 8	15 2	4 7	5 2	1 7	
Median	17 0	15 0	28 0	26 5	18 5	3 5	14 0	11 0	11 5	3 0	
Mode	#N/A	#N/A	2.0	#N/A	#N/A	0 0	#N/A	#N/A	#N/A	0 0	
Standard Deviation	13 8	11 9	29 6	30 2	23 5	4 5	37 2	11 5	12.8	4 2	
Minimum	0 0	1 0	2.0	0 0	2.0	0 0	0 0	0 0	2.0	0 0	
Maximum	34 0	31 0	67 0	79 0	63 0	11 0	98 0	32.0	34 0	11	
Count	6 0	6 0	6 0	6 0	6 0	6 0	6 0	6 0	6 0	6	
Statistics for all data/collection											
Date	7/12/98	7/15/98	7/18/98	7/23/98	7/24/98	7/27/98	8/23/98	9/3/98	9/29/98	10/3/98	
Mean	23 3	20 6	18 0	21 1	20 5	19 3	15 9	21 6	17 4	17 9	
Standard Error	0 6	0 6	0 4	0 4	0 4	1 1	0 3	0 6	0 6	1 0	
Median	24 5	21 0	17 0	22.0	21 0	20 0	14 0	23 0	16 0	17 0	
Mode	25 0	20 0	16 0	22.0	22.0	12.0	14 0	23 0	13 0	14 0	
Standard Deviation	5 9	5 4	4 9	4 9	5 4	5 4	4 1	5 3	5 2	4 6	
Minimum	11 0	10 0	10 0	11 0	10 0	12.0	10 0	12.0	10 0	13	
Maximum	39 0	35 0	35 0	36 0	36 0	29 0	30 0	36 0	31 0	28	
Count	108 0	90 0	184 0	196 0	147 0	26 0	156 0	77 0	86 0	23	

Average COTS Diameter from Shabrour Umm Gamar in 1998 Collections



PMG/st Oct 99

ANNEX8B-2-98COTSdata S UmGamarAvgDiaChart

ANNEX 8B Data from the Red Sea EEAA Crown-of-Thorns Starfish Control Prgogram (1998)

Site	Shabrour Umm Gamar		(Daily Data Sorted by Size)								
Date	7/12/98	7/15/98	7/18/98	7/23/98	7/24/98	7/27/98	8/23/98	9/3/98	9/29/98	10/3/98	TOTAL
Total #	360	543	284	196	116	42	302	77	171	23	2114
Depth	4-20 m	0-10m	0-10m	20 m	0-20m	12-19 m	0-15m	7-15m	0-18m	9-12m	

Size-Frequency Count

Bin Size	7/12/98	7/15/98	7/18/98	7/23/98	7/24/98	7/27/98	8/23/98	9/3/98	9/29/98	10/3/98
0-10 cm	0	1	2	0	2	0	2	0	4	0
11-15 cm	14	18	67	28	29	8	98	12	34	11
16-20 cm	20	25	57	57	38	5	29	19	23	6
21-25 cm	33	31	47	79	63	11	24	32	18	4
26-30 cm	34	12	9	25	8	2	4	10	5	2
> 30 cm	7	3	2	7	7	0	0	4	2	0
Total	108	90	184	196	147	26	157	77	86	23

Size-Freq % (Normalized)

Bin Size	7/12/98	7/15/98	7/18/98	7/23/98	7/24/98	7/27/98	8/23/98	9/3/98	9/29/98	10/3/98
0-10 cm	0 0	1 1	1 1	0 0	1 4	0 0	1 3	0	4 7	0
11-15 cm	13 0	20 0	36 4	14 3	19 7	30 8	62 4	15 6	39 5	47 8
16-20 cm	18 5	27 8	31 0	29 1	25 9	19 2	18 5	24 7	26 7	26 1
21-25 cm	30 6	34 4	25 5	40 3	42 9	42 3	15 3	41 6	20 9	17 4
26-30 cm	31 5	13 3	4 9	12 8	5 4	7 7	2 5	13 0	5 8	8 7
> 30 cm	6 5	3 3	1 1	3 6	4 8	0 0	0 0	5 2	2 3	0
Total	100 0	100 0	100 0	100 0	100 0	100 0	100 0	100 0	100 0	100

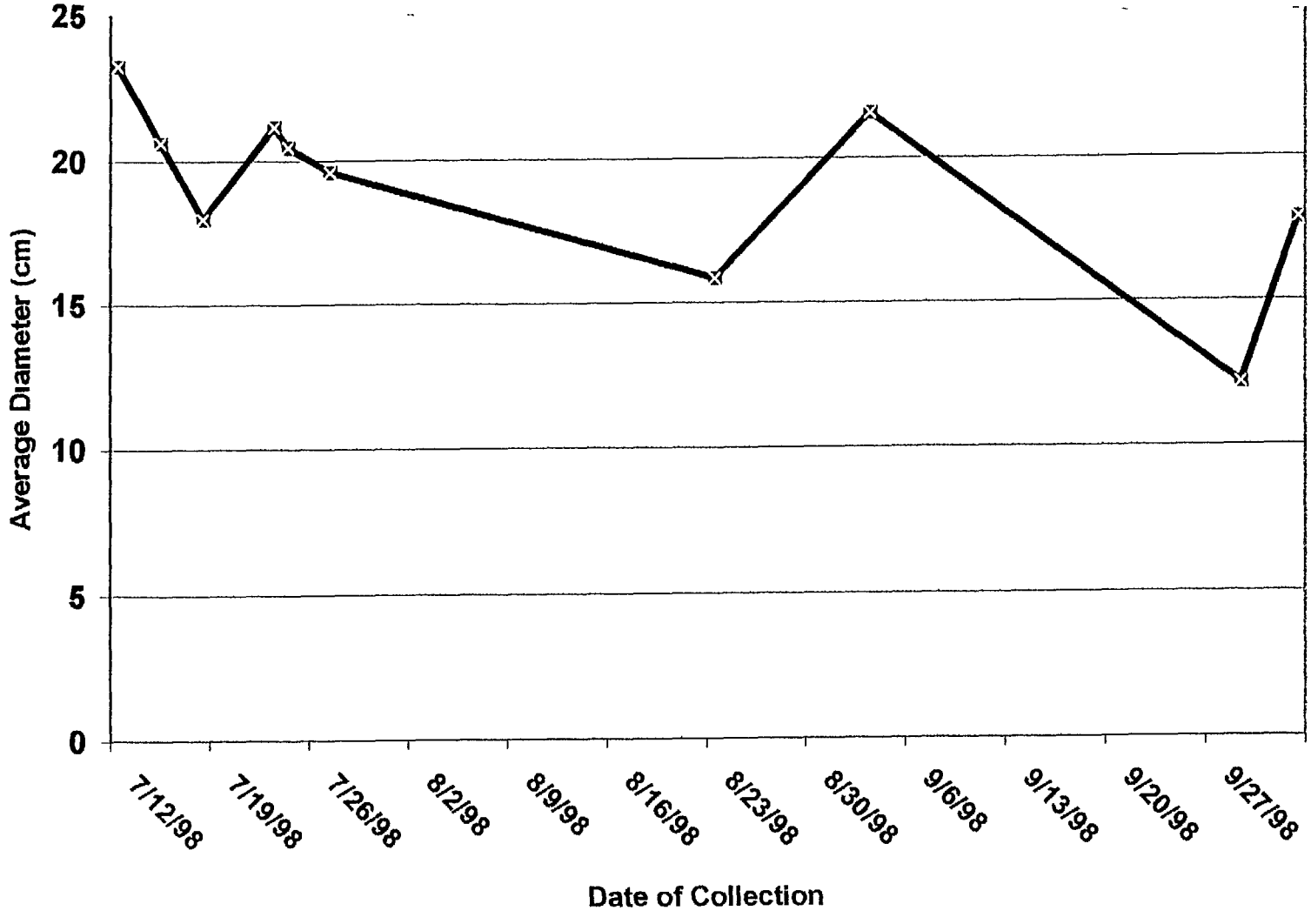
Statistics for groups/date

Date	7/12/98	7/15/98	7/18/98	7/23/98	7/24/98	7/27/98	8/23/98	9/3/98	9/29/98	10/3/98
Mean	18 0	15 0	30 7	32 7	24 5	4 3	26 2	12 8	14 3	3 8
Standard Error	5 6	4 9	12 1	12 3	9 6	1 8	15 2	4 7	5 2	1 7
Median	17 0	15 0	28 0	26 5	18 5	3 5	14 0	11 0	11 5	3 0
Mode	#N/A	#N/A	2 0	#N/A	#N/A	0 0	#N/A	#N/A	#N/A	0 0
Standard Deviation	13 8	11 9	29 6	30 2	23 5	4 5	37 2	11 5	12 8	4 2
Minimum	0 0	1 0	2 0	0 0	2 0	0 0	0 0	0 0	2 0	0 0
Maximum	34 0	31 0	67 0	79 0	63 0	11 0	98 0	32 0	34 0	11
Count	6 0	6 0	6 0	6 0	6 0	6 0	6 0	6 0	6 0	6

Statistics for all data/collection

Date	7/12/98	7/15/98	7/18/98	7/23/98	7/24/98	7/27/98	8/23/98	9/3/98	9/29/98	10/3/98
Mean	23 3	20 6	18 0	21 1	20 5	19 3	15 9	21 6	17 4	17 9
Standard Error	0 6	0 6	0 4	0 4	0 4	1 1	0 3	0 6	0 6	1 0
Median	24 5	21 0	17 0	22 0	21 0	20 0	14 0	23 0	16 0	17 0
Mode	25 0	20 0	16 0	22 0	22 0	12 0	14 0	23 0	13 0	14 0
Standard Deviation	5 9	5 4	4 9	4 9	5 4	5 4	4 1	5 3	5 2	4 6
Minimum	11 0	10 0	10 0	11 0	10 0	12 0	10 0	12 0	10 0	13
Maximum	39 0	35 0	35 0	36 0	36 0	29 0	30 0	36 0	31 0	28
Count	108 0	90 0	184 0	196 0	147 0	26 0	156 0	77 0	86 0	23

Average COTS Diameter from Shabrour Umm Gamar in 1998 Collections

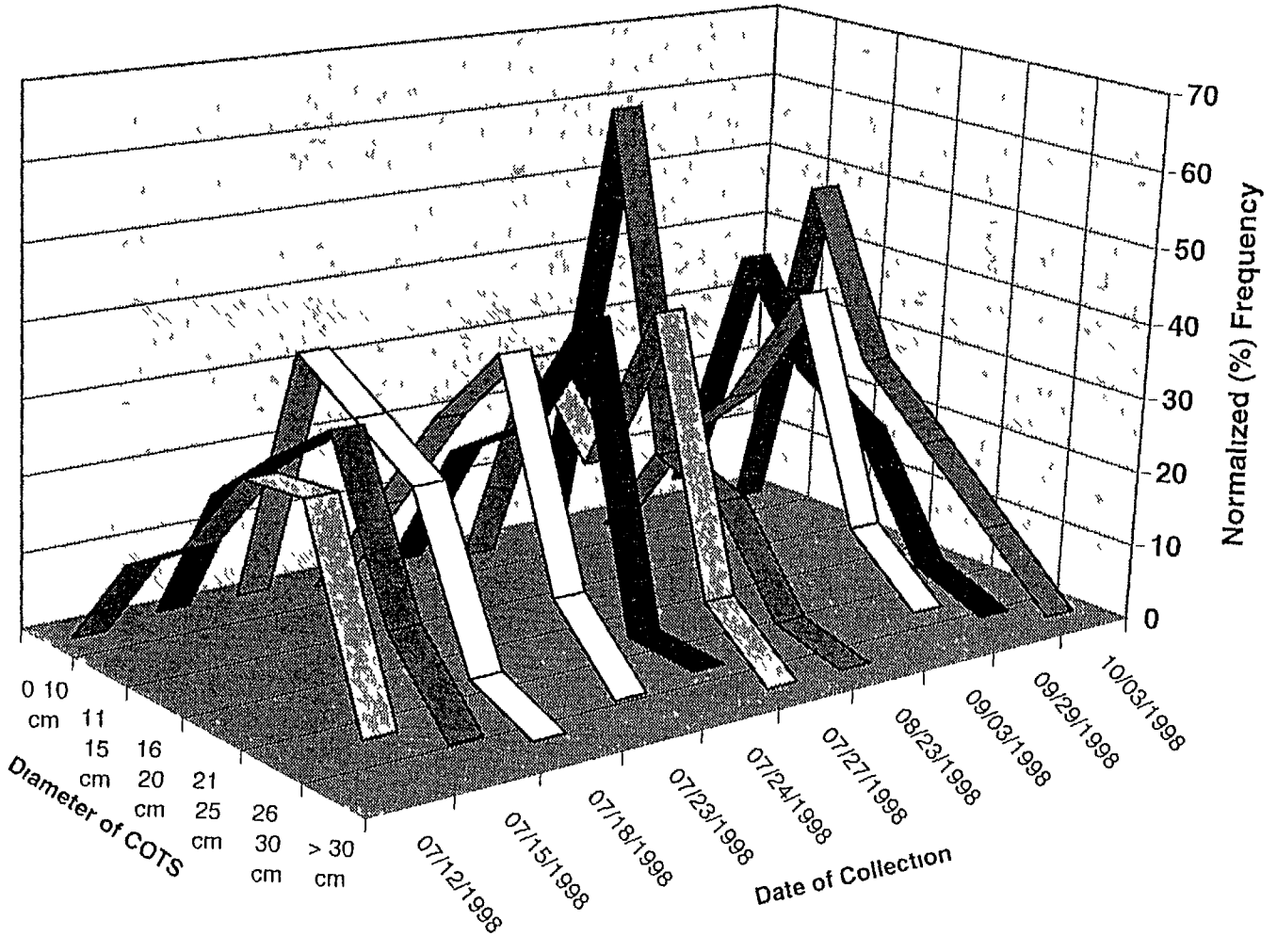


PMG/st Oct 99

ANNEX8B-2-98COTSdata S UmGamarAvgDiaChart

183

1998 Shabrour Umm Gamar COTS Size-Frequency Distribution



PMG st/Oct 99

ANNEX8B 2-98COTSdata S UmmGamarSizeFreqChart

ANNEX 9:

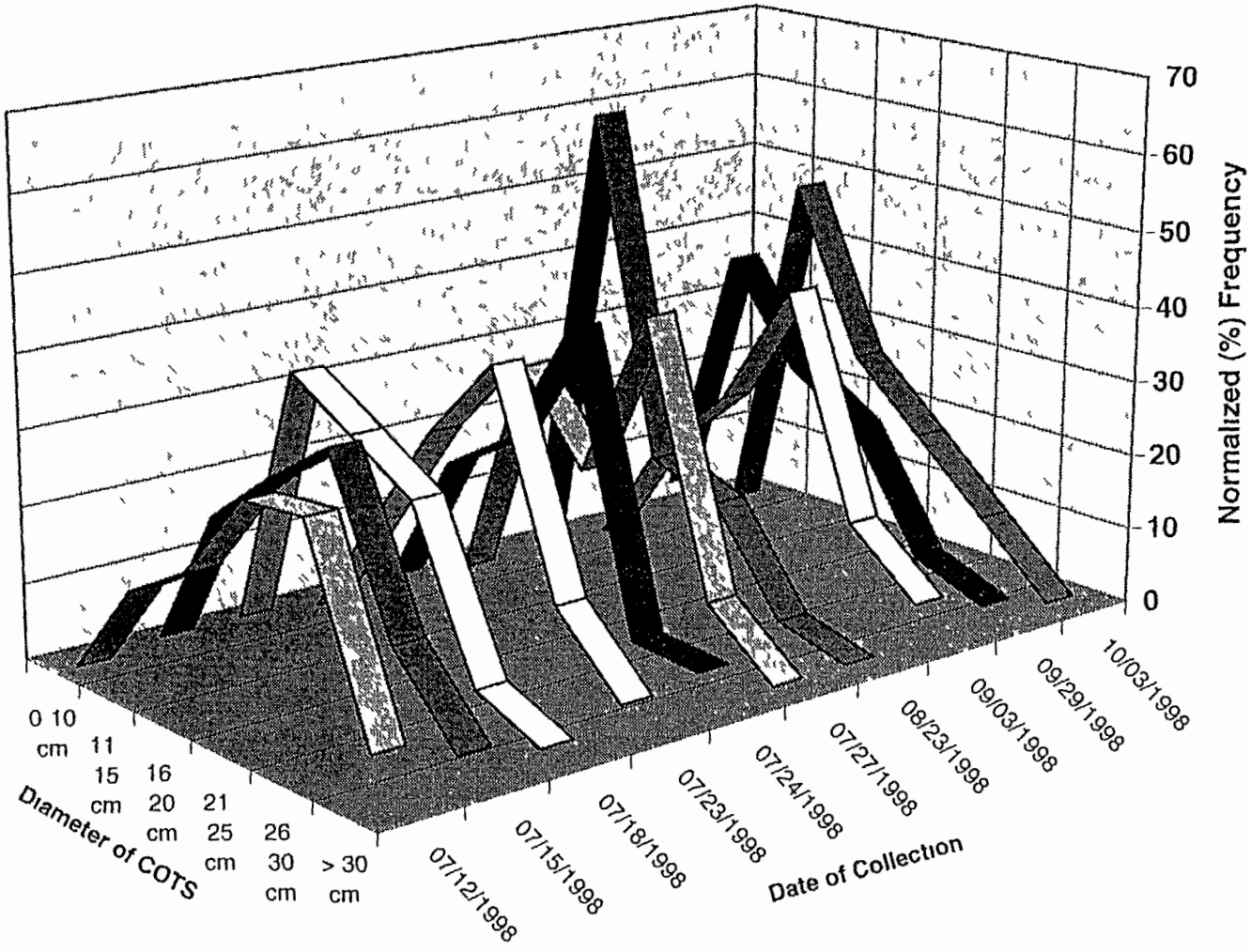
Figures from the GIS Database Created During the Zoning Workshop

7 Copies of Figures

A number of products were delivered at the completion of the February-March Red Sea Marine Park Zoning Workshop activity Several figures created by the GIS (Geographical Information System) Consultant have been delivered previously and delivered separately, unbound, for use in other ways There are a number of variations of these figures, but generally, they include physiographic images of the Egyptian Red Sea with different political and proposed zoning boundaries, and a 4-page series of nautical chart-based images (north to south) with proposed zoning boundaries noted. An indicative set of these color figures have been copied in black and white and included here for reference These include

a) Physiographic Map of the Northern Red Sea (Ras Ziet to Sudan border) with both geopolitical national boundaries noted at the Egypt-Sudan border.
b) Physiographic Map of the Northern Red Sea (Ras Ziet to Sudan border) with the proposed marine zoning boundaries noted
c) Physiographic Map of the Northern Red Sea (Ras Ziet to Sudan border) with the proposed Red Sea Marine Park boundary and the marine zoning boundaries noted
d) Nautical Chart (Ras Zeit to Hurghada) with the proposed marine zoning boundaries marked
e) Nautical Chart (Hurghada to Quseir) with the proposed marine zoning boundaries marked
f) Nautical Chart (Quseir to Wadi Gemal) with the proposed marine zoning boundaries marked
g) Nautical Chart (Wadi Gemal to Marsa Halaib) with the proposed marine zoning boundaries marked

1998 Shabrour Umm Gamar COTS Size-Frequency Distribution



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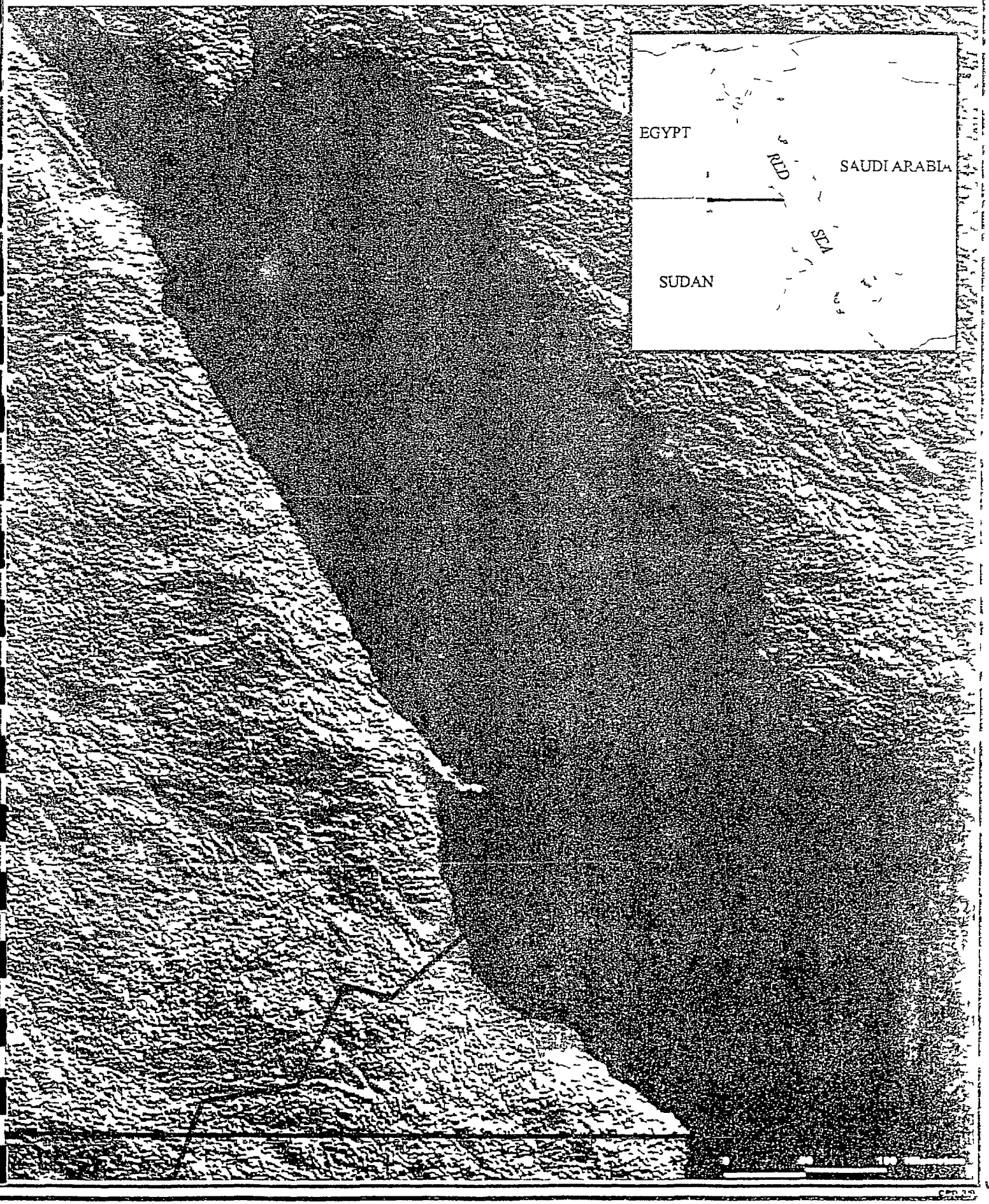
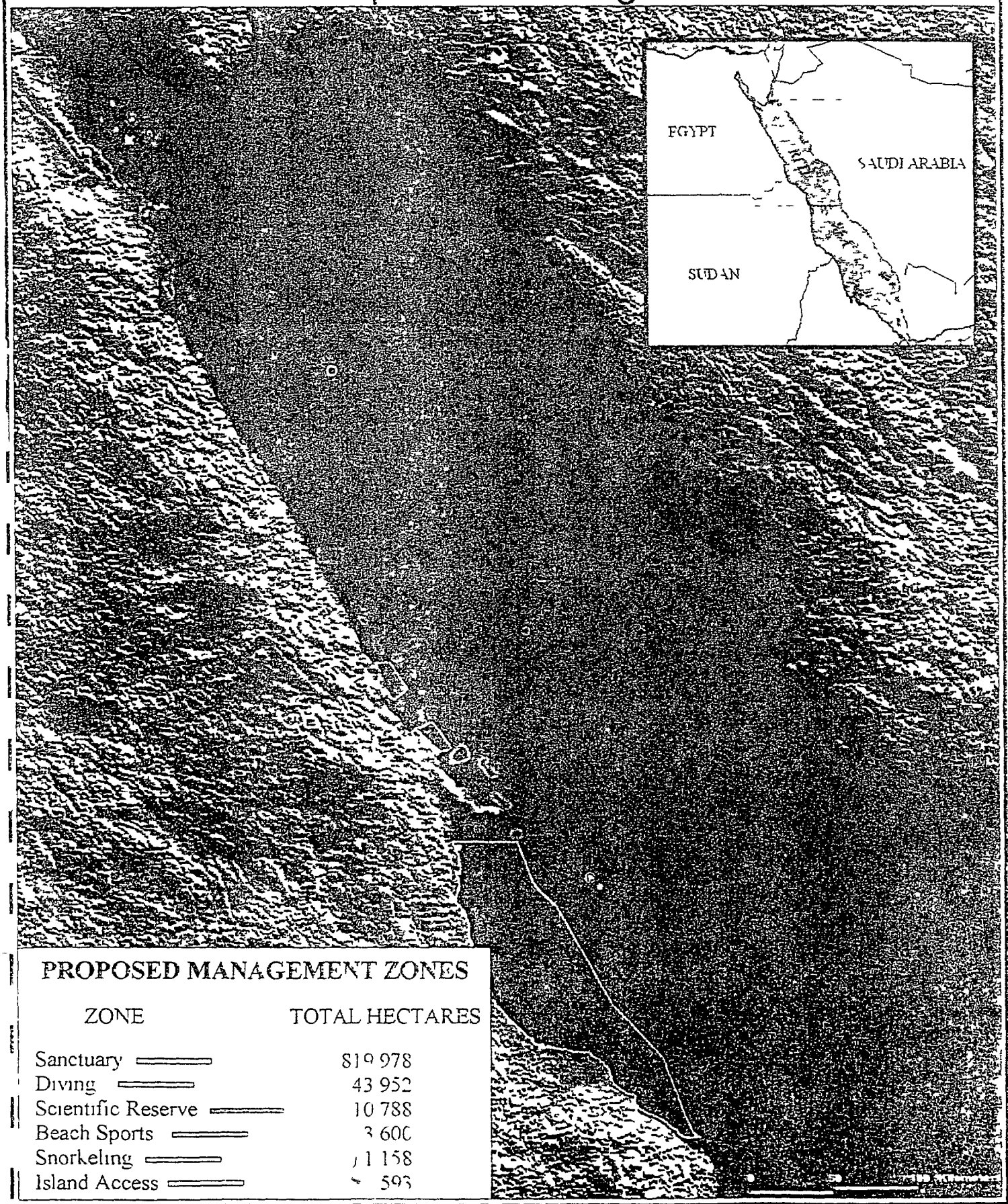
e) Nautical Chart (Hurghada to Quseir) with the proposed marine zoning boundaries marked
f) Nautical Chart (Quseir to Wadi Gemal) with the proposed marine zoning boundaries marked
g) Nautical Chart (Wadi Gemal to Marsa Halaib) with the proposed marine zoning boundaries marked

BEST AVAILABLE COPY

NORTHERN RED SEA



RED SEA MARINE PARK
Prospective Zoning Plan



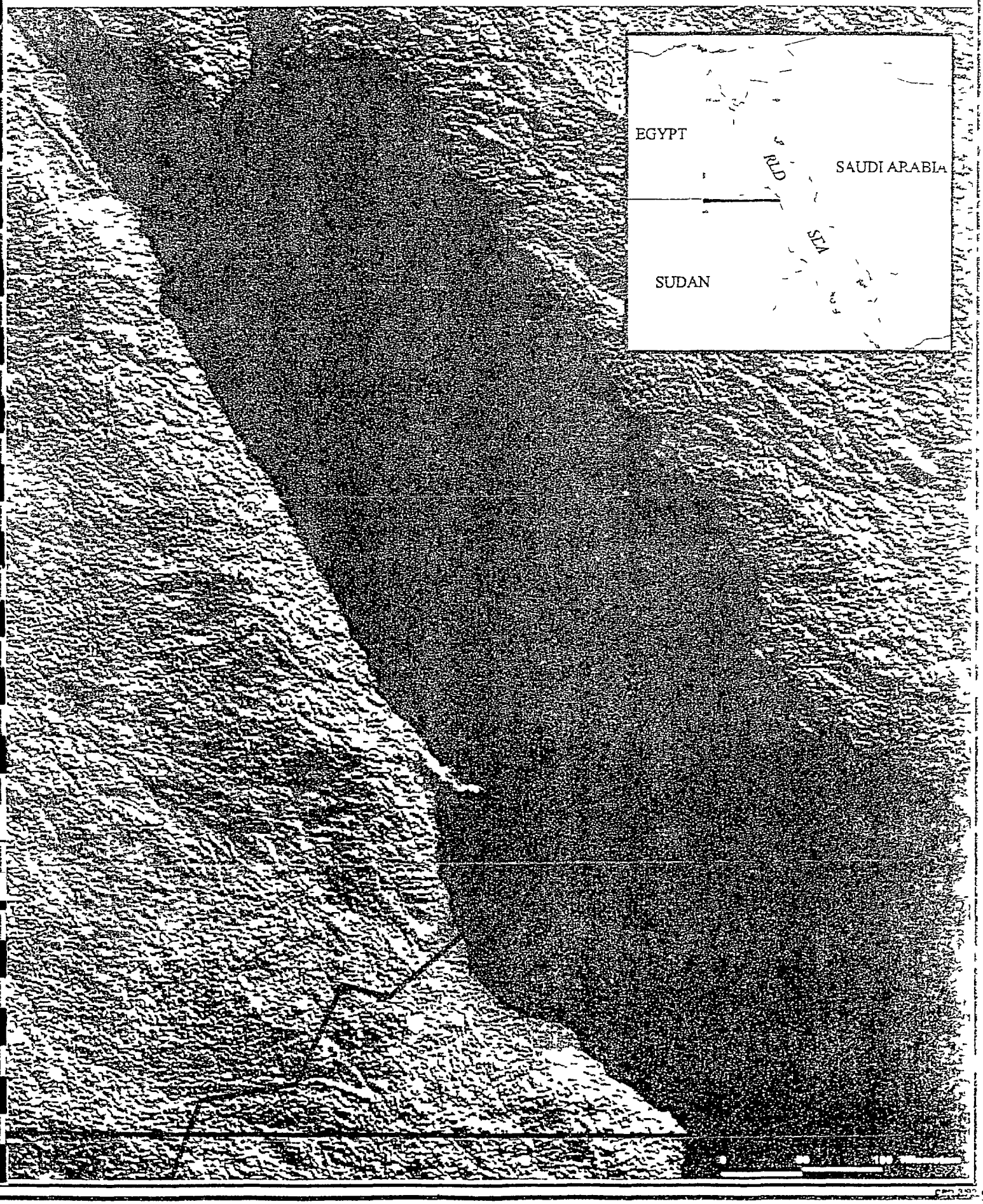
PROPOSED MANAGEMENT ZONES

ZONE	TOTAL HECTARES
Sanctuary	819 978
Diving	43 952
Scientific Reserve	10 788
Beach Sports	3 600
Snorkeling	11 158
Island Access	593

499

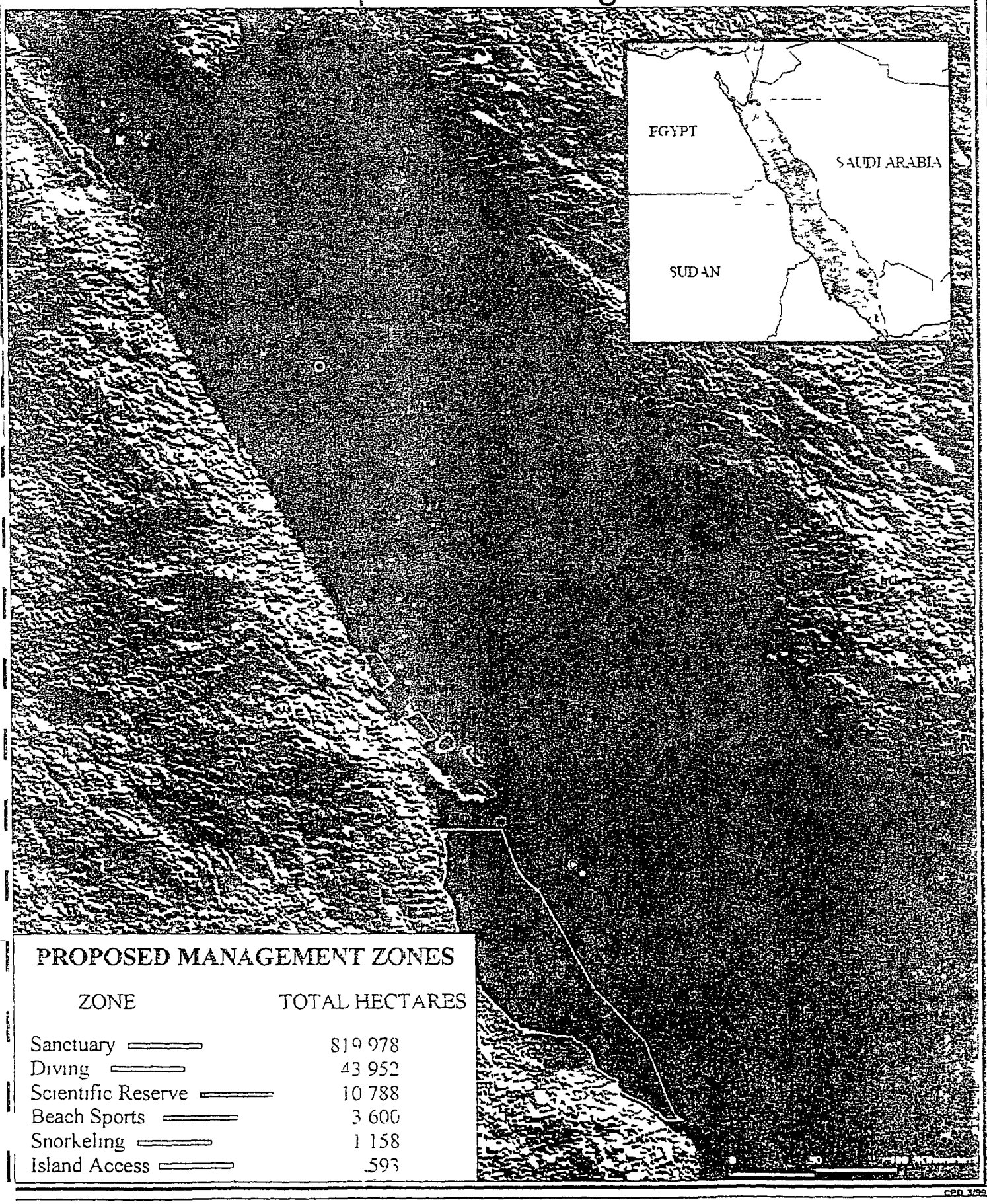
BEST AVAILABLE COPY

NORTHERN RED SEA



500

RED SEA MARINE PARK
Prospective Zoning Plan



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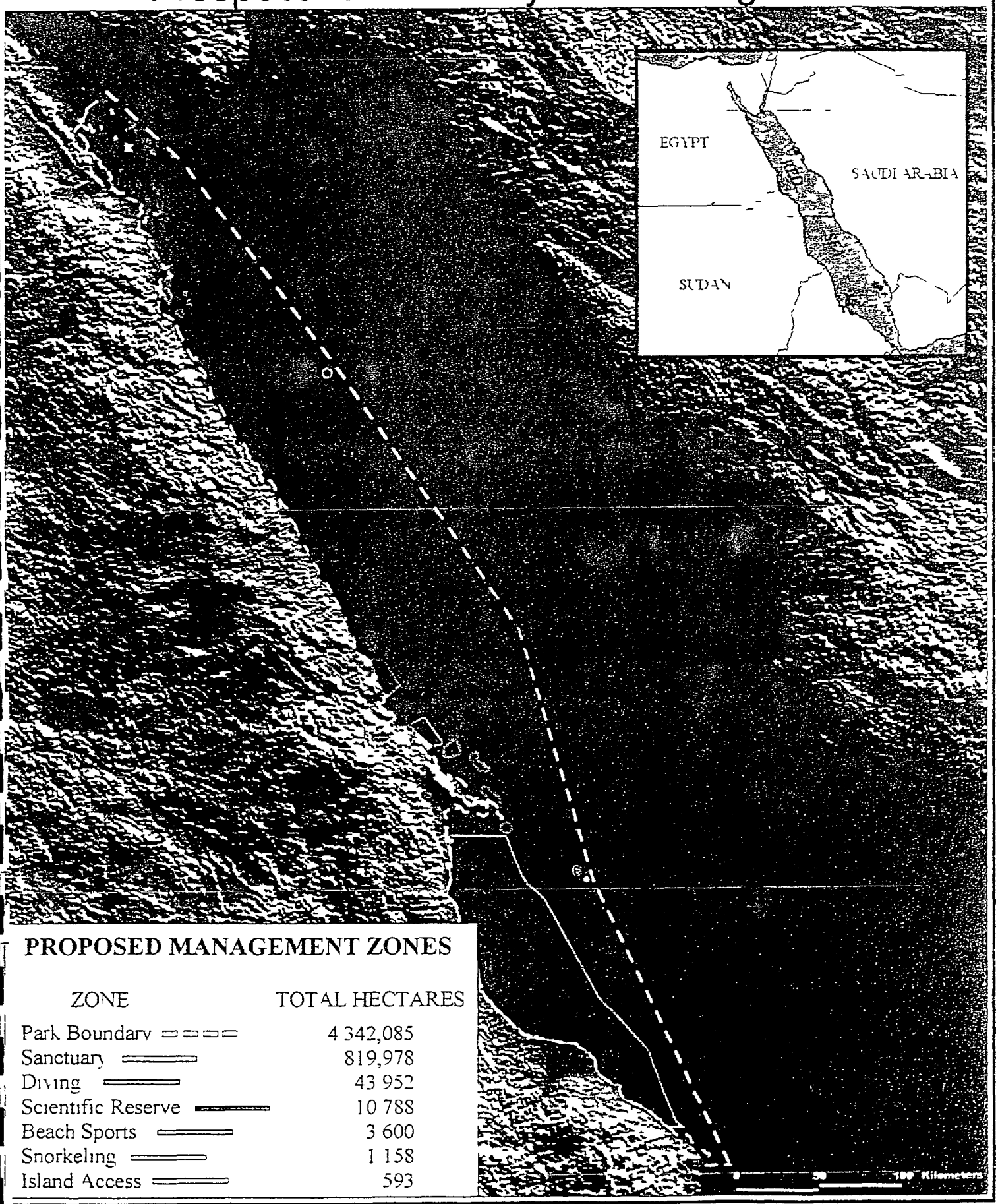
Diving	43 952
Scientific Reserve	10 788
Beach Sports	3 600
Snorkeling	1 158
Island Access	593

CPD 3/99

RED SEA MARINE PARK
Prospective Boundary and Zoning Plan

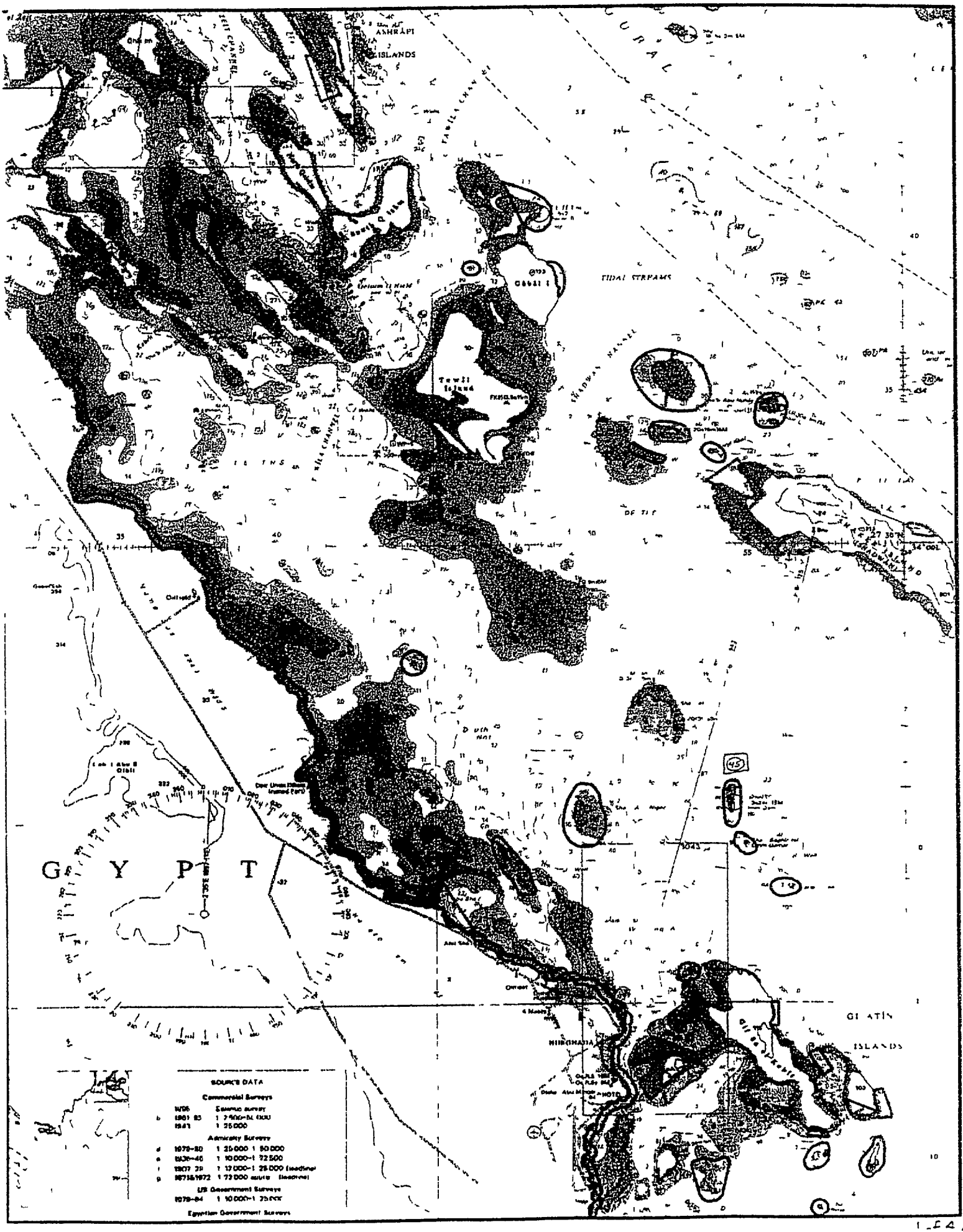


PROPOSED MANAGEMENT ZONES

ZONE	TOTAL HECTARES
Park Boundary	4 342,085
Sanctuary	819,978
Diving	43 952
Scientific Reserve	10 788
Beach Sports	3 600
Snorkeling	1 158
Island Access	593

CPD 3/99

507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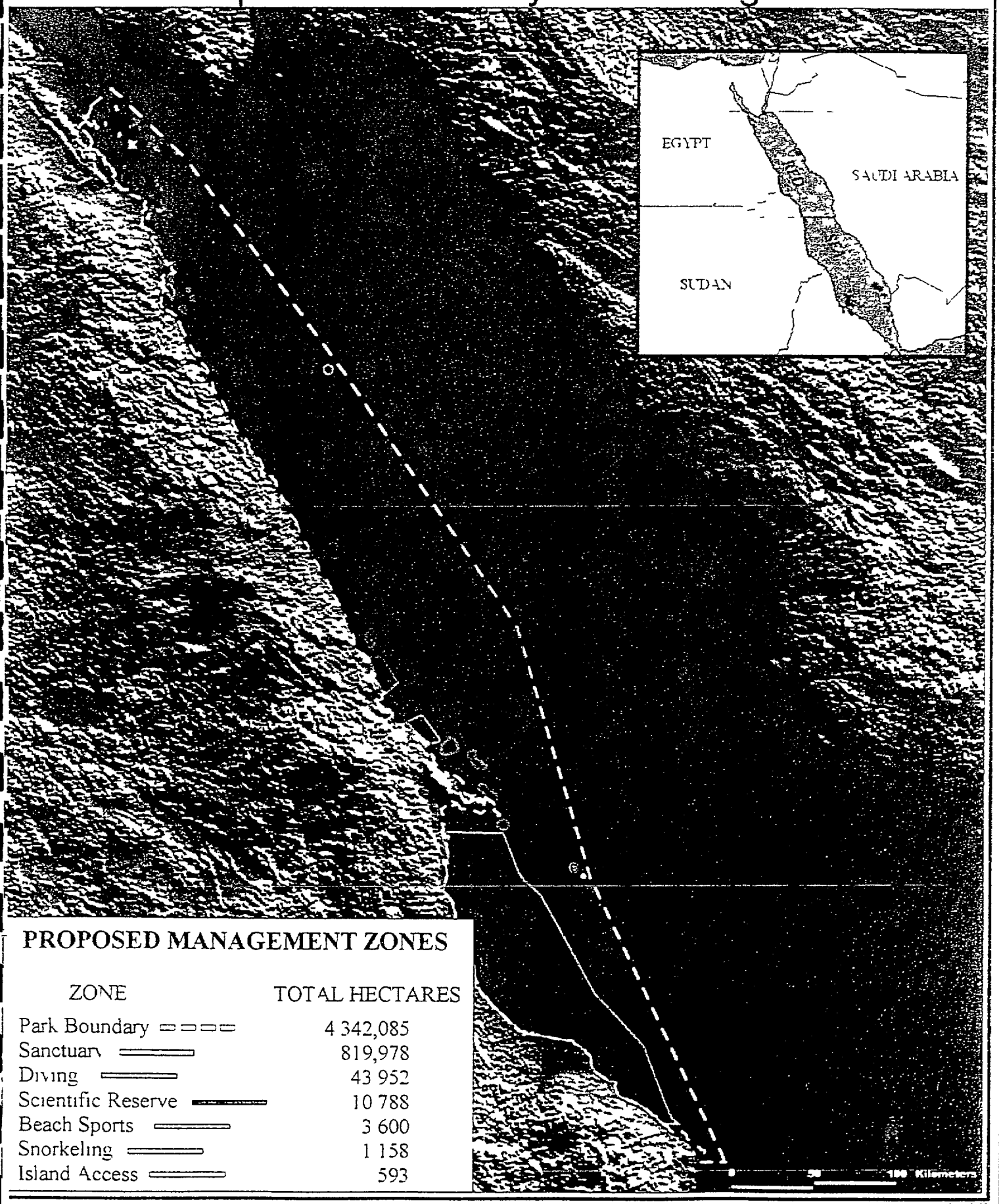
ISLANDS
TIDAL STREAMS
Tewfik Island
GI ATIN
ISLANDS
SOURCE DATA
Commercial Surveys
Admiralty Surveys
US Government Surveys
Egyptian Government Surveys

1.E450

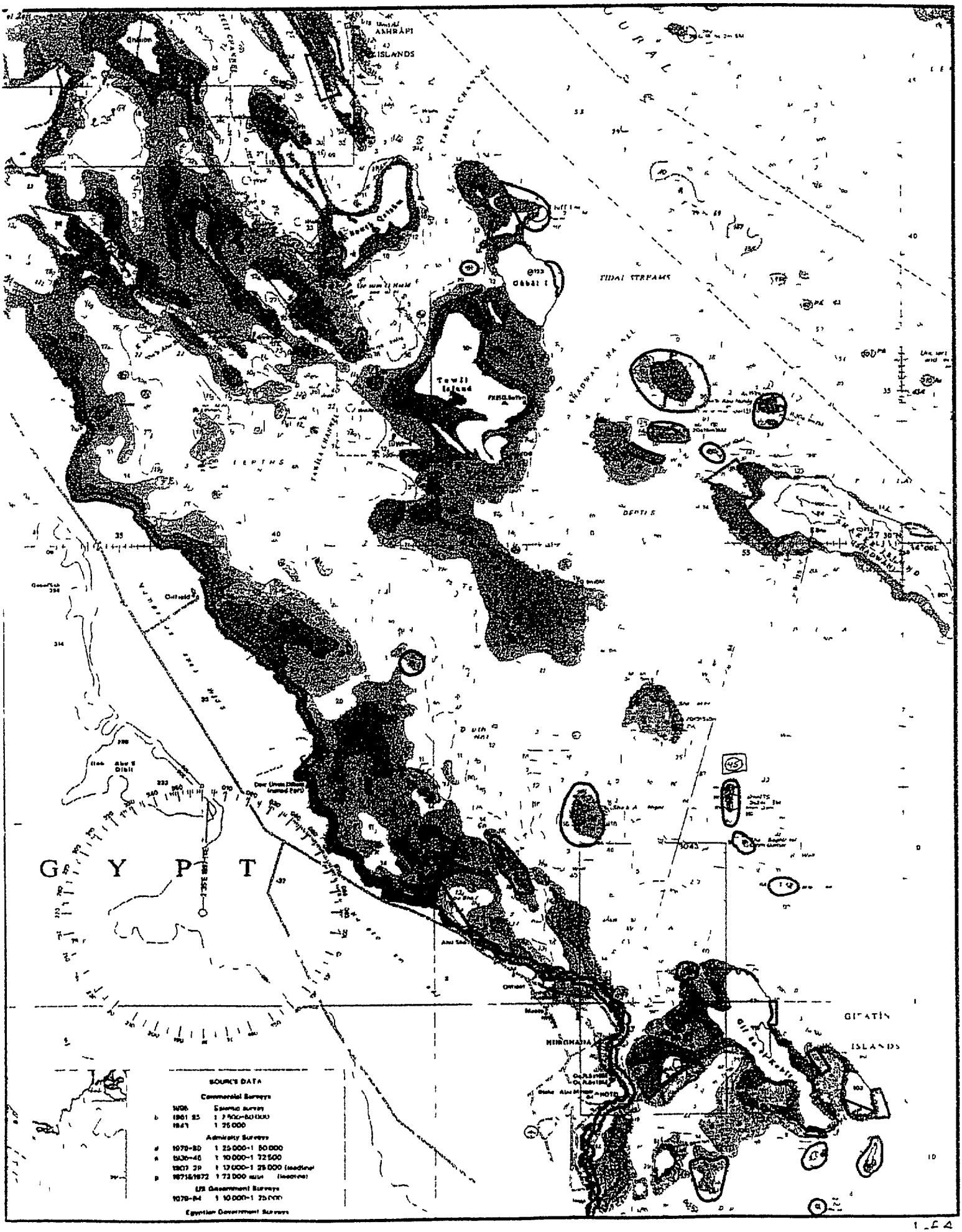
RED SEA MARINE PARK
Prospective Boundary and Zoning Plan



PROPOSED MANAGEMENT ZONES

ZONE	TOTAL HECTARES
Park Boundary	4 342,085
Sanctuary	819,978
Diving	43 952
Scientific Reserve	10 788
Beach Sports	3 600
Snorkeling	1 158
Island Access	593

CPD 3/99


ISLANDS
TIDAL STREAMS
DEPTHS
GITATIN
ISLANDS
SOURCE DATA
Commercial Surveys
Admiralty Surveys
UK Government Surveys
Egyptian Government Surveys

1.EA 505

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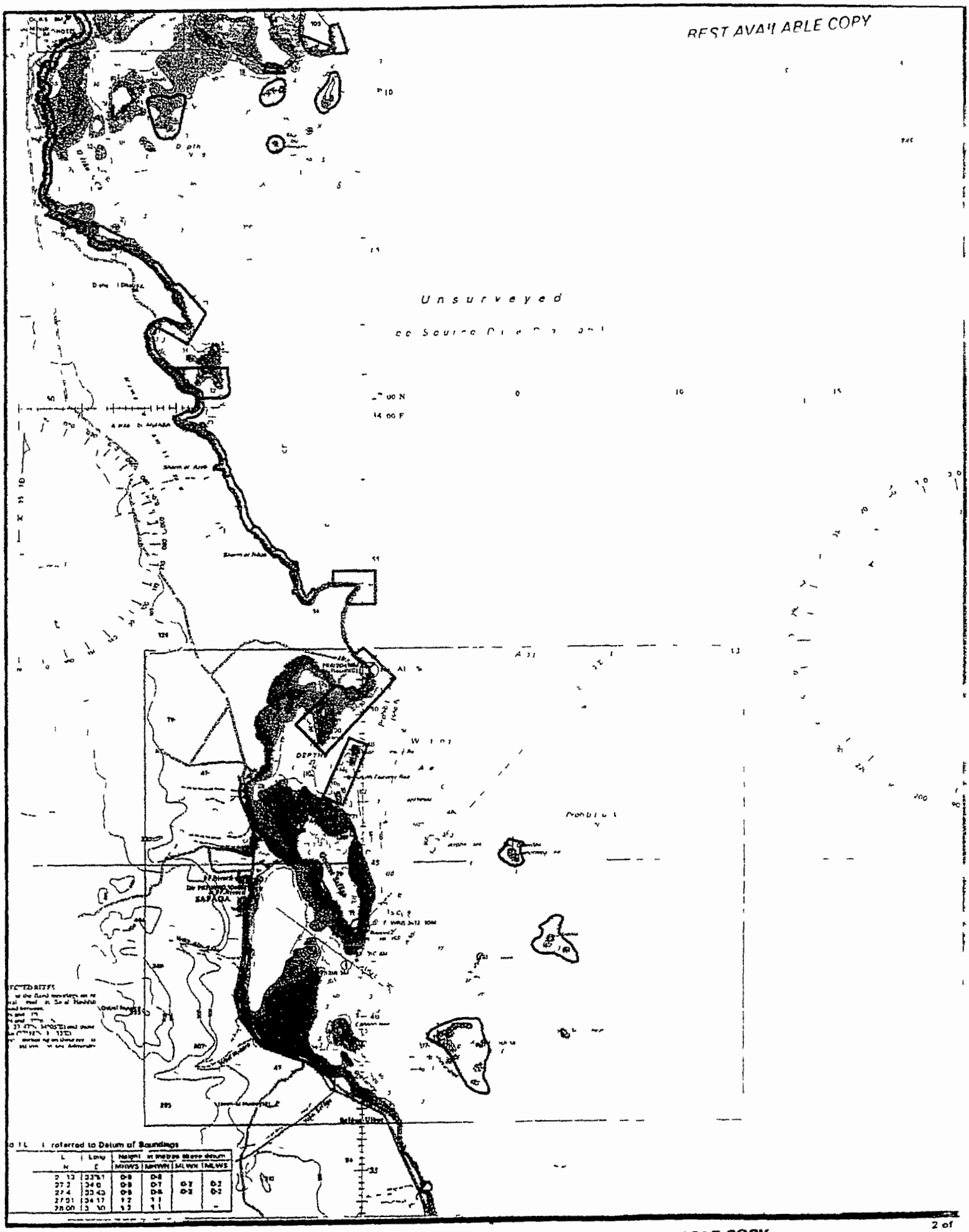

L N	Long E	Height in metres above datum MHWS	MHWN	MLWN	MLWS
27 13	33 51	0·8	0·8		
27 2	34 0	0·8	0·7	0·2	0·2
27 4	33 43	0·8	0·6	0·2	0·2
27 51	34 17	1·2	1·1		
28 00	3 10	1·2	1·1		–

referred to Datum of Soundings

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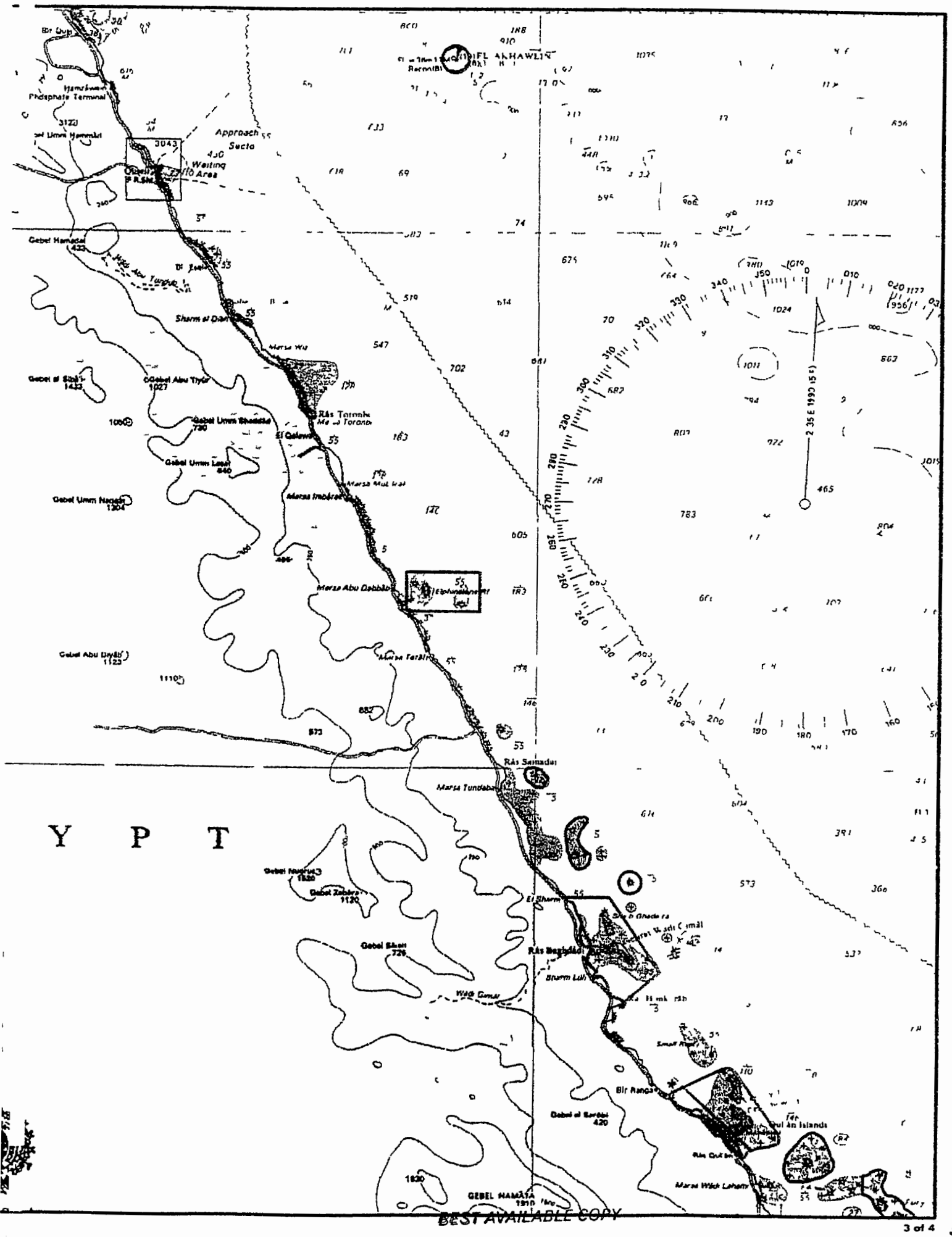

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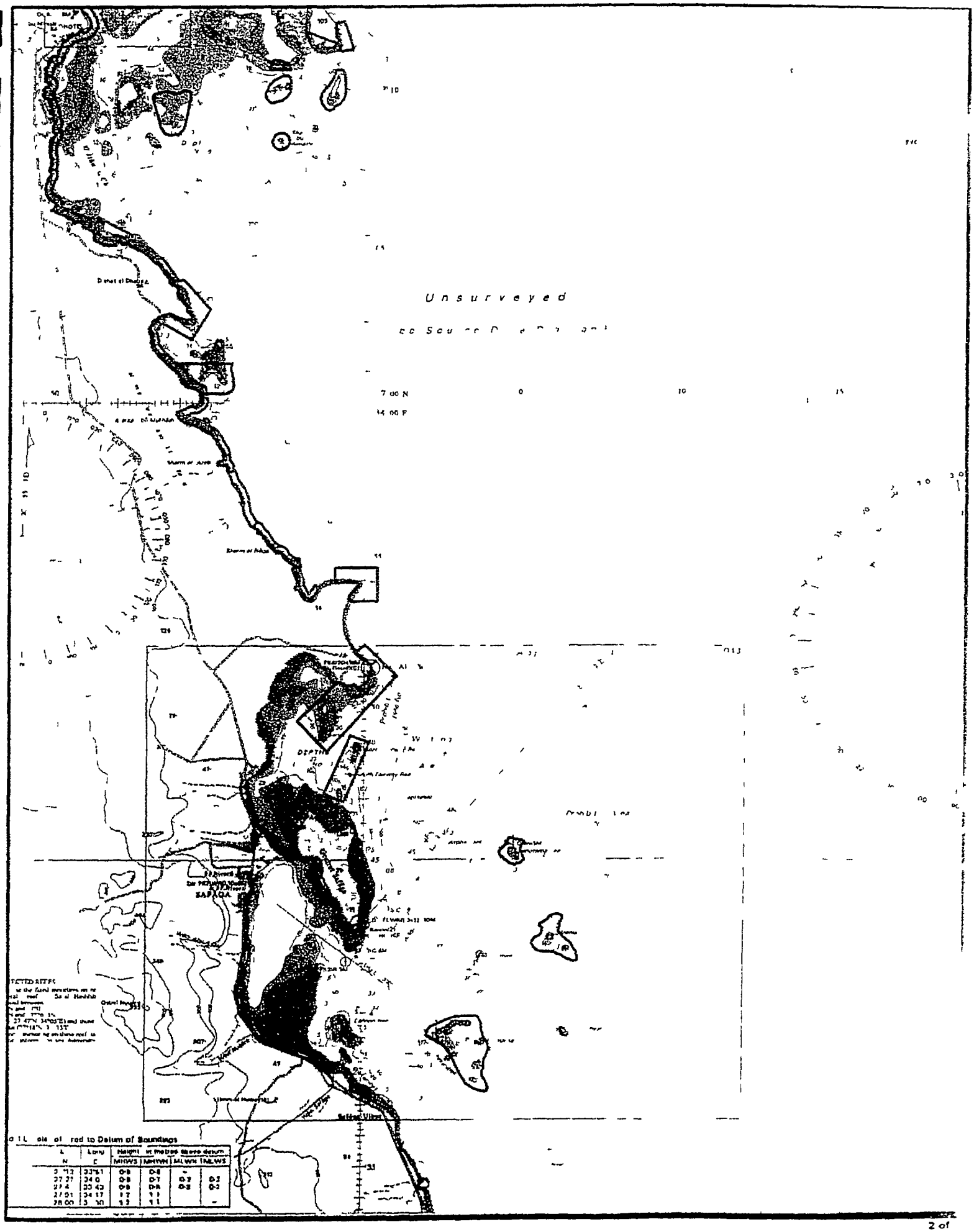

L	Long	Height in metres above datum			
N	E	MHWS	MHWN	MLWN	MLWS
3 [illegible]12	33[illegible]61	0·8	0·8	-	
27 27	34 0	0·8	0·7	0·2	0·2
27 4	35 43	0·8	0·8	0·2	0·2
27 01	34 17	1·2	1·1		
28 00	3 30	1·2	1·1		-

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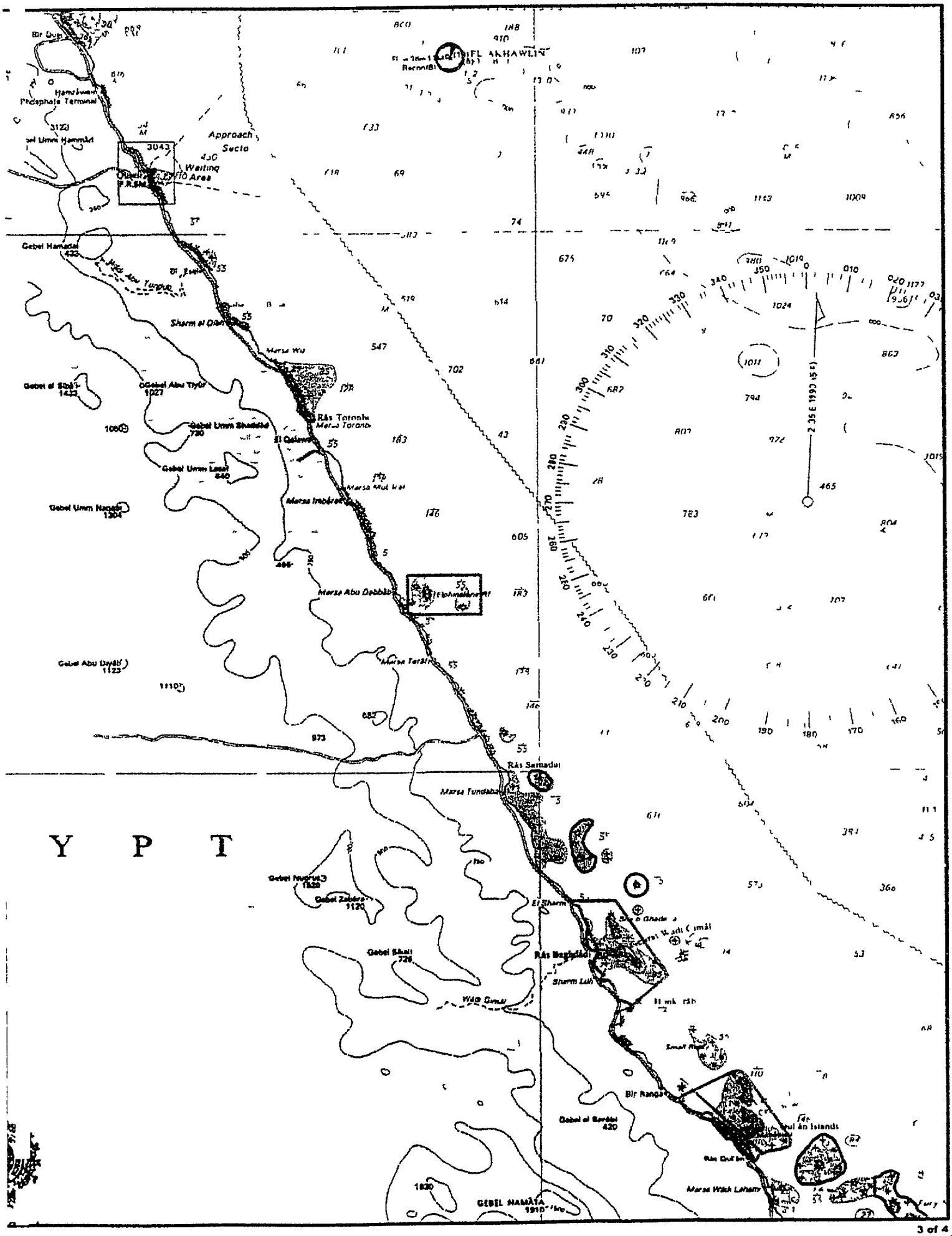
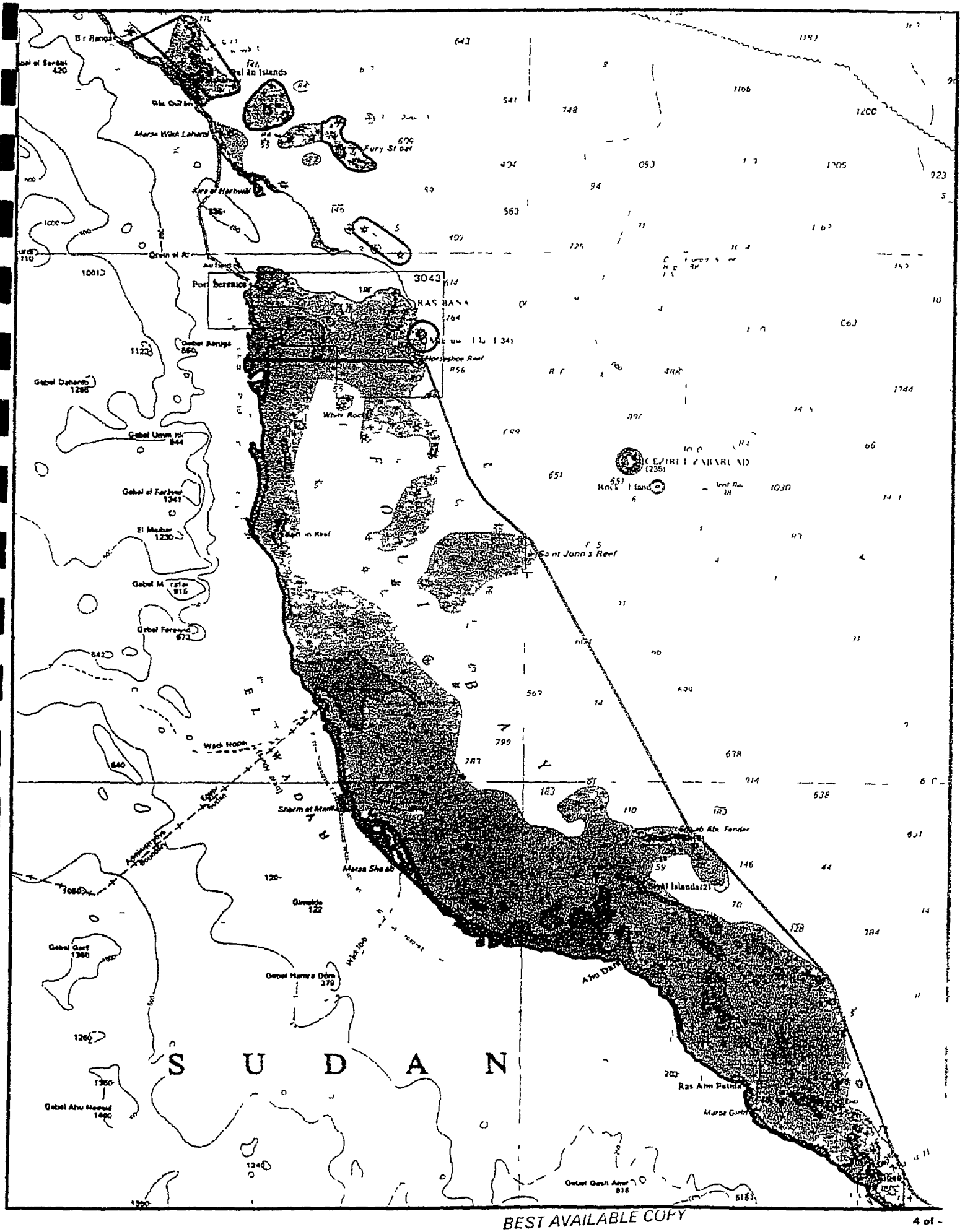

Phosphate Terminal
Approach
Suez
Waiting
Area
Gebel Hamadat
Sharm el Dam
Marsa Wu
Gebel Abu Thor
Gebel Umm Shaddad
Gebel Umm Lasal
Gebel Umm Naqab
Ras Toronba
Marsa Toronba
El Qalawi
Marsa Abu Dabbab
Gebel Abu Dayab
Ras Samadai
Marsa Tundaba
Gebel Nuqrus
Gebel Zabara
Gebel Bakal
El Sharm
Ras Bagdadi
Sharm Lah
Wadi Gamal
Bir Rangan
Gebel el Berbai
Ras Dul'an
Marsa Wadi Lahami
GEBEL HAMATA
Y P T

509



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GEMUL SEGUIR 1998

ABUNDANT GENERA (In order of Abundance)

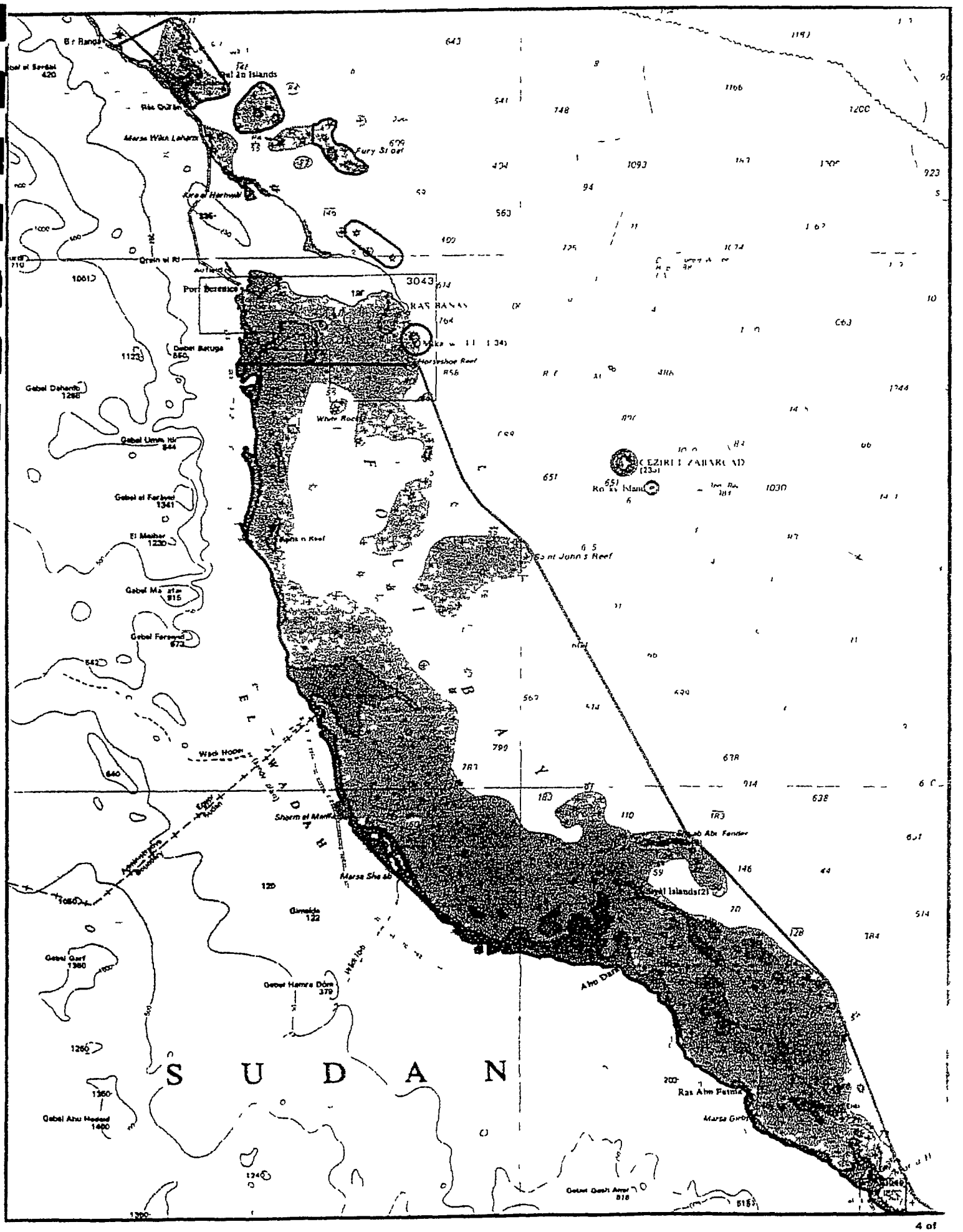
	Hard Corals		Soft Corals
1	*Porites*	1	*Sarcophytum*
2	*Millipora*	2	*Lobophytum*
3	Acropora	3	*Xenia*
4	*Montipora*	4	
5	*Pocillipora*	5	
6	*Favites*	6	
7	*Fungia*	7	
8	*Dendrophilia*	8	
9	*Turbinaria*	9	
10			

SUBSTRATE % COVER (2mX2m quadrant at 4 m depth)

Category/Quadrants	1	2	3	4	5	6	7	8	9
Hard Corals	40	25	30	20	25	35	10	40	--
Soft Corals	15	35	40	0	5	0	0	0	--
Sponge	0	0	0	0	0	0	5	0	--
Rock	45	40	30	30	20	65	75	75	--
Rubbles	0	0	0	50	30	0	0	0	--
Dead Corals	0	0	0	0	20	0	10	25	--
Sand	0	0	0	0	0	0	0	0	--
Algae > 1 cm height	0	0	0	0	0	0	0	0	--
Total (≈ 100%)									
Hard Corals w/Disease	0	0	0	0	0	0	0	0	--
Hard Corals W/Bleaching	0	0	0	0	0	0	0	0	--

Other groups
Echinodermata
Echinus (*Echinothrix diadema*), Pencil urchin
Mollusca
Bivalvia (*Tridacna spp*)

511


Fury Shoal
Port Bernice
3043
RAS BANAS
Horseshoe Reef
White Rock
Gebel Dahanb
Gebel Umm Hir
Gebel el Ferbyed
El Mahar
Gebel Ferseyed
Wadi Hoon
Sharm el Mellah
Marsa Shaab
Gebel Gurf
Gebel Hamra Dom
Gebel Abu Hadead
Abu Dar
Ras Abu Fatima
Gebel Gash Amer
S U D A N

512

GEMUL SEGUIR 1998

ABUNDANT GENERA (In order of Abundance)

	Hard Corals		Soft Corals
1	*Porites*	1	*Sarcophytum*
2	*Millipora*	2	*Lobophytum*
3	Acropora	3	*Xenia*
4	*Montipora*	4	
5	*Pocillipora*	5	
6	*Favites*	6	
7	*Fungia*	7	
8	*Dendrophilia*	8	
9	*Turbinaria*	9	
10			

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Category/Quadrants	1	2	3	4	5	6	7	8	9
Hard Corals	40	25	30	20	25	35	10	40	--
Soft Corals	15	35	40	0	5	0	0	0	--
Sponge	0	0	0	0	0	0	5	0	--
Rock	45	40	30	30	20	65	75	75	--
Rubbles	0	0	0	50	30	0	0	0	--
Dead Corals	0	0	0	0	20	0	10	25	--
Sand	0	0	0	0	0	0	0	0	--
Algae > 1 cm height	0	0	0	0	0	0	0	0	--
Total (≈ 100%)									
Hard Corals w/Disease	0	0	0	0	0	0	0	0	--
Hard Corals W/Bleaching	0	0	0	0	0	0	0	0	--

Other groups
Echinodermata
Echinus (*Echinothrix diadema*), Pencil urchin
Mollusca
Bivalvia (*Tridacna spp*)