

**Tourism Development Authority**  
**Red Sea Sustainable Tourism Initiative**



# Land Use Management Plan

**South Marsa Alam, Red Sea Coast, Egypt**

**June 2003**

**USAID / EGYPT**  
**Tourism Development Authority**  
**Red Sea Sustainable Tourism Initiative II**

**JUNE 2003**

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**Land Use Management Plan**  
**South Marsa Alam, Red Sea Coast, Egypt**

**Red Sea Sustainable Tourism Initiative**  
**Contract/Order No.LAG-I-00-99-00019-00**  
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## Acronyms/Glossary

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EEAA	Egyptian Environmental Affairs Agency
EEPP	Egyptian Environmental Policy Program
ESA	Environmentally Sensitive Areas
GEF	Global Environmental Facility (World Bank)
IDC	Integrated (Tourism) Development Center
IUCN	International Union for Conservation of Nature
LUMP	Land Use Management Plan
MVE	Monitoring, Verification, and Evaluation Unit
RSG	Red Sea Governorate
RSSTI	Red Sea Sustainable Tourism Initiative
SCT	Supreme Council of Tourism
TDA	Tourism Development Authority

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## Executive Summary



*Red Sea Desert Mountains*

The Land Use Management Plan (LUMP) for the planning area—a 5-kilometer-deep stretch of coastal land extending from the southern boundary of Marsa Alam down to Wadi Lahmi—is based on an environmental sensitivity analysis and policy determinations. The LUMP reflects a decision on the part of the Tourism Development Authority (TDA) to adopt a pattern of development in the planning area that preserves ecosystems of importance. However, it also reflects broader national interests regarding the designation of Protected Areas and strategies to optimize sustainable tourism development.

Sustainable tourism development of the area requires a phased, gradual approach which gives adequate consideration to the environmental impact of the development scheme and which avoids the unnecessary loss of unique and diverse ecological resources. A rational approach that balances both the environmental and developmental aspects of proposed tourism projects can minimize the alteration of natural habitats and biota of the unique and scientifically important areas in the Red Sea area south of Marsa Alam.

In preparation for the land use management plan, an assessment of the economic and social characteristics of the planning area was conducted. Numerous studies on natural and cultural resources were also carried out. These included assessments of climatic conditions, a study of the geology, geomorphology, soils, and surface hydrology of the South Marsa Alam Area, and individual studies on the herpetofauna, avifauna, mammals, botany, and coastal and marine sites of the area.

Maps were prepared using data from this extensive environmental and ecological field research. The data yielded information indicating the presence of several flora, fauna, and associated habitats that are unique or important to protect on a global, national, or regional level. All of this information was then ultimately incorporated into a sensitivity analysis to determine the ecological sensitivity of each area. Based on their weighted scores from the sensitivity analysis, areas were rated as having Very High, High, Medium, or Low Sensitivity.

The general results were as follows:

- Areas with Very High Sensitivity: Wadi El Gemal, mangroves, fringing reef, and the Marsa Naqari archeological site.
- Areas with High Sensitivity: main wadis, salt marshes, and seagrass beds.
- Areas with Medium Sensitivity: medium-sized wadis, sea sand beds, and desert sand plains.
- Areas with Low Sensitivity: small wadis, rugged lands, and gravel tablelands.

A zoning plan was then prepared, taking into account the following factors:

- Sensitivity Rankings
- Significant Resources and Area Attractions
- Hazard Analysis
- Development Opportunities and Constraints
- Existing TDA land allocations

Six Management Zones are identified in the Land Use Management Plan.

1. Core Zone (Absolute Reserve Areas)
2. Buffer Zone (Restricted Wilderness Areas)
3. Transition Zone (Ecotourism Zone)
4. Low Intensive Development Zone (Coastal Eco-Resort Zone)
5. Moderate Intensive Development Zone
6. Special Development Zones

The description of each zone and the accompanying regulations for each zone are summarized in Table 13 at the end of Part Seven.

international tourism, Egypt received 4.65 million foreign visitors during 2001, staying 29.8 million tourist-nights and spending a daily average of \$127 per visitor.

Total arrivals fell in 2001 from the record level of 5.5 million in 2000, because of the sagging economy of Europe, and because of the downturn in travel after the September 11 attacks in the USA. Statistics for 2002 indicate that total foreign visitors approximated 5.2 million, suggesting a trend of partial recovery in visitors. The heavier reliance on arrivals from Eastern European nations to compensate for the weakened arrivals from Western European nations may be a factor pushing average expenditure down or at least keeping it from rising.

Table 1 also shows an allocation of travel and tourism sector GDP to the foreign visitors sub-sector (in Egypt called “international tourism”) falling from \$5.29 billion in 2000 to around \$4.31 billion in 2001 and 2002, a drastic fall of 19% in activity. This is the amount of national GDP generated by foreign tourism directly or indirectly. Since leisure tourism typically is more volatile than business tourism, the Red Sea governorate, South Sinai governorate, Luxor, and Aswan tourist industries are bearing the brunt of this drop that most probably will lead to hotel occupancy and revenue losses even greater than 19%.

### **Economic Outlook for Egyptian Tourism**

Looking to the future, the WTTC forecast indicates that travel and tourism revenues will grow 4% per year to the year 2012. According to the WTTC, employment growth should increase by an annual growth rate of 1.95%. Both of these economic forecasts reflect the expectation of strong long-term growth.

The anticipated economic impacts of the WTTC growth rates will be a tourism industry that will fully double in size in only 18 years. With half of the nation’s total hotel capacity of 63,000 rooms in operation, and with some 70,000 more under construction, the hotel industry in the South Sinai and Red Sea governorates should generate much of this future growth in Egypt’s tourism.

Tourism growth to the Red Sea region should benefit greatly from the significant investments that have been made in commercial air service to Hurghada and Marsa Alam International Airports. Specifically, Hurghada has demonstrated strong demand resulting from charter flights originating in a variety of European cities. It is estimated that the Hurghada airport currently provides air services for approximately 750,000 to 1 million arrivals a year. Fluctuations in the number of flight operations are generally attributed to changes in the geopolitical conditions of the Middle Eastern region. (See Egypt and Red Sea map)

Commercial air services located at the recently opened Marsa Alam International Airport have greatly enhanced access to the South Marsa Alam area. Direct nonstop charter air services from Germany and Italy to Marsa Alam are greatly facilitating access to the attractive dive resources of the Marsa Alam area. In 2003, Egypt Air started two weekly flights from Cairo to Marsa Alam. This new air service provides a variety of routing services that add to the convenience of the Marsa Alam International Airport.

It is worth highlighting that the growth of tourism on the Red Sea coast resulted from a strategic policy decision nearly 30 years ago to enter the beach holiday business that has been the mainstay of Mediterranean tourism as an export activity. Formerly known only for its antiquities, Egypt has succeeded in emerging as a major beach holiday destination, and also as one of the world’s top dive destinations, two major victories, the former serving the European mass market, the latter a specialty or niche market of dive enthusiasts.



*Dive Boat in the Red Sea*

### **The Egyptian Tourism Development Authority**

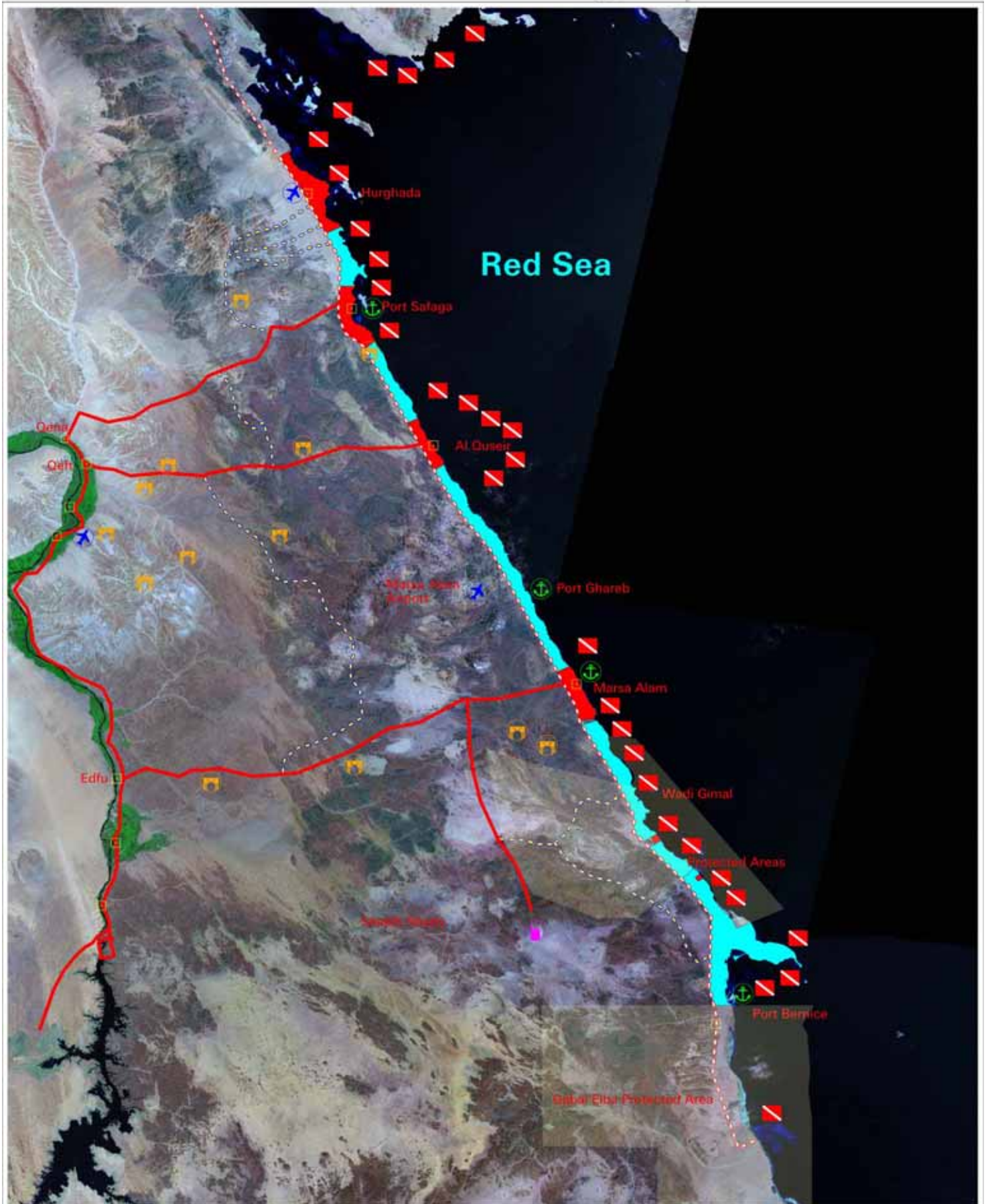
The Tourism Development Authority (TDA) was established in 1993 by the Egyptian government for the purpose of encouraging private tourism investment that will support both economic development and responsible environmental management. In order to implement its responsibilities, the TDA establishes tourism development zones and oversees the implementation of development plans for these zones. The TDA also plans the infrastructure for the zones and performs fiduciary responsibilities to insure acceptable returns on investments. Equally important, the TDA is responsible for monitoring the environmental conditions of tourism lands in order to safeguard their environmental quality. As an integral part of its management responsibilities, the TDA seeks to establish and implement a Land Use Management Plan in the South Marsa Alam Area of the Red Sea Region.

The TDA believes that tourism development along the Red Sea coast can play a vital role in the realization of one of Egypt's National Strategic Objectives, i.e., “the diversification of the nation's tourism products.” Egyptian tourism should enable the visitor to personally experience a variety of nature-based and cultural activities that accurately and authentically represent the natural beauty and cultural heritage of the country. Given its unique resource base, Egypt is well positioned to offer visitors a





# Red Sea Region



## Red Sea Region



## LAND USE MANAGEMENT PLAN

South Marsa Alam, Red Sea Coast, Egypt

Sustainable Land Use Management for Red Sea Ecosystems of Importance



## INTRODUCTION AND BACKGROUND



*El Gouna*

## Land Use Management Plan

This introduction to the Land Use Management Plan provides background information concerning the need for and evolution of a plan to devise environmentally sensitive zoning policies and regulations for the development of Egypt's Red Sea coastal area south of Marsa Alam.

The introduction first discusses the vital role tourism plays in Egypt's national economy. The second section describes the Egyptian Tourism Development Agency and its goals. The third section provides a brief history of tourism development along the Red Sea coast. And the final section discusses the Land Use Management Plan, provides a definition of the area that will be affected by the Plan, outlines the objectives of the Plan, and concludes with a brief description of the various parts of this document.

## Role of Tourism in Egypt's National Economy

Tourism plays several vital roles in the national economy of Egypt. These roles include the large amount of revenue derived from tourism-related businesses, benefits from foreign exchange, employment for the Egyptian people, income generation, and the improved quality of life resulting from public investment in community services. As a result of these several important economic benefits, the careful planning and development of the South Marsa Alam Area has the potential to provide substantial contributions to both the government and the people of Egypt.

## The Size of Egypt's Travel and Tourism Sector

Egypt's travel and tourism sector includes travel in Egypt by both domestic residents and international visitors; it also includes travel for all motives including official, medical, business, and leisure purposes. The World Travel and Tourism Council (WTTC) prepares Gross Domestic Product (GDP) estimates for Egypt's travel and tourism sector. These estimates include both the direct and indirect revenues obtained from travel and tourism. In addition, information derived from both the WTTC and Ministry of Tourism provides growth, employment, and tourist consumption information. These data are presented in Table 1 below.

**Table 1: Travel and Tourism (T&T) Sector Aggregates 2000-2002**

Category	2000	2001	2002
<b>Travel &amp; Tourism GDP US \$ Billion</b>	<b>10.20</b>	<b>8.99</b>	<b>9.06</b>
Percent of national GDP	10.72%	9.97%	9.65%
Travel and Tourism employment 000s	1,873.39	1,750.25	1,690
Percent of national employment	4.9%	4.3%	4.0%
Foreign Visitors to Egypt – million	5.51	4.65	5.2
Foreign Visitor Exports FVE \$B	4.66	3.73	3.65
T&T sector consumption \$B	8.98	7.7	7.68
FVE/T&T consumption percent	51.9%	48.4%	47.5%
<b>FVE allocation of T&amp;T-GDP \$B</b>	<b>5.29</b>	<b>4.35</b>	<b>4.31</b>

Sources: WTTC and Ministry of Tourism.

The Council's estimate for Egypt's travel and tourism industry for the period 2000 to 2002 illustrates a decline in GDP revenue from \$10.2 to \$9.0 billion dollars. The year 2001 shows a very major setback by a few measures, with travel and tourism GDP down nearly 9% (from US\$10.2 to \$8.99 billion), and employment down nearly 7%. The GDP allocated to foreign visitors plunged 18% from \$5.29 to \$4.35 billion in 2001. Employment, foreign visitor spending, and foreign travel and tourism GDP continued to weaken again in 2002. Information regarding the year 2003 is obviously not currently available, but it is suspected that the war in Iraq and other regional turmoil will have at least some negative economic impacts.

The WTTC estimates indicate the tourism sector's share of national employment of 4% or more, and a share of national GDP of around 10%. The employment trend from 2000 is understandably downward because of the negative economic and geopolitical environment which resulted in the drop in foreign visitor arrivals. These statistics underline the sector's crucial importance to the national economy even in its somewhat depressed state.

## International Tourism to Egypt

International tourism represents roughly half of Egypt's entire travel and tourism sector, \$4.3B of \$9.1B. It largely dominates Egypt's tourism industry. Focusing on





*Red Sea Tourist Beach*

country. Given its unique resource base, Egypt is well positioned to offer visitors a range of tourism experiences that are distinctly different from the rest of the world. This marketing advantage offers potentially significant opportunities to both private investors and the Egyptian people. Private investors are encouraged to realize the economic benefits that can be derived from well planned and operated tourism projects; the Egyptian people can expect improved employment, income, and investment opportunities from these types of projects.

The Tourism Development Authority's goal for tourism development in the South Marsa Alam Area of the Red Sea Region is to enable people to enjoy and learn about the unique natural, historical, and cultural resources in this region while simultaneously preserving their integrity and stimulating regional economic development. The TDA recognizes that accomplishment of its goal will require:

- Effectively promoting the conservation and restoration of wildlife habitats and ecosystems;
- Respecting local cultures and traditions;
- Planning, management, and marketing in order to meet the stringent environmental and recreation demands of the sophisticated and increasingly competitive tourism market; and
- Demonstrating economic feasibility to attract financing and sustain business operations.

## **Tourism Development along the Red Sea Coast**

During the last century, the tourism industry in Egypt has diversified in terms of attractions, products, and geographic distribution. The original foundation of Egyptian tourism was the presence of antiquities in the Nile Valley that earned worldwide acclaim. These ancient sites and their monuments continue to enjoy large numbers of visitors and a variety of tourism products have been created to accommodate these visitors.

Antiquities remained the primary tourism attractions in Egypt until the early 1980s. During the last two decades, the Red Sea Coast has become one of the most important tourist destinations in Egypt and the Middle East. The extraordinary abundance of marine life found in the coral reef systems of the Red Sea has proven to be a powerful attraction to tourists throughout the world. The Red Sea's sandy beaches, sunny climate, and tranquil sea have provided the natural conditions necessary to promote tourism. The result has been a remarkable growth in both tourism development and visitation.

In response to the market opportunities created by the area's attractive natural resources, new destinations such as El Gouna and Hurghada in the Red Sea region and Sharm El Sheik in the Sinai Peninsula were established. These destination resort communities have provided shore- and marine-based resort facilities and amenities that have witnessed strong tourism growth. The destination resort facilities in these regions not only diversified Egypt's tourism product, but also distributed tourists to more remote parts of the country.



*Mangrove Stand*

The Red Sea governorate encouraged the first phase of tourism development in the northern part of the Red Sea region. A considerable effort was made to promote investment in the region by means of tourism development. Pioneer investors successfully established the northern part of the Red Sea coast as an international tourist destination. But their development success resulted in significant environmental costs. The rapid growth of tourism development and natural resource utilization in the northern part of the Red Sea has had a variety of negative environmental impacts. For example, the tourism development pattern in Hurghada altered the coastline, damaged several coral communities, and reduced the land habitats of many bird species. The environmental deterioration caused by this type of tourism development demonstrated a pattern of resource use that adversely affected both environmental quality and economic investment. It became apparent that this type of development was not sustainable.

In was in recognition of the need to conserve both the environmental quality and economic resources of the Red Sea region, that the TDA was established for the purpose of facilitating, promoting, and controlling the tourism development process. The TDA was authorized to monitor the environmental impacts of tourism development beyond municipal boundaries. The geographic limit of this authority was established by presidential decree to include an area five kilometers wide that extends 680 kilometers along the Red Sea coast from 25 kilometers north of Hurghada to 20 kilometers south of Halaib.

In 1993, the Tourism Development Authority prepared regional and sector development plans for the Red Sea coast in order to realize the development potential of this region. These plans aimed to create new growth centers and new investment opportunities. The primary type of tourism development encouraged for these five sectors was beachfront resorts and "tourist villages." The regional development plan



*Turquoise Waters of the Red Sea*

of the Red Sea coast defined the following five primary sectors:

- Hurghada City
- Hurghada to Safaga
- Safaga to Quseir
- Quseir to Marsa Alam
- Marsa Alam to Ras Banas

In addition to private investment, tourism development was facilitated by substantial public investment. For example, Egypt's substantial financial investment in transportation facilities and community infrastructure in the Red Sea region significantly enhance the TDA's ability to offer diverse tourism products throughout the Eastern Desert and along the entire coast of the Red Sea. Modern air transport facilities in Hurghada and Marsa Alam provide international air service. Extensive road improvements along the coast have improved access to the region. And the completion of large-scale marine facilities at Port Ghalib, in the vicinity of Marsa Alam, will eventually provide mooring for nearly 1,800 private vessels. These investments are ample evidence of Egypt's commitment to implementing tourism development in the Red Sea region. (See Red Sea Region map.)

## The Land Use Management Plan

In 1997, the TDA designated five areas south of Marsa Alam as integrated tourism development centers (IDCs) and prepared development plans for these centers. According to the TDA investment department, 235 projects have been allocated to investors in the five IDCs. The TDA committed to most of these projects between 1998 and 2000.



*Mangroves in the Planning Area*

In 1998, the TDA, in cooperation with the Egyptian Environmental Affairs Agency (EEAA) and the Red Sea governorate, prepared a study of Red Sea coastal and marine resources and a management plan funded by the World Bank's Global Environmental Facility (GEF). This study aimed at developing the full tourist potential of this area with new tourism activities based on environmentally sound management practices. The GEF study proposed the declaration of two protectorates within the study area, Wadi El Gemal and Hamata.

The experimental development process as experienced in Hurghada has illuminated the importance of adapting development to environmental concerns in the Red Sea as well as the importance of ecosystems. The intensive development that took place there has not succeeded in combining protection of natural resources and tourism development in one package. The challenge for TDA is how to introduce a development plan that respects and protect the natural assets of the Red Sea and satisfies the development requirements of Egypt.

In the late 1990s, the TDA identified the need to advocate a new tourism development approach that is environmentally sensitive and valid for local populations. The Red Sea Sustainable Tourism Initiative (RSSTI) was created in 1998 as a TDA project funded by the United States Agency for International Development (USAID). This project is being implemented by PA Government Services, a U.S. subsidiary of PA Consulting Group. RSSTI works hand in hand with the TDA in core work areas with the following key objectives:

- Develop "best practices" for sustainable tourism.
- Introduce and implement environmental management systems.
- Enhance environmental impact assessment and monitoring processes.
- Support and build environmental management information systems.
- Develop a strategy for environmentally sensitive land use zoning.
- Increase awareness of sustainable tourism concepts.

A major initiative is the development and adoption of environmentally sensitive land use zoning policies and regulations for Tourism Development Authority lands in the Southern Red Sea region. Together with the TDA, RSSTI has developed a Land Use Management Plan for the Southern Red Sea Region for consideration by top levels in concerned ministries, including the Ministry of the Environment and the Ministry of Tourism. This document (the Land Use Management Plan) represents a collaborative effort between the TDA and RSSTI, incorporating and drawing on a host of research and information compiled by consultants and staff of the two projects.

### Definition of the Study and Planning Areas

Egypt's South Marsa Alam area along the Red Sea coast contains a vast mountainous wilderness called the Eastern Desert, a sparse and predominantly nomadic population, world-renowned marine resources, rare wildlife, and numerous antiquities. The Tourism Development Authority (TDA) recognizes that the establishment of successful tourism and land use planning will require a competent understanding of these factors and the application of planning techniques that are compatible with these unique conditions.



*Coastal Plateau in the Planning Area*

compatible with these unique conditions.

The northern boundary of the study area is located just south of the city of Marsa Alam and the southern boundary is approximately the community of Berenice, just south of Ras Banas. The western boundary consists of a line extending along the summits of the mountains located in this area of the Eastern Desert. These summits are the upper limit of numerous watersheds that drain into the Red Sea. The eastern boundary is the Red Sea itself. The planning area concerns the five kilometers coastal strip under TDA jurisdiction, stretching from Wadi Umm Tondoba to just south of Wadi Lahmi.

The coastal lands outside of municipal boundaries are primarily dedicated to the development of tourism projects under the auspices of the Tourism Development Authority. Land ownership and authority of the Red Sea coast is shared among several government jurisdictions including the Red Sea governorate and Egyptian ministries. (See Land Jurisdiction map.)

Located within the South Marsa Alam Area is an environmentally and historically important area called the Wadi El Gemal-Hamata Protected Area. For several years, the Wadi El Gemal area received considerable attention from various government agencies and private institutions. The area, which includes Wadi Lahmi and Wadi Ghadir in addition to Wadi El Gemal, is deemed important by the Egyptian government because of its biota and marine ecosystems that are unique to the Eastern Desert and the Red Sea, and because of the numerous antiquity sites located within this area. Based on the diverse natural and heritage resources located within this region, the Government of Egypt formally declared as a Protected Area in January 2003. (See Regional Context map.)

The TDA recognizes that a successful tourism project is entirely dependent upon the natural and heritage resources that are unique to a particular region. For this reason, the TDA has selected the South Marsa Alam Planning Area to illustrate techniques that can serve as Land Use Management Planning principles for accomplishing sustainable tourism. The selection of this region and the Wadi El Gemal-Hamata Protected Area in particular, represents an important opportunity for Egypt to demonstrate international leadership in sustainable tourism management.

## **Objectives of the Land Use Management Plan**

Sustainable development in the Red Sea area south of Marsa Alam is based on realizing the potential of environmentally sound tourist activities and facilities. The Land Use Management Plan emphasizes an active, resource-based tourism experience designed to provide tourists with an opportunity to interact with nature on a personal scale.

In addition to economic development considerations, the TDA recognizes that tourism development must be performed in a responsible manner in order to safeguard Egypt's natural and cultural resources for both present and future generations. It is essential for the nation to both conserve its scarce environmental resources and preserve its cultural integrity. Sustainable tourism represents an opportunity for Egypt to demonstrate responsible stewardship of its valuable natural and cultural resources.

The protection and perpetuation of natural integrated ecosystem processes, native wildlife and plant communities, rich marine diversity, and cultural heritage of the area are important aspects of the Land Use Management Plan. The objectives listed below represent the foundation of the Plan. The success of the Plan will be measured by the extent to which it fulfills these objectives:

1. Protect the wilderness character of the area south of Marsa Alam for use and enjoyment by present and future generations.
2. Promote an improved understanding and appreciation for the area's natural and cultural resources that result in appropriate tourism development, and inspire environmental awareness in tourists. This can be accomplished by identifying and utilizing interpretive themes and programs consistent with the specific attributes of the area.
3. Identify the optimum location of areas for tourism use and corresponding eco-activities appropriate for conserving the natural integrity of the area. An associated factor is the need to describe specific resource conditions and potential visitor experiences in different sub-zones based on natural sensitivity.
4. Identify opportunities for recreational uses and experiences that are compatible with the conservation of the wilderness character and cultural values of the region.
5. Establish a dialogue process and partnership between the target groups, i.e., tourism investors and governmental bodies such as TDA, EEAA, and the Red Sea governorate, to promote shared responsibility for sustainable development in the area.



# *Land Jurisdiction*



Red Sea Sustainable Tourism Initiative



Managed by:  
Government Services, Inc.



Financed by:  
United State Agency for  
International Development (USAID)



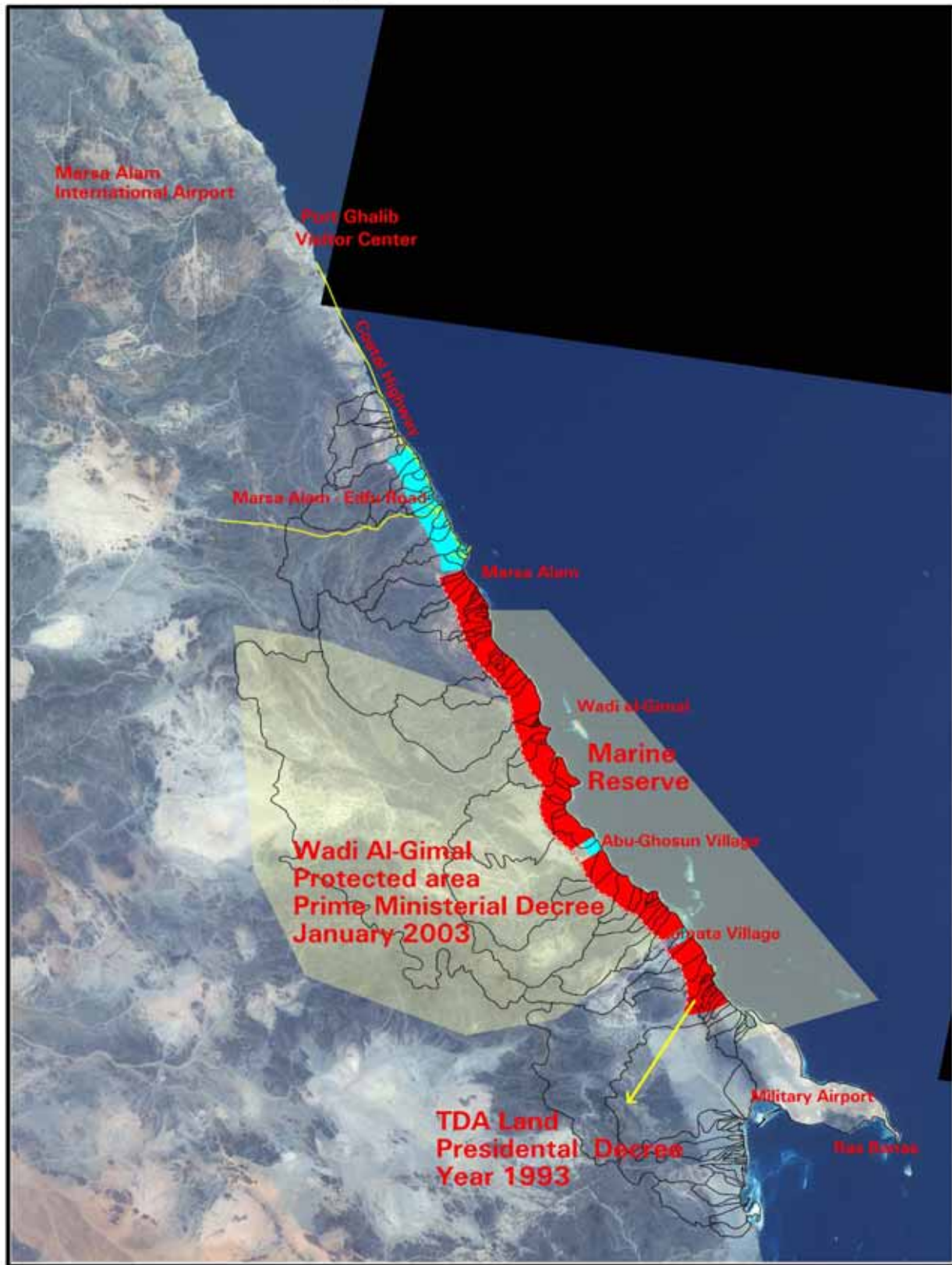
Implemented by:  
Tourism Development Authority (TDA)



## **Organization of the Land Management Plan**

The Land Use Management Plan consists of seven parts. Part One provides a description of socio-economic characteristics and a market assessment of the study area. Part Two describes the climate and natural resources of the study area. Part Three reviews ecological zones and sub-zones (key habitats) of the study area. Part Four presents the results of a sensitivity analysis of environmentally sensitive areas in the Red Sea area south of Marsa Alam. Part Five discusses development opportunities and constraints. Part Six presents the proposed land use zoning plan. Part seven reviews land use management criteria and regulations.

# Regional Context



Red Sea Sustainable Tourism Initiative



Managed by:  
Government Services, Inc.



Financed by:  
United States Agency for  
International Development (USAID)



Implemented by:  
Tourism Development Authority (TDA)





## PART ONE: SOCIO-ECONOMIC AND MARKET ASSESSMENTS

### 1.1 Introduction

The Red Sea area south of Marsa Alam is far behind the rest of Egypt in terms of economic, social, and infrastructural development. There is little doubt that local people and economic conditions will be affected by future tourism development in the planning area. Specifically, local populations will experience both increased employment opportunities and increased contacts with foreigners. Infrastructure and services will experience an increase in quality and availability, but also increased demand for use. Existing resorts will experience increased competition from new resort facilities. But returns on resort investment could experience declines if an abundance of similar facilities are developed.

In order to better understand the existing social and economic characteristics of the Red Sea area south of Marsa Alam, a socio-economic assessment was conducted in May 2003 by a team of senior social scientists and experienced field researchers. The team first reviewed traditional and new economic activities, then interviewed the members of nineteen local communities and surveyed the managers of existing tourism facilities in the planning area. Much of this section is a summary of their assessment. More comprehensive information can be found in the study entitled "Socio-Economic Assessment of the Southern Red Sea Region," RSSTI, May 2003.

A brief market assessment, based on Ministry of Tourism statistics and World Travel and Tourism Council forecasts, follows and supplements the socio-economic assessment



*Rangeland*



*Camels*



*Traditional Well and Camel Herders*

### 1.2 Traditional and New Economic Activities

The Eastern Desert of Egypt is one of the most arid deserts of the world. The inhabitants of this desert have survived its harsh conditions for thousands of years by means of a nomadic existence supported by tribal social systems.

Traditional economic activities of this region depend upon a variety of natural resource uses. The tribal people living in the Eastern Desert subsist by means of sheep-herding, goat-herding, camel-herding, charcoal production, the collection of medicinal plants, and temporal cultivation in ecologically favorable habitats. Small communities along the coast, such as Qulaan, depend upon fishing. Mining is an important employer for many. More recently, resorts, hotels, dive camps, and other tourism-related facilities have been introduced in the Red Sea Area south of Marsa Alam.

#### Grazing

Small-scale grazing, dependent on rangeland, has contributed to the economy and culture of the Arab world since early civilization. By adapting to changing conditions, this pastoral system has survived until the present day but only in very limited areas. The southern part of the Eastern Desert is one of these areas. The traditional pastoral system is essentially a nomadic existence driven by the seasonal movement of flocks in search of water and grazing.

Rangeland in this part of the desert is constrained by extreme aridity, low productivity, and limited water availability, hence utilization is opportunistic and depends on sporadic rainfalls that induce plant growth and provide surface water. There is great variation from year to year in the livestock carrying capacity of the rangeland, and pastoral livestock production is subject to huge risks.

Nomadic and semi-nomadic populations have a range of strategies for coping with environmental risk and minimizing its impact. They adjust to the climatic risk of drought by varying the number of livestock and/or migrating in search of feed and water, and may also vary the species composition of their flocks between sheep, goats, and camels. This could mean that in good years animal numbers would be increased by retaining all the young stock and living mainly on the milk. In dry years many animals would be slaughtered or traded for other commodities. In a severe drought, pastoralists migrate further into grazing lands of other tribes, settle near the coast, or migrate towards Sudan. When a good (wet) year occurs, the pastoral livelihood system encompasses alternative economic activities such as those noted earlier, i.e., herding, charcoal production, the collection of medicinal plants, cultivation, mining, and fishing.

#### Mining

The Eastern Desert is well known for its wealth of mineral resources, particularly metals and ornamental stones. Since ancient times, marble and granite, together with metals, have been extracted and used or sold within and outside Egypt. Especially important were the gold mines, remains of which are seen in almost every large wadi, but virtually all ceased mining by the early 1930s. Recently however, in 1994, an Australian mining company (Centamid) was granted a large concession around the old Sukkari gold mine.



*Almanite Mine*

Although the results of the company's exploration work showed that gold is abundant, no commercial exploration has yet taken place.

At present, there are more than 200 mines in the larger Southern Red Sea area, the majority extracting barites, quartz, and feldspar. There are also several iron, almanite (a natural mixture of iron and titanium), phosphate, kaolin, and talc mines. A total of about 600 quarries exist in the desert, extracting argil, sandstone, granite, marble, sand, pebbles, and clay. According to the 1993 Environmental Profile of Aswan, approximately 10,000 workers are employed in mines and quarries in the wider Eastern Desert.

### **Fishing**

The fisheries resources of the Egyptian Red Sea have traditionally been exploited at a low level and until recently represented the economic and nutritional mainstay of the coastal population.

In Qulaan, a fishing settlement in the planning area with a population of 50, fishing is a family affair and every member of the family participates to some degree. Men and boys above age nine engage in fishing with a boat and net fishing in shallow water; women and girls clean, sort, and salt the catch, and sometimes also fish shallow waters using nets. In contrast, fishing as a secondary occupation for desert dwellers is undertaken by males only.

Fishing capacity and techniques have developed over the years. The community now has four fishing boats, one with a motor. Each boat is owned by four to six people who share costs and revenues. Fresh fish are sold to traders who have the cooling facilities villagers lack. The fishing season is in summer and lasts for about six months. Residents indicate that fishing resources have diminished over the years. Larger boats and motors than community members can afford are required to go further out to sea, especially in winter when fish stocks near the shore decrease.

The socio-economic assessment described in the introduction to this section provides additional information concerning the community of Qulaan and fishing as a primary occupation in the planning area.

### **Resort and Tourism Development**

During the last several years, a variety of resort, hotel, and dive camp developments have been constructed along the Red Sea coast of the planning area. Land has been sold, buildings developed, and facilities operated under the authority of the TDA.

The vast majority of TDA properties in the Red Sea area South of Marsa Alam have already been sold for the purpose of constructing tourism facilities. The land that has been sold comprises much of the coast line of the planning area. All TDA properties, both developed and undeveloped, are illustrated on the map entitled Existing TDA Land Allocation. The map entitled Existing Land Use illustrates most existing land uses and settlements. Section 1.4 describes existing tourism facilities.

## **1.3 Socio-Economic Assessment**



*Ababda Settlement*

The information that follows constitutes a brief overview of the current living conditions of the local population of the planning area as well as the involvement of local communities in tourism-related activities.

The socio-economic assessment team surveyed a total of 19 settlements of 194 families with 928 individuals. These settlements included eight villages and eleven small (between four to ten families) settlements located within wadis. Ninety-five percent of all settlements visited have inhabitants of tribal origin (primarily Ababda). Immigrants from the Nile Valley live in 21% of the communities, principally Hamata and Abu Ghusun. Results of the study indicate that most residents have very limited resources and opportunities.

Basic infrastructure is minimal. Only 26% of all communities have access to permanent electricity, 21% have access to health care facilities, 21% to educational facilities, and 5% to animal health services. Seventy-four percent of the villages are dependent on water delivery by tank truck, 21% have access to piped water, and 5% use well water. Access to materials from outside wadi settlements is limited mainly to mobile grocery and water trucks.

Concerning their organization, 68% of the settlements have a community leader and 37% of the settlements have established a community centre.

Settlements are built primarily out of wood and steel sheets (42%) with some stone houses (26%) and some cement block construction (11%). Sixteen percent of the inhabitants use bushes to erect their shelters.

The six main sources of income for the inhabitants of the area are livestock grazing (35%), small-scale fishing (27%), trade (23%), crafts production (21%), tourism (19%), and labor (14%). Almost all households must work at both primary and secondary occupations to survive.

Major problems confronting inhabitants include limited access to educational, health, and electricity services, high illiteracy rates, and the negative effects of existing tourism activities (i.e., garbage from tourism facilities and dive boats). Those interviewed made several suggestions to ameliorate these and other problems. Among these suggestions are the improvement of basic services, the opportunity to produce and market handicrafts, the possibility of cooperating with hotels in tourism activities, the availability of language training, and the opportunity to acquire skills related to tourism, marketing, and environmental awareness.

Thus far, local communities have not benefited substantially from the tourism development in their region. Indigenous individuals are in a disadvantaged position compared to Egyptians from the Nile Valley in terms of direct employment by large hotels (as well as in other economic sectors) because they lack the capabilities and skills needed in large-scale luxurious tourism establishments. Ecotourism, by contrast, seems to offer more opportunities for the direct involvement of local communities, especially as ecotourism establishments are often more willing to invest in local development.

## 1.4 Tourism Facilities/Local Employment

As part of the socio-economic assessment, a professional survey team interviewed managers of all existing tourism facilities. Employment of local workers was a primary focus of these discussions.

### Hotels



*The Shams Alam Hotel*

There are three hotels in the planning area that have a present capacity of approximately 600 beds, catering at the moment mostly to the German, Swiss, Italian, and Austrian markets. The oldest, the Shams Alam Hotel, located next to the mouth of Wadi El Gemal, has been operating since 1999. The Zabargad Hotel opened in the fall of 2001 and the Lahmi Bay Hotel in 2002.

The three hotels employ a total of approximately 321 staff members. Only eight employees are indigenous inhabitants of the planning area. The remaining staff is composed of Egyptians from the Nile Valley and Alexandria. Most of them have previous working experience in tourism. The eight local staff members all work for the Shams Alam Hotel in low ranking positions that require no formal qualifications, such as gardening and outdoor cleaning, and have no direct contact with guests.

The Zabargad and Lahmi Bay Hotels do not employ any local workers, even though the hotel representatives interviewed agreed that they would prefer to employ local people, especially as they are cheaper because they can commute between their residence and the hotel and do not require long holidays and travel allowances to visit distant families. Both hotels indicated, however, that no well-trained staff is available locally.

### Diving Centers



*The Wadi Gemal Dive Center*

The three diving centers operating in the planning area are all affiliated with and located adjacent to a hotel. All have foreign managers. The three diving centers offer PADI courses and certifications; one also certifies according to CMAS standards.

The employees of the diving centers can be classified into three groups: 1) dive instructors and dive masters (the manager of each center is in all cases also a dive instructor); 2) technical staff who fill the air tanks used in diving, clean equipment, carry it to and from the diving boat, and operate small feluccas and zodiacs; and 3) boat crews who are responsible for the boats, including navigation, maintenance, and cleaning, and who also prepare food and drink on the boats.

The three diving centers employ directly a total of 57 staff members. Two centers do not own diving boats and have no boat crews. Instead, they hire boats on a long-term basis that come with their own crew. Thus when including the boat crews in the calculation, a total of approximately 97 persons are engaged in the diving centers' direct operations. Of that total, 55 are local.

Diving centers in Egypt, especially when managed by a foreign company, tend to bring most of their diving staff from outside Egypt. Only four of nineteen dive masters and instructors are Egyptian, and those four are from Alexandria, Cairo, and Quseir.

The technical staff are mostly local people or people from Quseir who have acquired diving experience in the north. Many local employees have previously worked as fishermen, which employers regard as an advantage, as these employees know the sea well and are at ease with it.



# Existing TDA Land Allocation



Red Sea Sustainable Tourism Initiative



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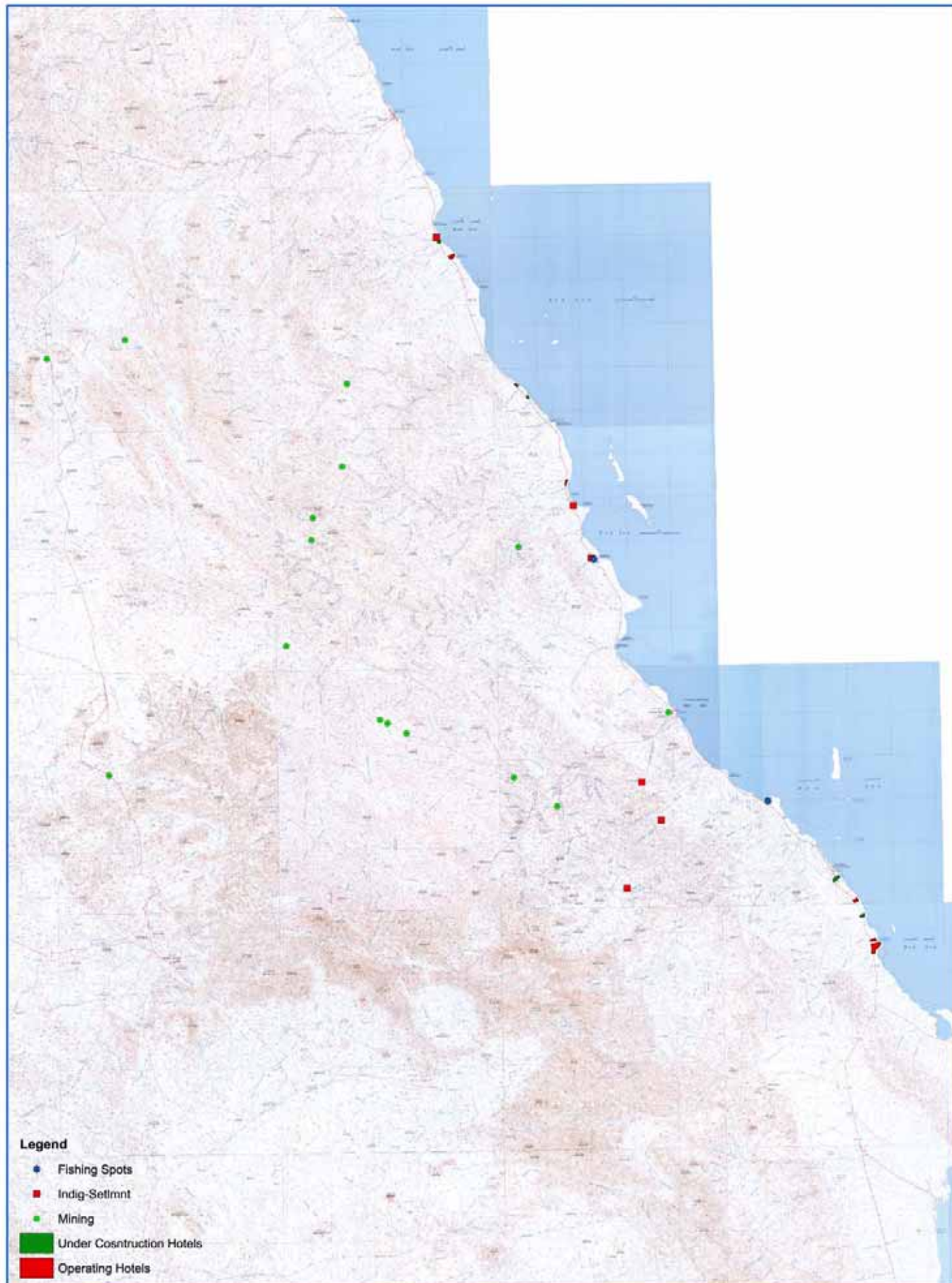


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Authority

## Existing Land Use

Red Sea Sustainable Tourism Initiative (RSSTI)  
Southern Region of the Red Sea  
Egypt





## Diving Lodges

There are two diving lodges in the planning area. Both belong to Red Sea Diving Safari, a company that also owns and manages a diving lodge in Marsa Shagara and the diving center of the Kahramana Hotel, both of which are located north of Marsa Alam.

Red Sea Diving Safari employs approximately 34 persons its Nakari and Wadi Lahmi diving lodges (the number of staff members in both Nakari and Wadi Lahmi varies according to the number of resident guests). The manager of Nakari is an Egyptian from Alexandria and the manager of Wadi Lahmi is Australian. Sixteen of the 34 employees are local workers. The managers say that the lodges are small and require flexible employees who can contribute to all aspects of lodge operations. Local workers occupy a wide variety of positions, including cooking, managing supplies, cleaning, and providing technical assistance for diving.

## 1.5 MARKET ASSESSMENT

The following brief market assessment is based on Ministry of Tourism statistics and World Travel and Tourism Council (WTTC) estimates and projections.

### 1.5.1 International Tourism to the Red Sea & South Sinai Governorates

The share of international tourism to Egypt handled by the hotel industry and live-aboard dive industry in these two governorates represents a very major share of the nation's entire international tourism industry, estimated at 49% of it, if the combined area's visitor volume is adopted as a guide. Both areas specialize in beach holidays and in dive holidays, and have generated a volume that now far surpasses cultural tourism and business tourism to represent Egypt's primary tourism product.

Table 2 presents indicators of national tourism as well as tourism into each of these two governorates. Exhibit 1 depicts the foreign currency capture (receipts) of each governorate as compared to the national total. Some observations follow.

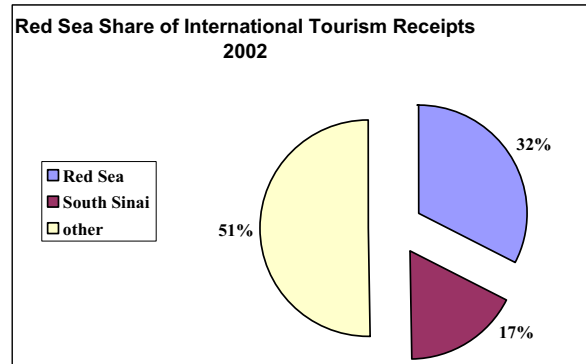
- Tourist arrivals include foreign tourists lodged in live-aboard boats as well as in commercial hotels. 2002 figures reflect 2001 figures inflated by 12%, the observed rate of recovery in the national tourist arrivals figure.
- Approximately 2.6 million foreign visitors (49% of the total to Egypt) is the estimate for the combined tourism industry in 2002.
- Receipts-per-tourist includes expenditures on lodging, food, entertainment, ground and air transportation, touring and shopping, medical services and all other services obtained from the Egyptian economy. A total of \$2,076 million of receipts is estimated, nearly one half the national total of \$4,180 million.
- Receipts are far higher in the Red Sea governorate (RSG) than the South Sinai governorate (SSG) because of higher count of visitor arrivals, and a much longer length of stay of 8 days in the RSG versus 4.8 in the SSG.
- This equates to travel and tourism sector GDP of \$2.4 billion for the combined area, and employment of 470,000.

**Table 2. Red Sea and South Sinai 2002 Indicators of International Tourism**

Category	National	RSG	SSG	RSG+SSG
Tourist arrivals (M)	5.2	1.4	1.2	2.6
Share of total arrivals Egypt		26.0%	23.1%	49.1%
Tourist days (M)	33.0	10.7	5.7	16.4
Tourism receipts (US\$M)	4,180.3	1,355.5	720.1	2,075.5
Share of tourism receipts		32.4%	17.2%	49.7%
Receipt per tourist (US\$)	804	1002	601	814
Receipt per tourist-day (US\$)	126.7	126.7	126.7	126.7
Employment	947,488	307,227	163,204	470,431
Tourism GDP (US\$B)	4.87	1.58	0.84	2.42

Note: Estimates are derived from study assumptions and Ministry of Tourism statistics for 2001.

**Exhibit 1: Red Sea Share of 2002 International Tourism Receipts**



The combined hotel stock of the two governorates (exceeding 63,000 rooms), represents Egypt's largest hotel capacity, far exceeding that of the Nile Valley cities, Cairo included. Unlike the valley cities that offer very distinctive and world-famed heritage assets, the Red Sea industry is competing directly with all of the warm weather destinations that ring the Mediterranean Sea. Its most distinguishing asset is its famed underwater marine life, which other destinations around the Mediterranean Sea, with their limited coral reefs and cooler climate, cannot offer.

### 1.5.2 Future Growth

As noted in the introduction to the Land Use Management Plan, the economic outlook for Egyptian tourism is very positive. Forecasts indicate strong long-term growth and a tourism industry that will double in size in only 18 years. The Red Sea and South Sinai governorates are expected to generate much of the anticipated future annual growth in both tourism revenues and employment.

## PART TWO: RESOURCES OF THE RED SEA AREA SOUTH OF MARSA ALAM

Part Two of the Land Use Management Plan reviews the climate, the natural resources, and the antiquities and cultural heritage resources of the Red Sea area south of Marsa Alam.

### 2.1 Climate

The southern region of the Red Sea lies in an area that represents one of the global extremes of hot and arid conditions with scarce rainfall. Generally, the year is divided into cooler and hotter seasons roughly corresponding to the conventional northern hemisphere winter and summer. Winter extends from mid-October to mid-April with summer occupying the rest of the year. As shown in Table 3 the coolest month is January, which has a mean daily mean temperature of 18.3 degrees Celsius. The hottest is August with a mean daily temperature of 32.1 degrees Celsius. Diurnal differences in air temperature of 10 degrees Celsius or more are common.

The region is nearly rainless, receiving only odd showers, sometimes at intervals of several years. These showers can sometimes amount to only a millimeter or two of rainfall. Occasionally, however, very heavy rains fall over a short period. Such rains can cause flash floods. Average rainfall totals 17.4 millimeters per year, with November receiving the greatest amount (13 millimeters).

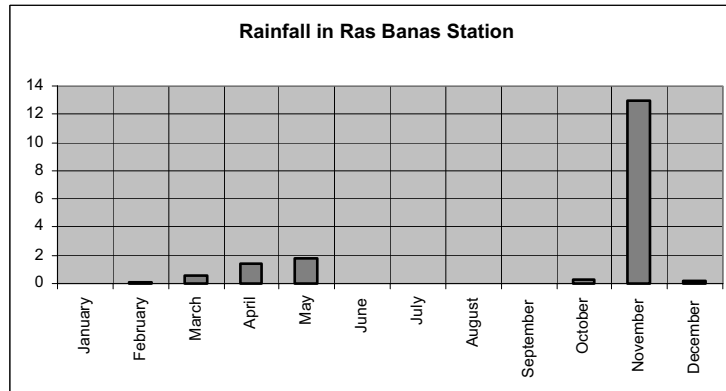
The mean annual relative humidity is 43% and the mean annual evaporation rate is 16.8 millimeters. Monthly variations are shown in Table 3 and Exhibit 4. Average wind speeds reach their annual peak in June at 13.8 knots.

Table 3 lists meteorological parameters based on data compiled over a ten-year period at the Ras Banas meteorological station. Exhibits 2 through 4 provide additional information regarding rainfall, average temperatures, and the relation between relative humidity and evaporation.

**Table 3. Meteorological Parameters in Ras Banas Station**

Parameters	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Mean
Maximum temperature	24.8	26.1	28.6	32	35	38.4	38.3	38.8	37.2	34.1	26.1	26.1	32.4
Minimum temperature	12.4	12.5	15	18.1	21.1	24.2	24.3	25.1	24.2	20.7	14.1	14.1	19.1
Daily mean temperature	18.3	19.3	19.3	28.4	28.4	31.6	31.8	32.1	30.9	27	19.7	19.7	25.5
Relative humidity	54	51	45	39	32	28	34	36	34	49	59	57	43
Evaporation (mm)	9.3	10.4	13.1	16.6	21.7	28	23.3	22.5	22.7	15.3	10.1	8.7	16.8
Rainfall (mm)	-	0.1	0.6	1.4	1.8	-	-	-	-	0.3	13	0.2	1.45

**Exhibit 2: Rainfall in Ras Banas Station**





*Shear Zoned Ophiolitic Melange in Wadi Ghadir*

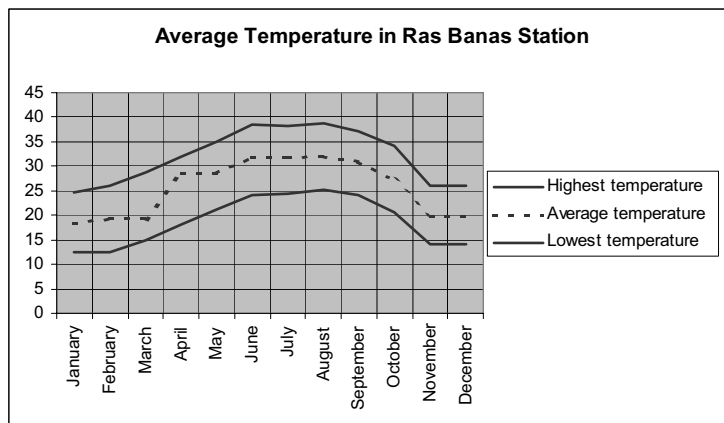


*Pillow Lava Graded into Sheeted Dykes during Thrusting of the Ophiolitic Melange*

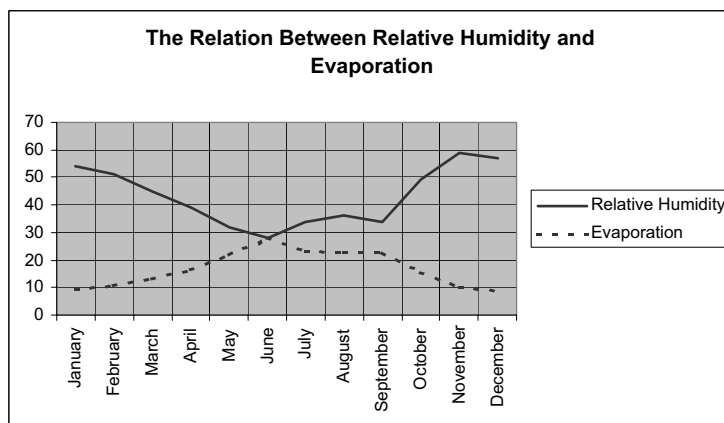


*Basic Dykes Intruded in Granitic Rocks*

**Exhibit 3: Average Temperature in Ras Banas Station**



**Exhibit 4: Relative Humidity and Evaporation**



## 2.2 Abiotic Resources

The information that follows provides a brief overview of the abiotic resources of the Red Sea area south of Marsa Alam. More complete information can be found in the study on geology, geomorphology, soils, and surface hydrology contained in the volume, "Natural Resources, South Marsa Alam Area," Tourism Development Authority, February 2003.

The term "study area," as used in this and the following sections, encompasses the area bounded by Marsa Alam in the north, Ras Banas in the south, the summits of the Red Sea mountains in the west, and the Red Sea coast in the east.

### 2.2.1 Geology

The geology of the study area is unique for several reasons. First, the geologic formations contain some of the oldest rocks on earth (Pre-Cambrian) and thus have a remarkable story to tell about the ways in which the earth was formed. Second, the area once contained huge amounts of mineral wealth that provided the rationale for the human settlement that occurred throughout the region. Third, the geologic formations have created dramatic landscapes that have resulted in beautiful landscapes.

The study area is part of Egypt's Eastern Desert. It is covered mainly by Pre-Cambrian igneous and metamorphic rocks with a thin blanket of Phanerozoic sedimentary rocks. Basement rocks, mainly Pre-Cambrian, are represented primarily by Hafafit gneisses, metavolcano sedimentary rocks, ophiolitic melange group, granitic rocks with some small outcrops of Hammamat sediments, and Dokhan volcanics. Dyke swarms, quartz veins, and other types of veins are also present. Some basement rocks intruded during the Cretaceous period are known as ring complexes. These complexes are found in the southwestern part of the area in Gebel Kahfah.

Mineral deposits in the study area, especially gold, copper, and gemstones, have been known and exploited by Egyptians from 2500 BC to the present day.



*Older Granite (Granodiorite Rocks at the Entrance of Wadi Ghadir)*



*Sand Accumulation behind Sharm El Luli*



*Ripple Marks in Sand Accumulation behind Sharm El Luli*



*Intermountain Sabkha in Wadi Umm El Abbas*

Along the coastal plain, Tertiary and Quaternary sedimentary rocks cover most of the basement complex. The Tertiary rocks consist of Paleocene chalk, Eocene limestone, Oligocene clastics, Miocene sediments, and Pliocene marine beds. The Quaternary deposits are represented by undivided Quaternary wadi deposits, sabkhas, and playa deposits.

Important geological features in the study area, of interest to both scientists and tourists, include an ophiolitic sequence with diagnostic pillow basalts and sheeted dykes in Wadi Ghadir, the intermountain sabkha in Wadi Umm El Abbas, and the sand accumulation in Wadi El Luli (an eolian deposit in an area surrounded by mountains). (See Geological Ages, Mineral Resources, and Rock Units maps.)

## 2.2.2 Geomorphology

The area is rich in geomorphologic features. Topographically, it includes very high relief mountains (1509-1976 meters) as well as medium relief peaks (570-879 meters). Eastward, the relief becomes lower passing into low hills, sedimentary cuestas, tablelands, and plains. (See Slope Analysis map.)

The main geomorphologic units are mountainous areas, rugged lands, cuestas of sedimentary rocks, terraces, sand sheets, sand plains, sand and gravel soils, sabkhas and salt marshes, and raised beaches (which are also referred to as uplifted fossil reef plateaus in other sections of this document). (See Geomorphology map.)

The shore shows meandering, forming numerous bays, sharms, and heads. (See Shoreline Classification map.) Islands formed mainly of reef shoulder are also present. Coral reefs are abundant and protect the shore against waves, currents, and tides.

## 2.2.3 Soils

The soils in the Red Sea area south Marsa Alam are shallow and generally consist of unconsolidated particles that have been derived mainly from basement and sedimentary rocks composed mainly of sandstone, shale, and limestone overlying the igneous and metamorphic rocks. Such soils exhibit large grain size and low organic content. They are not inherently productive.

The substratum of the coastal plain is typically covered by wadi sediments or coastal sediments. The wadi and coastal sediments are composed of yellow to brown, medium to coarse sand, with some gravel and some silt and clay layers. The sands and gravel are more graded within the coastal sediments. Compact layers of gypsum and carbonate are also present at varying depths. The depth of the surface deposits range from 0 to 10 meters. Further inshore outcrops of bedrock are more common and deposits of sand and gravel range in depth from 0 to 15 meters.

Hyper-saline lowlands, known as sabkhas, are present on the alluvial plains of wadis. The sediments within the sabkhas are made up of wet sand with halite and gypsum deposits. The deposits are composed of grey to white fine sand, with salty crystals and conglomerate, overlying fine grey sand. (See Soils map.)

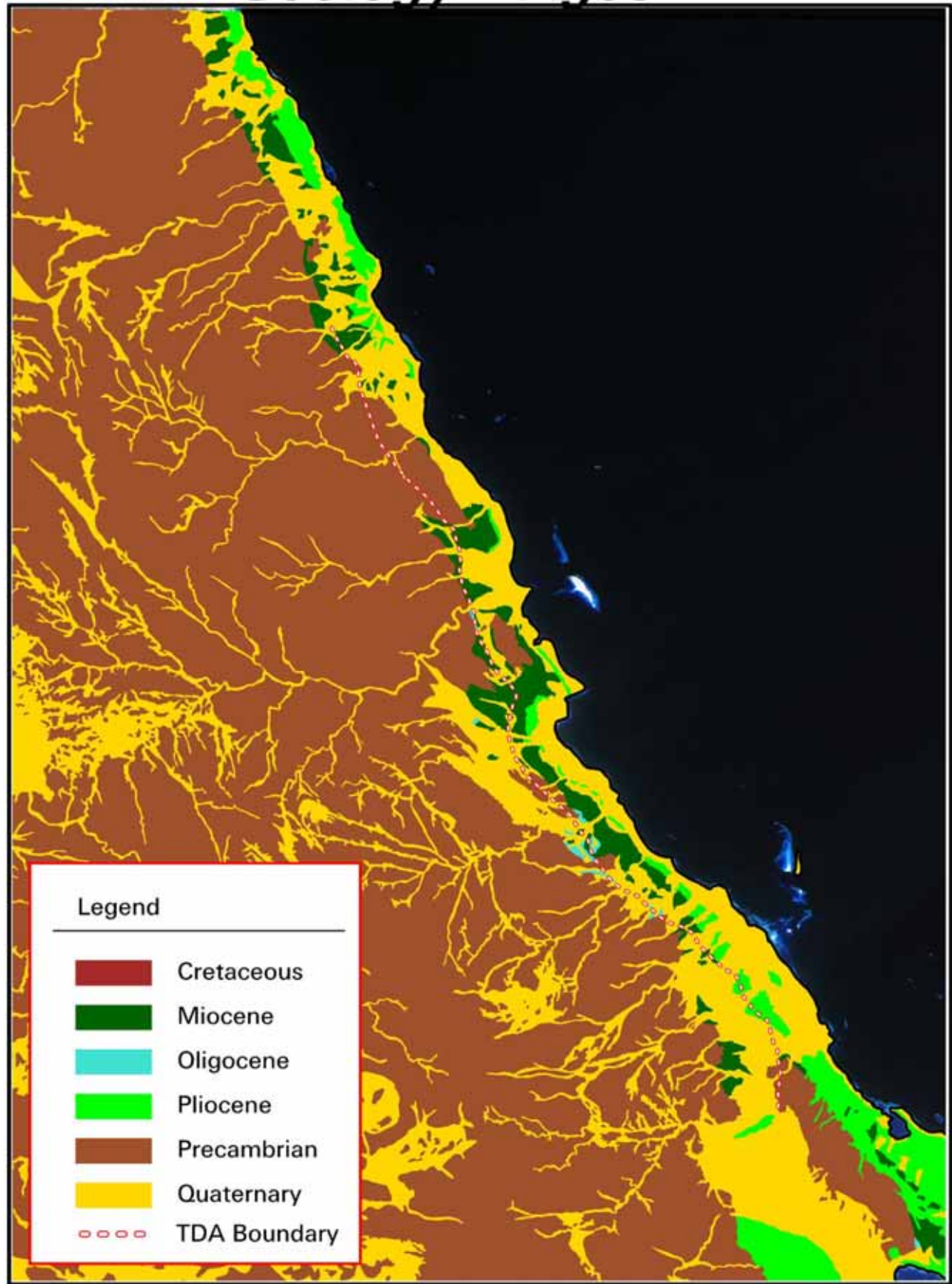
## 2.2.4 Surface Hydrology (Drainage Systems/Watersheds)

The study area is subdivided by many major wadis, of which Wadi El Gemal, Wadi Ghadir, Wadi Umm El Abbas, Wadi Ringa, Wadi Qulaan, Wadi Abu Ghusun, and Wadi Lahmi are the most significant. (See Drainage Pattern, Catchments Basin, and Wells maps.)

These wadis have very steep slopes in the area of the Red Sea Mountains, with no vegetation cover and generally impermeable rocks. The combination of these factors leads to heavy runoff of floodwaters in upstream areas. In downstream areas, with sedimentary rocks of reasonable permeability and wide and flat valleys, the runoff is reduced. While both the rainy season and the length of each flood (following the rains) is limited, any development of the area must include measures that either protect against flood damage or avoid construction in flood-prone zones. As the flood waters are a critical source of water for flora and fauna, any controlling or diversionary measures must be sited as far downstream as possible. (See Flooding Potential map and discussion of flash flood hazards in Part Five.)



# Geology - Ages



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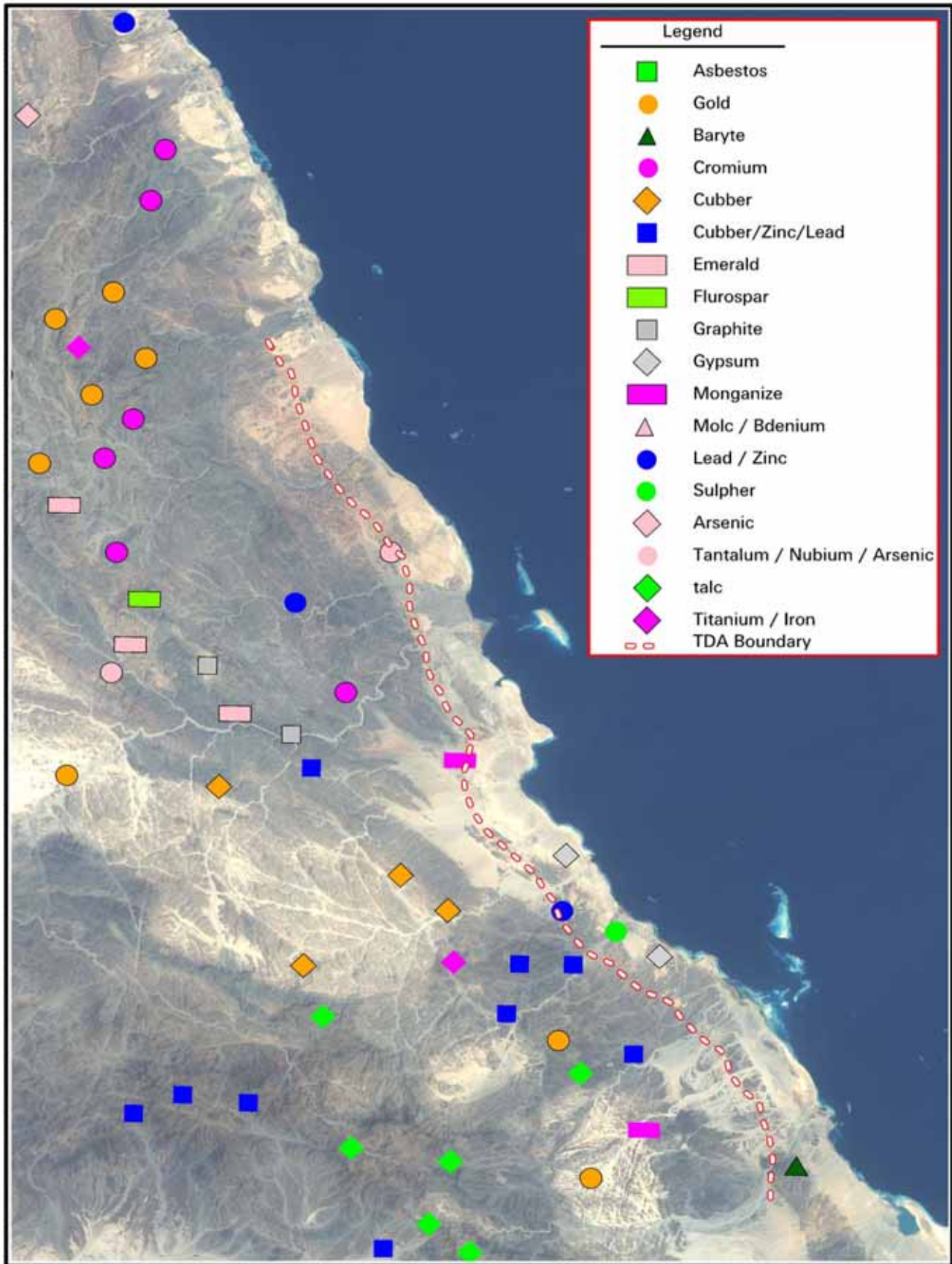
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# Mineral Resources



Scale  
10 0 10 20 30 Kilometers



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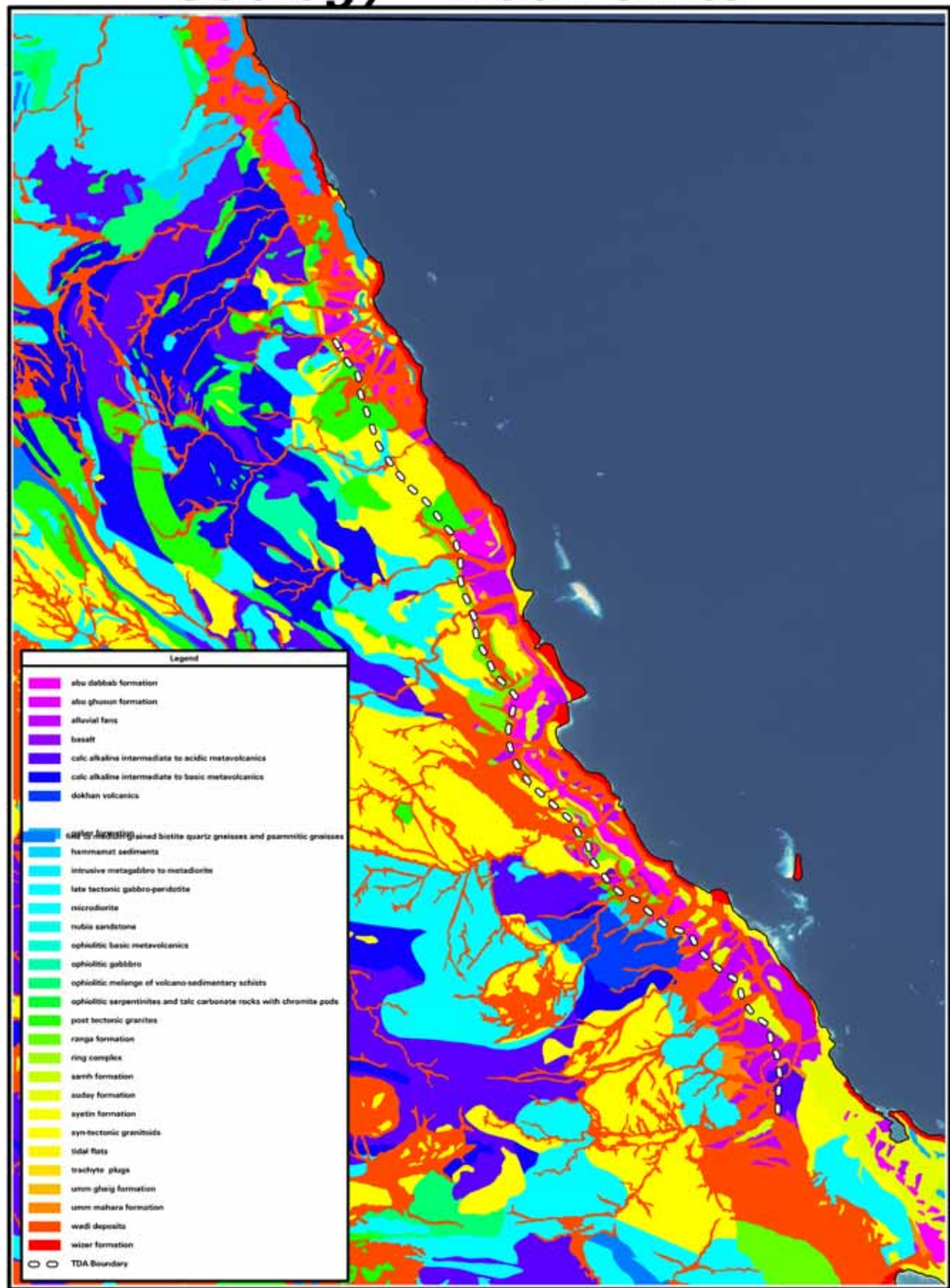


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# Geology - Rock Units



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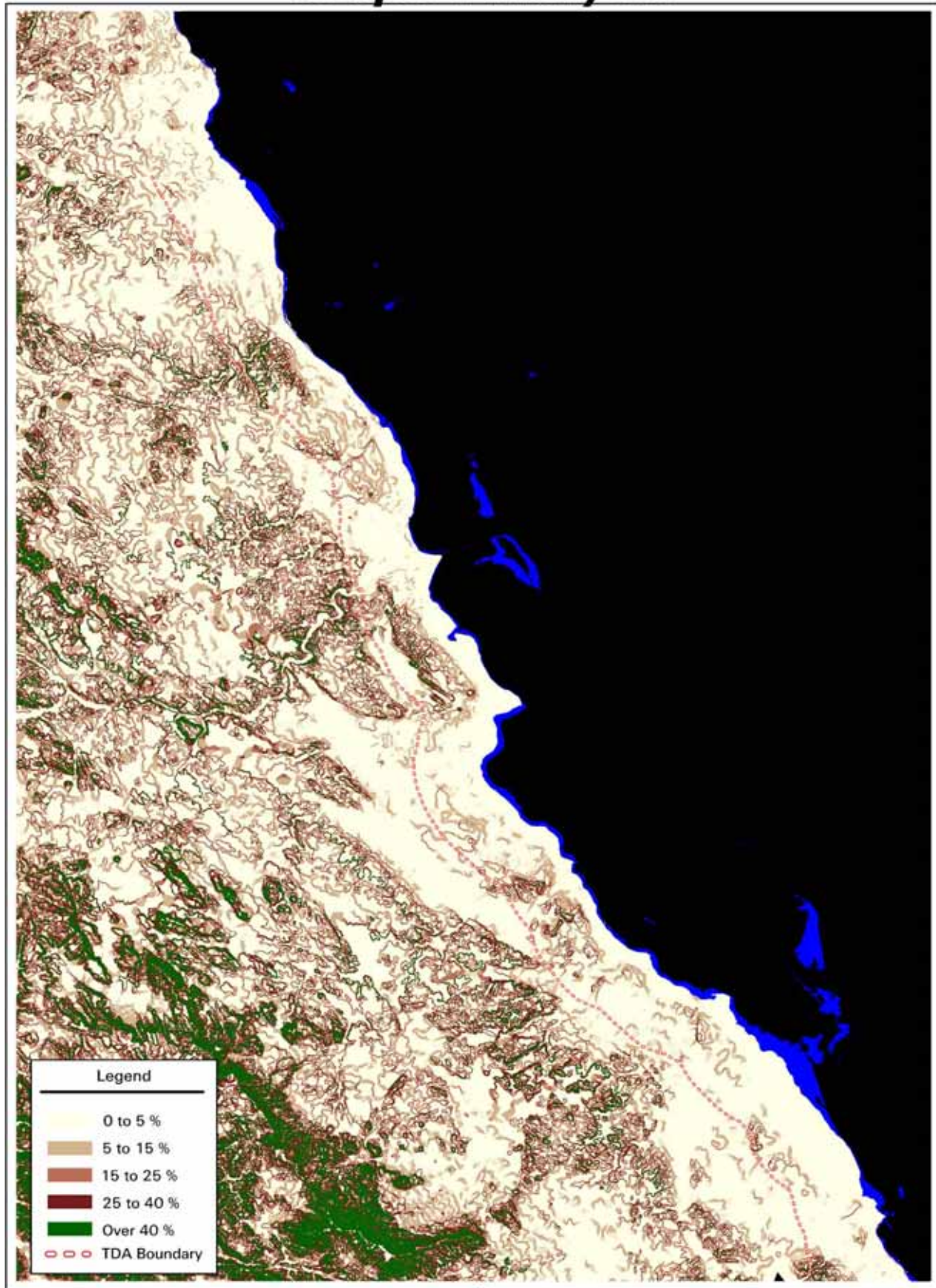


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# Slope Analysis



Scale  
10 0 10 20 30 Kilometers



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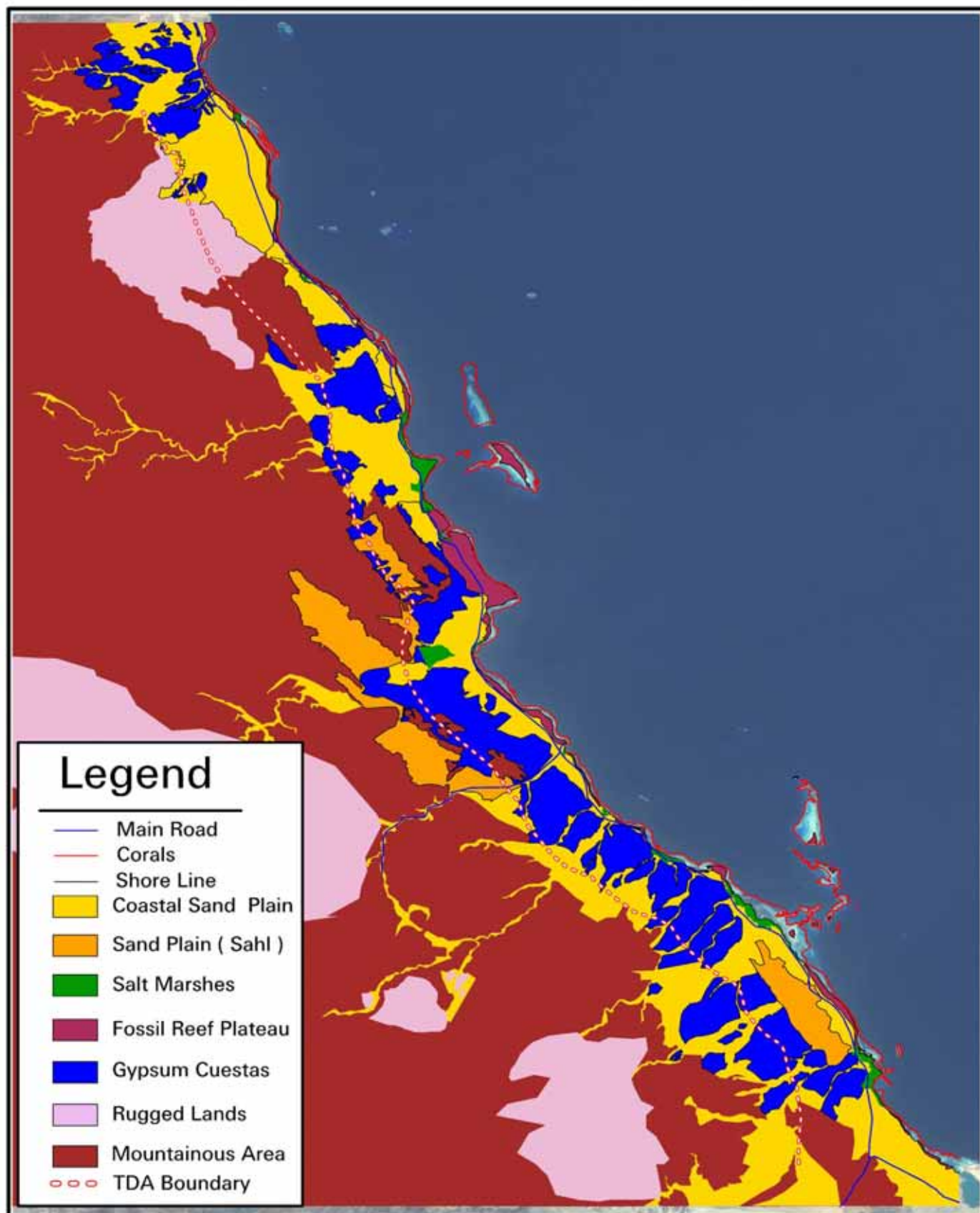
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# Geomorphology



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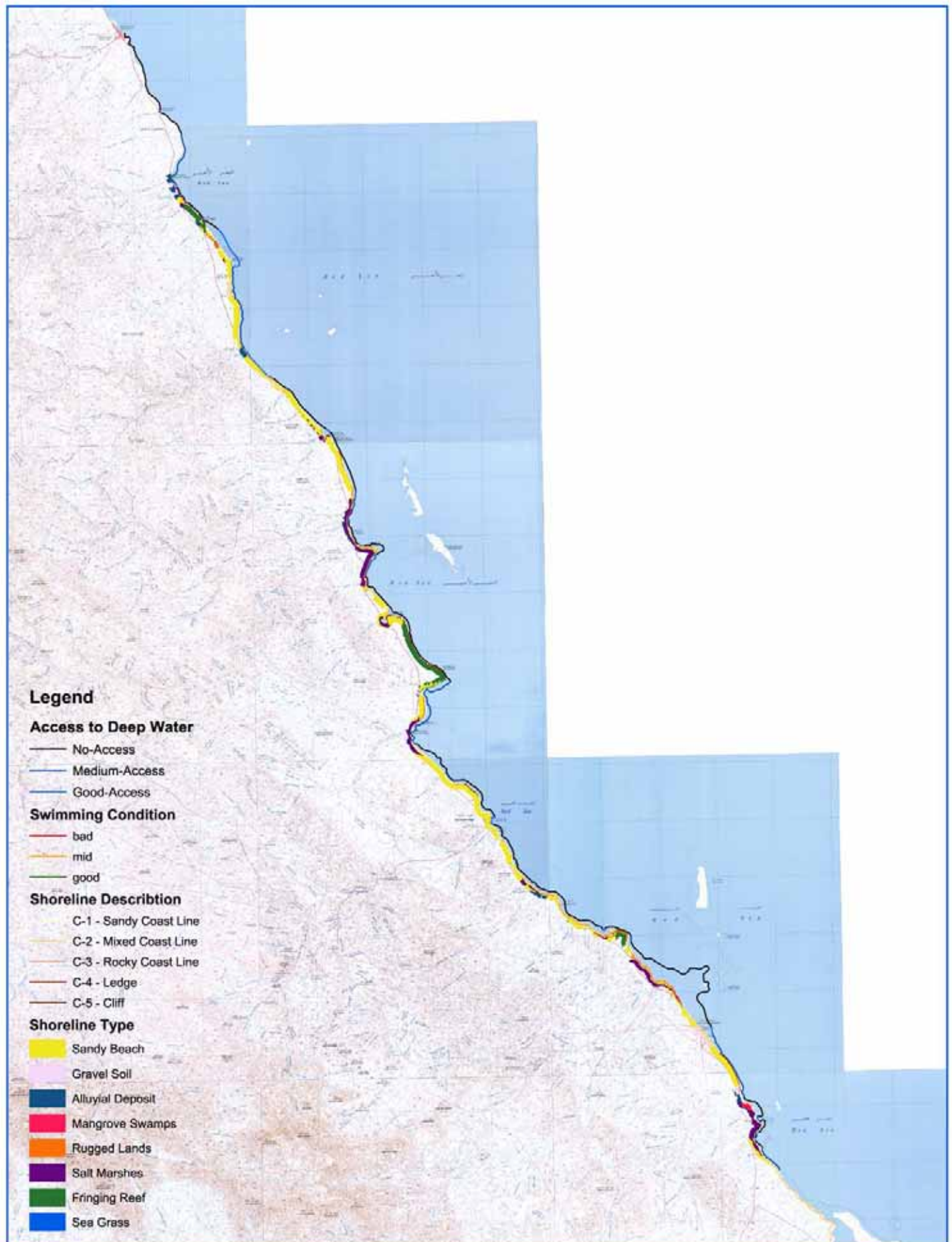
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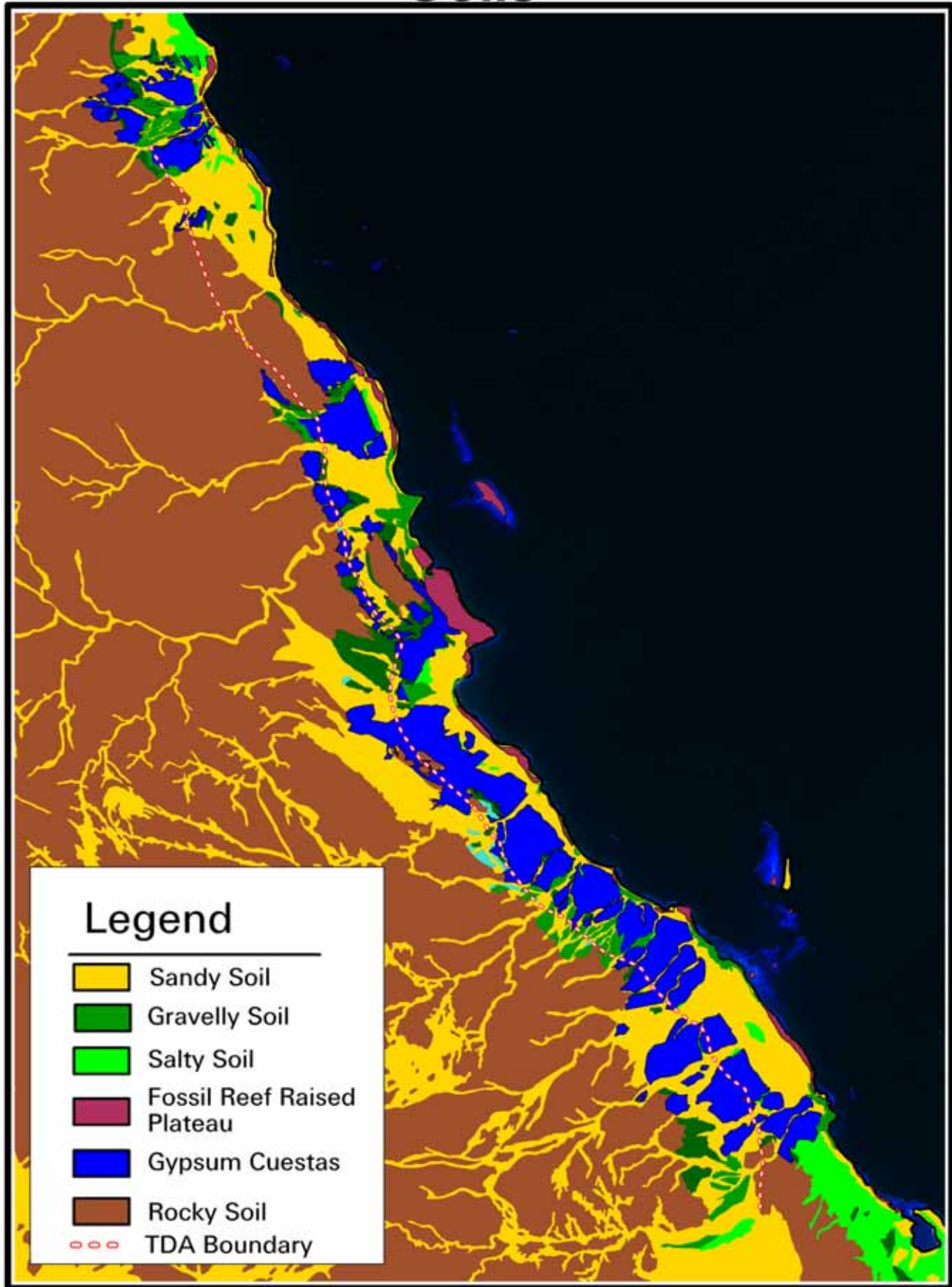


Tourism Development  
Authority

## Shore Line Classification

Red Sea Sustainable Tourism Initiative (RSSTI)  
Southern Region of the Red Sea  
Egypt

# Soils



Scale

10 0 10 20 Kilometers



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# Drainage Pattern



Legend  
○ ○ TDA Boundary

Scale  
10 0 10 20 30 Kilometers



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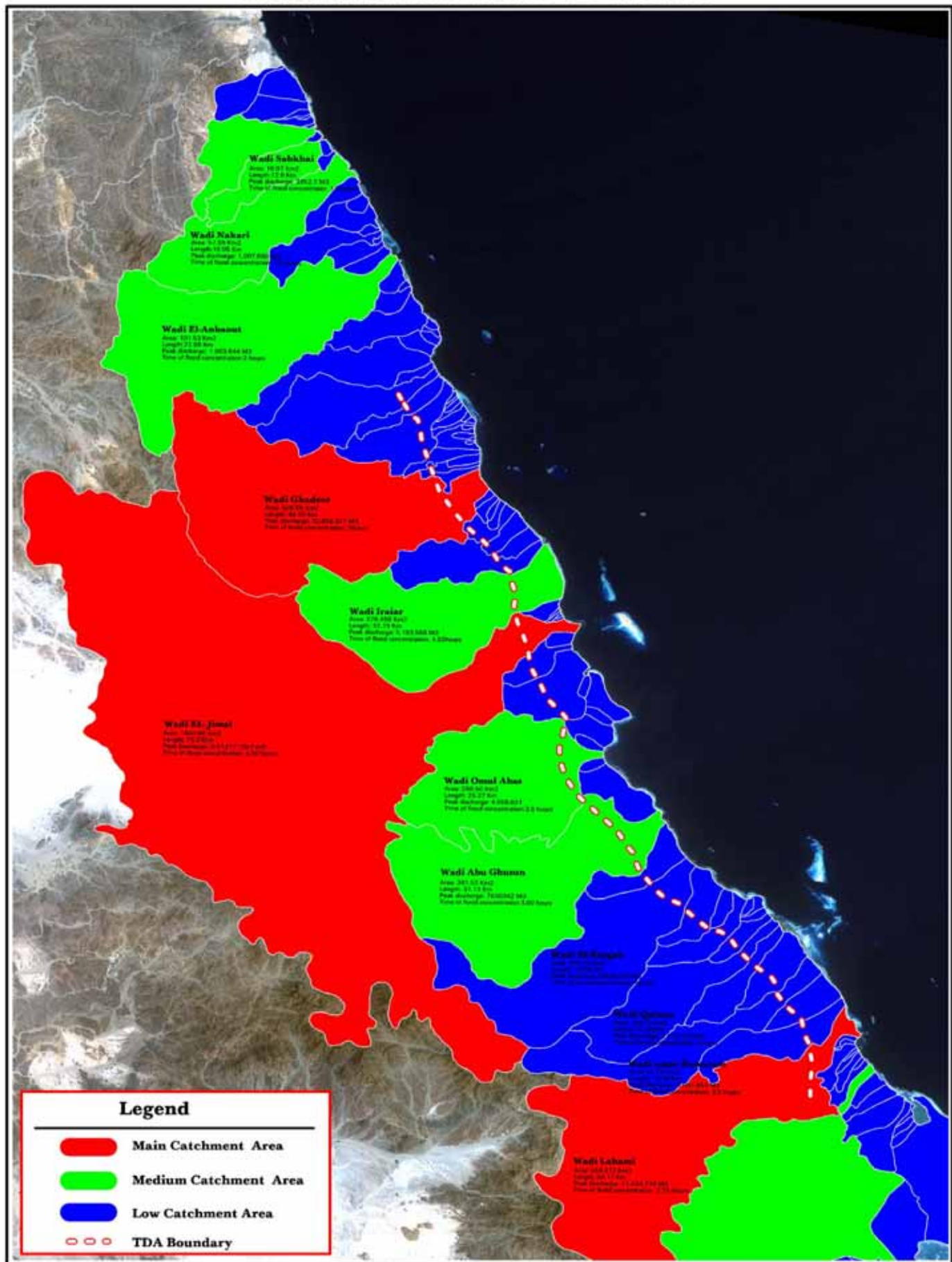


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## Catchments Basin



Scale



### Red Sea Sustainable Tourism Initiative



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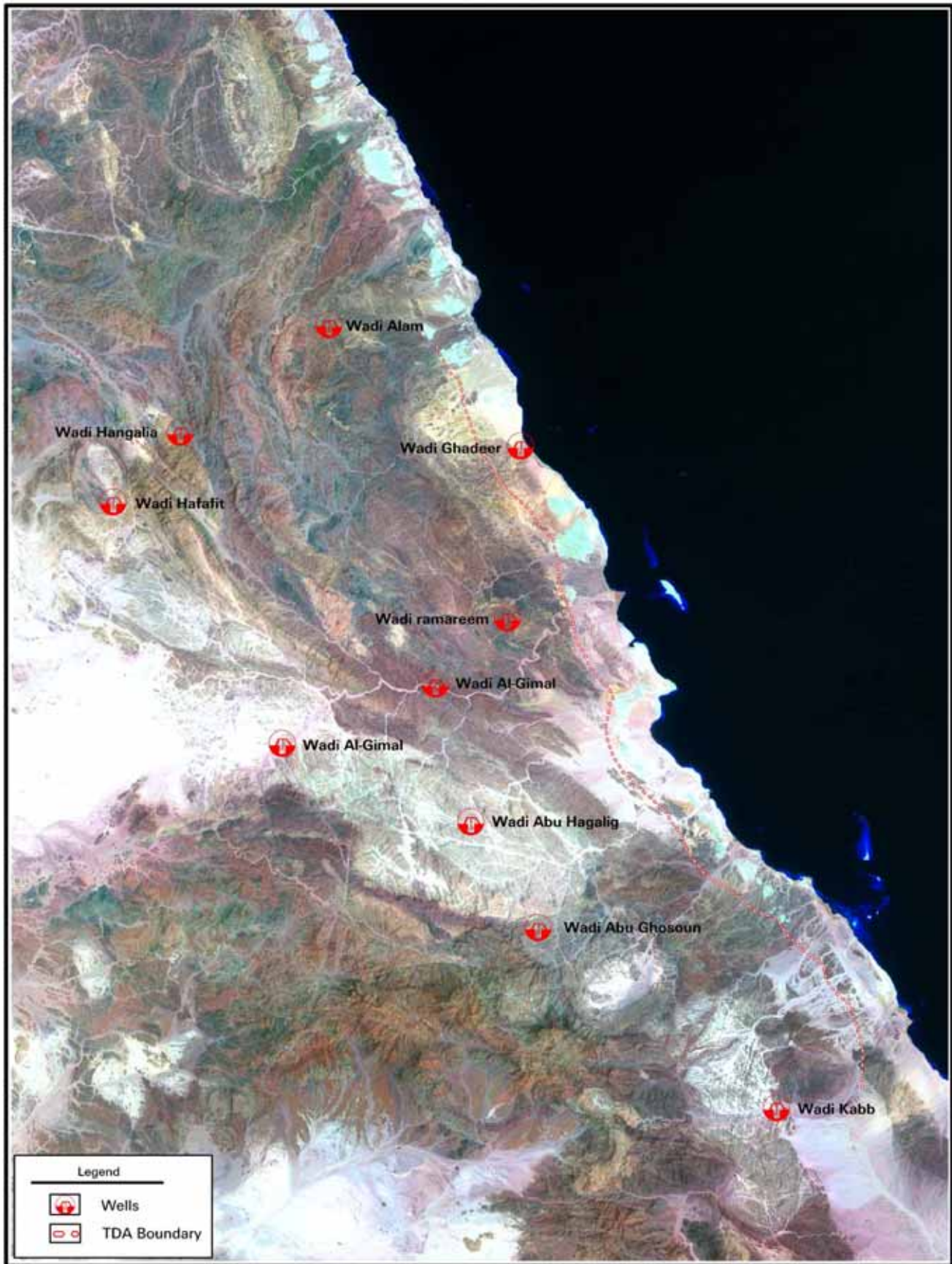


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**Implemented by:**  
**Tourism Development Authority (TDA)**

# Wells



Red Sea Sustainable Tourism Initiative



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## 2.3 Biotic Resources



*Eyed Dabb Lizard and Burrow*

The information that follows is intended as a brief overview of the fauna and flora surveyed to date in the Red Sea area south of Marsa Alam, as well as their status on the IUCN (the World Conservation Union) Red List of Threatened Species. More complete information on these subjects can be found in the individual studies on herpetofauna, avifauna, mammals, botany, and coastal and marine sites contained in the volume, "Natural Resources, South Marsa Alam Area," Tourism Development Authority, February 2003. (See maps of Fauna, Flora, and Marine Species Habitats as well as Part Three which discusses the fauna and flora of ecological zones and various habitats in the Red Sea area south of Marsa Alam.)

### 2.3.1 Fauna

#### Reptiles

A total of 28 reptilian species were recorded in the study area, representing eight families belonging to three orders. The lizard forms the largest reptilian group of species in the study area, represented by 17 species (two-thirds of the species in the area) and four families. One lizard appears on the IUCN Red List, as shown in the table below. Eight species of two families of snakes were also found in the area, as were the marine turtles discussed in the following paragraph.



*Horned Viper*

#### Marine Reptiles

Three species of sea turtles belonging to two families have been recorded in the study area. The green turtle, *Chelonia mydas*, and the hawksbill turtle, *Eretmochelys imbricata*, are common in the waters of the Red Sea and breed on Wadi El Gemal island. The leatherback turtle, however, is present in small numbers without nesting in the Red Sea area. All three appear on the IUCN Red List, as shown in the table below.

**Table 4. Threatened Reptilian Species**

HABITAT	IUCN STATUS		SCIENTIFIC NAME	COMMON NAME
	GLOBAL	NATIONAL		
WADIS AND ROCKY AREAS	--	VU	<i>UROMASTYX OCELLATUS</i>	EYED DABB LIZARD
LITTORAL SALT MARSHES AND OTHER COASTAL AREAS	EN	EN	<i>CHELONIA MYDAS</i>	GREEN TURTLE
LITTORAL SALT MARSHES AND OTHER COASTAL AREAS	CR	CR	<i>ERETMOCHELYS IMBRICATA</i>	HAWKSBILL TURTLE
LITTORAL SALT MARSHES AND OTHER COASTAL AREAS	EN	EN	<i>DERMOCHELYS CORIACEA</i>	LEATHERBACK TURTLE

IUCN Status: CR = critically endangered; EN = endangered; VU = vulnerable.



*Reef Heron*

#### Birds

The avifauna of the study area is made up of at least 97 bird species belonging to 14 orders and 37 families. About half of that number were identified as species that breed in the study area, and there are most likely far more that pass through the area as part of their migration patterns. Table 5 on the following page presents a list of key species, their habitats, IUCN status, seasonality, and breeding periods.



*Egyptian Vulture*

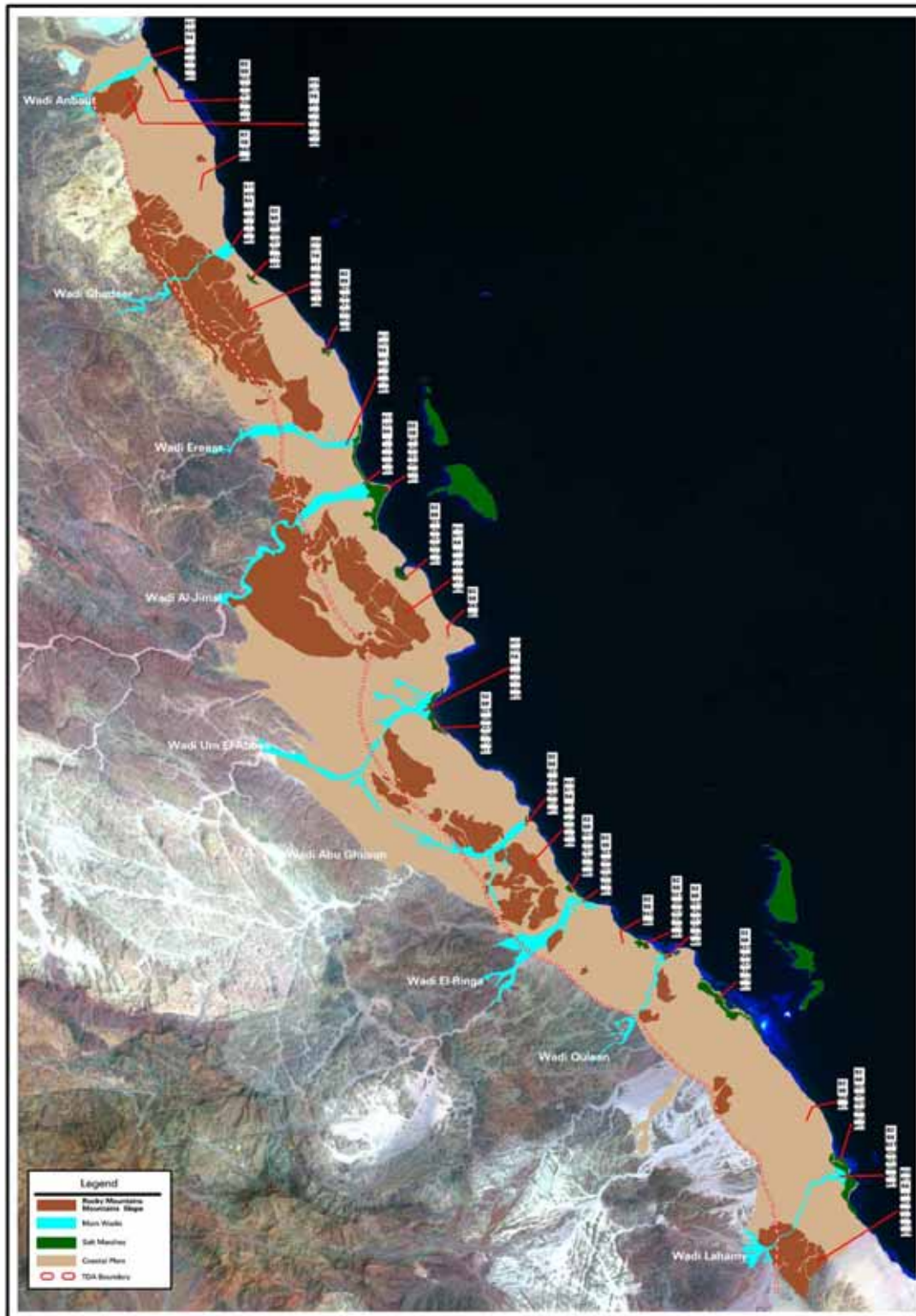


**Table 5. Key Birds, South of Marsa Alam to Hamata**

COMMON NAME	SCIENTIFIC NAME	IUCN STATUS		HABITAT	SEASONALITY												BREEDING
		NATIONAL	GLOBAL		J	F	M	A	M	J	J	A	S	O	N	D	
RED-BILLED TROPIC BIRD	<i>PHAETHON AETHAREUS</i>	EN		WADI EL GEMAL AND SHWARIT ISLANDS			+	+	+	+	+	+					MARCH-MAY
STRIATED HERON	<i>ARDEOLA STRIATA</i>			WADI EL GEMAL AND SHWARIT ISLANDS AND UMM LADID	+	+	+	+	+	+	+	+	+	+	+	+	MAY-AUGUST
WESTERN REEF HERON	<i>EGRETTA GULARIS</i>			WADI EL GEMAL AND SHWARIT ISLANDS AND HAMATA MANGROVE			+	+	+	+	+	+					MARCH-JUNE
SPOONBILL	<i>PLATELEA LEUCORDIA</i>			MANGROVES AND ISLANDS	+	+	+	+	+	+		+	+	+	+	+	MARCH-JUNE
OSPREY	<i>PANDION HALIAETUS</i>			WADI EL GEMAL AND SHWARIT ISLANDS AND HAMATA MANGROVE	+	+	+	+	+				+	+	+	+	JAN-MAY
SOOTY FALCON	<i>FALCO CONCOLOR</i>			WADI EL GEMAL AND SHWARIT ISLANDS				+	+	+	+	+	+	+	+	+	JUNE-OCT
SOOTY GULL	<i>LARUS HEMPRICHII</i>			WADI EL GEMAL ISLAND	+	+	+	+	+	+	+	+	+	+	+	+	JUNE-NOV
WHITE-EYED GULL	<i>LARUS. LEUCOPHTHALMUS</i>		VU	WADI EL GEMAL, ISLAND			+	+	+	+	+	+	+	+			JUNE-SEP.
CASPIAN TERN	<i>STERNA CASPIA</i>			WADI EL GEMAL ISLAND	+	+	+			+	+	+	+	+	+	+	FEB.-MAY
TAWNY OWL	<i>STRIX BUTLERI</i>			WADI NUQRUS		+	+	+	+	+		+	+				-
BAR-TAILED DESERT LARK	<i>AMMOMANES CINCTURUS</i>			WADI LAHMI	+	+	+	+	+	+	+	+					FEB-MAY
DESERT LARK	<i>AMMOMANES DESERTI</i>			MOUNTAINS OF ALL WADIS		+	+	+	+	+	+	+		+	+		JAN-MAY
HOOPOE LARK	<i>ALAEMON ALAUDIPES</i>			WADI LAHMI	+	+		+	+	+	+	+				+	FEB-MAY
MOURNING WHEATEAR	<i>OENANTHE LUGENS</i>			MOUNTAINS OF ALL WADIS	+	+	+	+	+	+		+	+	+	+	+	MARCH-MAY
HOODED WHEATEAR	<i>OENANTHE MONACHA</i>			MOUNTAINS OF WADI EL GEMAL	+	+	+	+	+			+	+	+	+	+	FEB.-NOV.
WHITE-CROWNED BLACK WHEATEAR	<i>OENANTHE LEUCOPYGA</i>			SHORES OF WADI EL GEMAL			+	+	+	+	+	+					FEB.-APRIL
GREAT GREY SHRIKE	<i>LANIUS EXCUBITOR</i>		VU	MOUNTAINS OF WADI EL GEMAL	+	+	+	+	+	+	+		+	+	+	+	JANUARY-JUNE
BROWN-NECKED RAVEN	<i>CORVUS RUFICOLLIS</i>			MOUNTAINS OF WADI EREAR	+	+	+	+	+	+	+	+	+	+	+	+	JAN.-APRIL

IUCN Status: CR = critically endangered; EN = endangered; VU = vulnerable

# Fauna Species and Habitats



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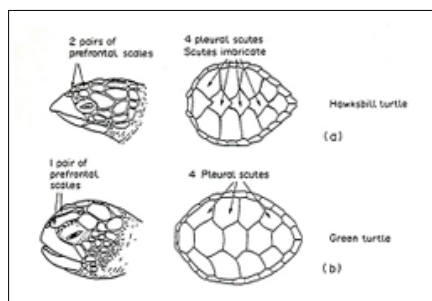
Nubian Ibex



Dorcas Gazelle



Green Turtle



Heads and Dorsal Carapaces of Endangered Turtle Species



Avicennia Marina (Mangrove)

### Land Mammals

A total of eighteen species and subspecies were recorded in the study area representing eleven families belonging to seven orders. Several other species are expected to be found with further research. As shown in the Table 6, six terrestrial mammals appear on the IUCN Red List.

### Marine Mammals

Dugongs and dolphins make up the marine mammals that are found in the study area. Dugongs have been observed near Wadi El Gemal Island, as well as further south, and dolphins are known to have breeding grounds in the area. All species of dugong are globally endangered.

Table 6. Threatened Mammalian Species

HABITAT	IUCN STATUS		SCIENTIFIC NAME	COMMON NAME
	GLOBAL	NATIONAL		
WADIS AND MOUNTAINS	--	VU	<i>GENETTA GENETTA</i>	COMMON GENET
WADIS AND MOUNTAINS	--	VU	<i>FELIS SILVESTRIS</i>	WILD CAT
WADIS AND MOUNTAINS	--	CR	<i>CARACAL CARACAL</i>	CARACAL
WADIS AND MOUNTAINS	CR	CR	<i>EQUUS AFRICANUS</i>	WILD ASS
WADIS AND MOUNTAINS	--	EN	<i>GAZELLA DORCAS</i>	DORCAS GAZELLE
WADIS AND MOUNTAINS	EN	VU	<i>CAPRA NUBIANA</i>	NUBIAN IBEX
SEAGRASS BEDS	VU	CR	<i>DUGONG DUGON</i>	DUGONG (SEA COW)

IUCN Status: CR = critically endangered; EN = endangered; VU = vulnerable.

### Fish

A total of 65 species of fish were recorded at five dive sites in the study area. Although none of the recorded fish species appears on the IUCN Red List, one manta ray that was observed, the whiptail leopard, *Himantura uarnak*, is included on the IUCN Red List.

### Corals

The dive sites mentioned above were also surveyed for corals and other marine taxa. The greatest diversity of corals found at any one site was 35 species (33 hard corals and 2 soft corals). Although some of the coral species recorded at these sites are rare, none is on the IUCN Red List.

### Invertebrate Marine Life

Several species of mollusks and/or mollusk shells (both common and rare), two species of sponge, and one crab were recorded at the five dive sites. None of these species is on the IUCN Red List.

## 2.3.2 Flora

A study of the Red Sea coastal area south of Marsa Alam to Hamata recorded 59 flowering plant species belonging to 29 families. The study focused particularly on ten wadis, the coastal desert plain, salt marshes, and mangrove swamps. Table 7 presents a list of key plant species, their habitats, status, density, and seasonality.

### Wadis

The various habitats of wadis (terraces, channels, banks) support several tree species which are highly valuable natural resources. The most abundant species are *Acacia tortilis*, *Acacia raddiana*, *Balanites aegyptiaca*, and *Tamarix aphylla*. Some wadi plants are surface texture-dependent and others are location-dependent. Communities growing on banks and terraces are not easily disturbed by periodic flooding. Vegetation is limited by the scarcity of water, and only sparse populations of individuals are able to survive by minimizing competition between their root systems.

### Coastal Plain

Nine plant species were recorded in the coastal desert plain of the study area. The dominant species are *Zilla spinosa*, *Zygophyllum coccineum*, and *Tamarix aphylla*. These species extend their distribution and abundance to the terraces and banks of the wadis, and are able to build phytogenic mounds. The accumulation of drifted sand at Sharm El Luli allows several sand dune plants to grow, i.e., *Calligonum polygonoides*, *Cornulaca moncantha*, *Cyperus conglomeratus*, and *Stipagrostis plumose*. A few medicinal plants also grow in this habitat, such as *Anastatica heirochuntica* and *Cleome droserfolia*.

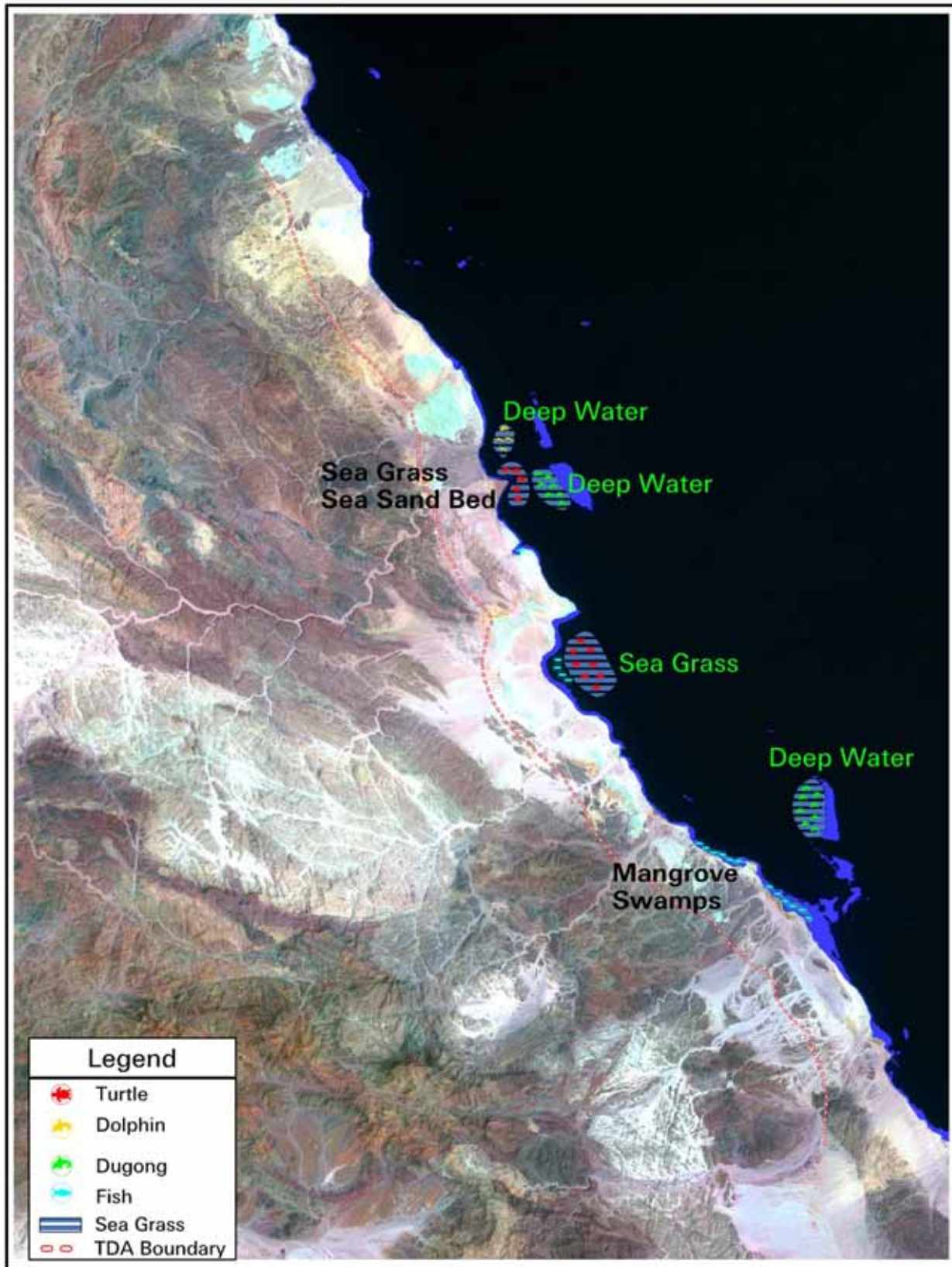
Palm groves occur in the deltas of big wadis having wide catchment areas. In the downstream part of Wadi El Gemal, a palm grove resembling an oasis is formed by the date palm *Phoenix dactylifera* and the endangered dome palm tree *Hyphaene thebaica*.

### Salt Marshes

Fifteen plant species are on record as inhabiting salt marshes of the study area. Most are halophytes, but these are sometimes mixed with xerophytes. The dominant species are *Arthrocnemum macrostachyum*, *Zygophyllum album*, *Tamarix nilotica*, and *Limonium axillare*. The rare halophytic species *Atriplex fainosa* and *Aeluropus massunesis* were recorded on the shores of the study area, and *Phragmites australis* is represented in reed swamps along the Red Sea coast.



# Marine Species and Habitats



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*Balanites aegyptiaca* (Ileej)

### Mangrove Swamps

Vegetation in Red Sea coastal mangrove swamps is dominated by *Avicennia marina*, a globally threatened species. This species tends to form fringing vegetation along the tidal waters in mud flat habitats (Abu Ghusun, Hamata). The frontal growth of this plant extends into the dry salt marsh habitats (North Shams Alam, Sharm El Luli) and in some places has the ability to form sand mounds (the shoreline area of Wadi El Gemal). Associated species include two seagrasses, namely *Halodule uninervis*, and *Halophila stipulacea*.

### Offshore

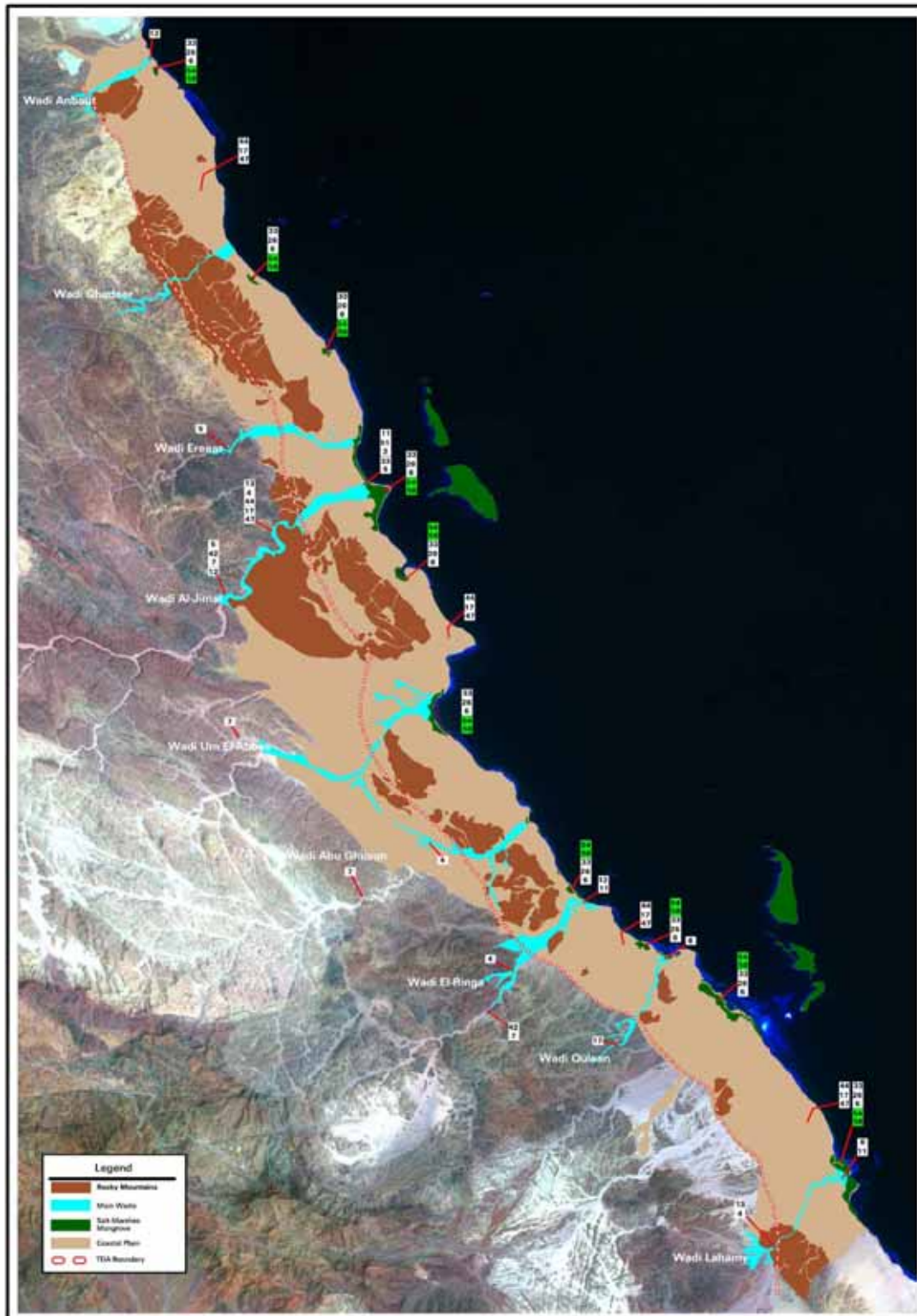
Although the offshore area was not part of the botany study, it is worth noting briefly here that seagrasses, occupying sandy bottom areas of the sea in near-shore areas, are important habitats for invertebrates, and are vital sources of nutrients for dugongs and marine turtles (both endangered). According to one study, eleven seagrass species are found in the Red Sea.

Table 7. Key Plant Species, South of Marsa Alam to Hamata

HABITAT/ SUB-ZONE	COMMON NAME	SCIENTIFIC NAME	STATUS			GROWTH FORM	LIFE FORM	PLANT DENSITY	SEASONALITY												PHENOLOGY	
			GLOBAL	REGIONAL	LOCAL				J	F	M	A	M	J	J	A	S	O	N	D	FLOWER	FRUIT
WADI UPSTREAM	--HARGAL	<i>SOLENOSTEMMA ARGEL</i>	VUL. END.	RARE	V. RARE	SPARSE	CUSHION SHRUB	LOW	X	X	X	X	X	X	X	X	X	X	X	X	SEPT/DEC	DEC/JAN
	--OLLEIQ EL GABAL	<i>COCCULUS PENDULUS</i>		V. RARE	V. RARE	SPARSE	LIANA TREE	LOW	X	X	X	X	X	X	X	X	X	X	X	X	?	?
	--IJLEJ	<i>BALANITES AEGYPTIACA</i>	RARE END.	RARE	COMMON	SPOTTY	BIG TREE	HIGH	X	X	X	X	X	X	X	X	X	X	X	X	ALL YEAR	ALL YEAR
	--TONDOB	<i>CAPPARIS DECIDUA</i>		RARE	V. RARE	SPARSE	SMALL TREE	LOW	X	X	X	X	X	X	X	X	X	X	X	X	ALL YEAR	ALL YEAR
WADI DOWN- STREAM	--MASHTA	<i>CLEOME DROSERFOLIA</i>	VUL. RARE	RARE	V. RARE	SPOTTY	CUSHION HERB	LOW	X	X	X	X	X	X	X	X	X	X	X	X	FEB/AUG	SEPT/OCT
	--LASAF	<i>CAPPARIS SPINOSA</i>		RARE	COMMON	SPARSE	CUSHION SHRUB	MEDIUM	X	X	X	X	X	X	X	X	X	X	X	X	SUMMER	AUTUMN
	--ARAK	<i>SALVADORA PERSICA</i>	VUL.	RARE	RARE	SPOTTY	CUSHION SHRUB	HIGH	X	X	X	X	X	X	X	X	X	X	X	X	AUTUMN	WINTER
	--OSHAR	<i>CALOTROPIS PROCERA</i>	STABLE	COMMON	COMMON	SPARSE	SMALL TREE	LOW	X	X	X	X	X	X	X	X	X	X	X	X	SUMMER	AUTUMN
	--MARKH	<i>LEPTADENIA PYROTECHNICA</i>	THREAT	RARE	RARE	SPARSE	SMALL TREE	LOW	X	X	X	X	X	X	X	X	X	X	X	X	SUMMER	AUTUMN
	--HAMEES	<i>COCCINIA DIVERSIFOLIA</i>	END.	V. RARE	V. RARE	SPARSE	CREeping HERB	LOW	-	X	X	X	X	X	X	X	X	X	X	X	SPRING	SUMMER
	--KOMESHA	<i>COMETES ABYSSINICA</i>	VUL.	RARE	V. RARE	SPARSE	HERB	LOW	X	X	X	X	-	-	-	-	-	-	-	-	WINTER	SPRING
	--HANDAL	<i>CITRULLUS COLOCYNTHIS</i>	THREAT.	RARE	RARE	SPOTTY	CREeping HERB	LOW	X	X	X	X	X	X	X	X	X	X	X	X	SPRING	SUMMER
COASTAL PLAIN	--DOOM	<i>HYPHAENE THEBAICA</i>	END. THREAT	RARE	V. RARE	SPARSE	SMALL TREE	LOW	X	X	X	X	X	X	X	X	X	X	X	X	APRIL/MAY	JULY/OCT
	--ASSAL	<i>SUAEDA MONICA-</i>		RARE	V. RARE	SPARSE	BIG TREE	LOW	X	X	X	X	X	X	X	X	X	X	X	X	AUTUMN	WINTER
	--ARTA	<i>CALLIGONUM POLYGONOIDES</i>	THREAT	RARE	V. RARE	SPARSE	SHRUB	LOW	X	X	X	X	X	X	X	X	X	X	X	X	SPRING	SUMMER
TIDAL ZONE	--HAMOOL	<i>HALOPHILA STIPULACEA</i>	INDETER	COMMON	COMMON	SPOTTY	SEAGRASS	MEDIUM	X	X	X	X	X	X	X	X	X	X	X	X	Nov/DEC	JAN/MAR
	--HAMOOL	<i>HALODULE UNINERVIS</i>	INDETER	COMMON	COMMON	SPOTTY	SEAGRASS	LOW	X	X	X	X	X	X	X	X	X	X	X	X	Nov/DEC	JAN/MAR
MANGROVE SWAMP	--SHORA	<i>AVICENNIA MARINA</i>	THREAT	RARE	COMMON	DENSE	SMALL TREE	HIGH	X	X	X	X	X	X	X	X	X	X	X	X	APRIL/JUNE	JULY/OCT
SALT MARSH	--HANGANEIN	<i>AELUROPOUS MASSAUENSIS</i>	END. THREAT	RARE	RARE	DENSE	GRASS	HIGH	X	X	X	X	X	X	X	X	X	X	X	X	FEB/APRIL	MAY/JULY
	--HAWA	<i>ATRIPLEX FARINOSA</i>		RARE	RARE	SPOTTY	SHRUB	LOW	X	X	X	X	X	X	X	X	X	X	X	X	OCT/DEC	NOV/MAR

Status: END = Endangered; VUL = Vulnerable; Indeter. = Indeterminate; V. Rare = Very Rare.

# Flora Species and Habitats



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## 2.4 Antiquities and Cultural Heritage Resources

The antiquities and rich cultural resources of the Red Sea area south of Mars Alam have the potential to enrich the educational and recreational value of the tourist experience. For thousands of years, this area was the vital center of trade routes linking Asia, Africa, and the Mediterranean Sea. Its extraordinary mineral wealth enriched numerous ancient empires. An integral part of this remarkable history is the culture of the indigenous tribal groups that have inhabited the region for millennia.



*Temple of Isis at Sekeit*

### 2.4.1 Trade Routes and Caravans

At least four major caravan routes served as the method for conveying goods and communicating information between Red Sea ports ancient cities such as Thebes along the Nile River.

Sea trade was landed at the southern Red Sea ports of Berenice (and later) Naqari, and Quseir for shipment across the Eastern Desert caravan routes to cities in the Nile Valley. Once cargo reached the Nile River, it could be floated downstream to the Mediterranean Sea.

These routes for the most part, followed the course of the wadis and had watering points at regular intervals. After the coming of Islam, they were also followed by Egyptian pilgrims traveling to Mecca.

Perhaps the most distinctive caravan route was the legendary Elephant Route of the Ptolemies. The Elephant Route crossed the Red Sea Mountains by way of Wadi El Gemal and then proceeded to the largest fortified trading center located along the route. This fortress city was named Appollonos by Alexander the Great and then later re-named Appollonia by the Romans.

The means of transport along these routes was originally donkeys. When camels were introduced to Egypt from Saudi Arabia, they became the primary mode of transport. During the era of the Ptolemies, elephants were also transported along this route. Today, the Ababda tribal people of the region continue to breed camels and trade them throughout Egypt and the Sudan.

The town of Berenice, located south of Ras Banas, was founded in 275 BC by Ptolemy II in order to import African elephants. Berenice later flourished as the “transfer port” at the southernmost tip of the Roman Empire, facilitating trade between Alexandria and Rome and the many ports of India, Africa, Arabia, and the Far East.

Marsa Naqari is the site of another ancient port city of the Ptolemy period. The importance of the site is indicated by the presence of ancient roads. The Via Hadriana, the main Roman road along the Red Sea coast, passes nearby. Traces have also been found of another road that linked Marsa Naqari to Edfu on the Nile. This road passes through various mining areas.

Today, the remnants of water stations called hydreumas, wells, and way markers in the form of large stone cairns testify to the vital importance of these ancient caravan routes.



*Hydreuma*

### 2.4.2 Mining Settlements

The natural resources of the area were the source of a huge amount of mineral wealth that played a vital role in the economic strength of ancient empires.

Mineral deposits, especially gold, copper, and gemstones, were known and exploited by Egyptians from pre-Dynastic times. The ancient Egyptians were able to smelt gold and copper and to produce bronze in about 2500 BC. Artists using the green of malachite, the blue of turquoise, and the purple of amethyst produced the amazing colors in the tombs at Thebes. Emerald, agate, chalcedony, and garnet gemstones were used for jewelry and other ornamentation. With increasing demand for gold, copper, pigments, and gemstones, economic geology began in ancient Egypt. Between 2500 and 2000 BC, geologic exploration for these valuable commodities resulted in the discovery of vast quantities of mineral resources in Wadi El Gemal and the adjoining wadis of Nuqrus and Sekeit. Some of the world's oldest gem quality emerald mines are located in Wadi Nuqrus and Wadi Sekeit. These areas were mined extensively by the ancient Egyptians and then later by the Romans for approximately two thousand years.

The precious metals and gemstones mined from this area supported the development of ancient Upper and Middle Egyptian, Ptolemaic, Roman, Nubian, Coptic, and Abyssinian civilizations. The area experienced its most extensive economic development during the period of approximately 2500 BC to 200 AD.

Mining operations resulted in the establishment of large towns where several hundred people in each town and surrounding settlements worked to construct and operate mines, smelt metals, and process vast quantities of ore. Because the various empires and nomadic tribes frequently fought each other for control of the mineral wealth and



*Remains of Roman Mining Settlement*



*Desert Shrine*

trade routes located in this region, many fortifications were established to defend them. The structural remains of numerous sentry posts and fortresses provide vivid evidence that the mining wealth region was secured by a significant military population garrisoned in the wadis. An incredible abundance of pottery, stone sculptures, and tools also provide ample evidence of the large size of the human settlements that once thrived in this region.

The numerous human settlements associated with the production and protection of the mines produced a catastrophic impact on the environment. The most significant environmental result of the ancient mining operations and their associated settlements was the nearly complete deforestation of the region. The trees were used to produce charcoal for the smelting and forging processes and for energy for the settlements. The mineral wealth of the region was extracted at the expense of native vegetation. When the vegetation was removed, the soils were lost to erosion and the land could no longer store water. The ultimate consequence was the transformation of the region into a vast desert.

(See Antiquities and Cultural Heritage Resources map.)

### 2.4.3 Cultural Heritage Resources

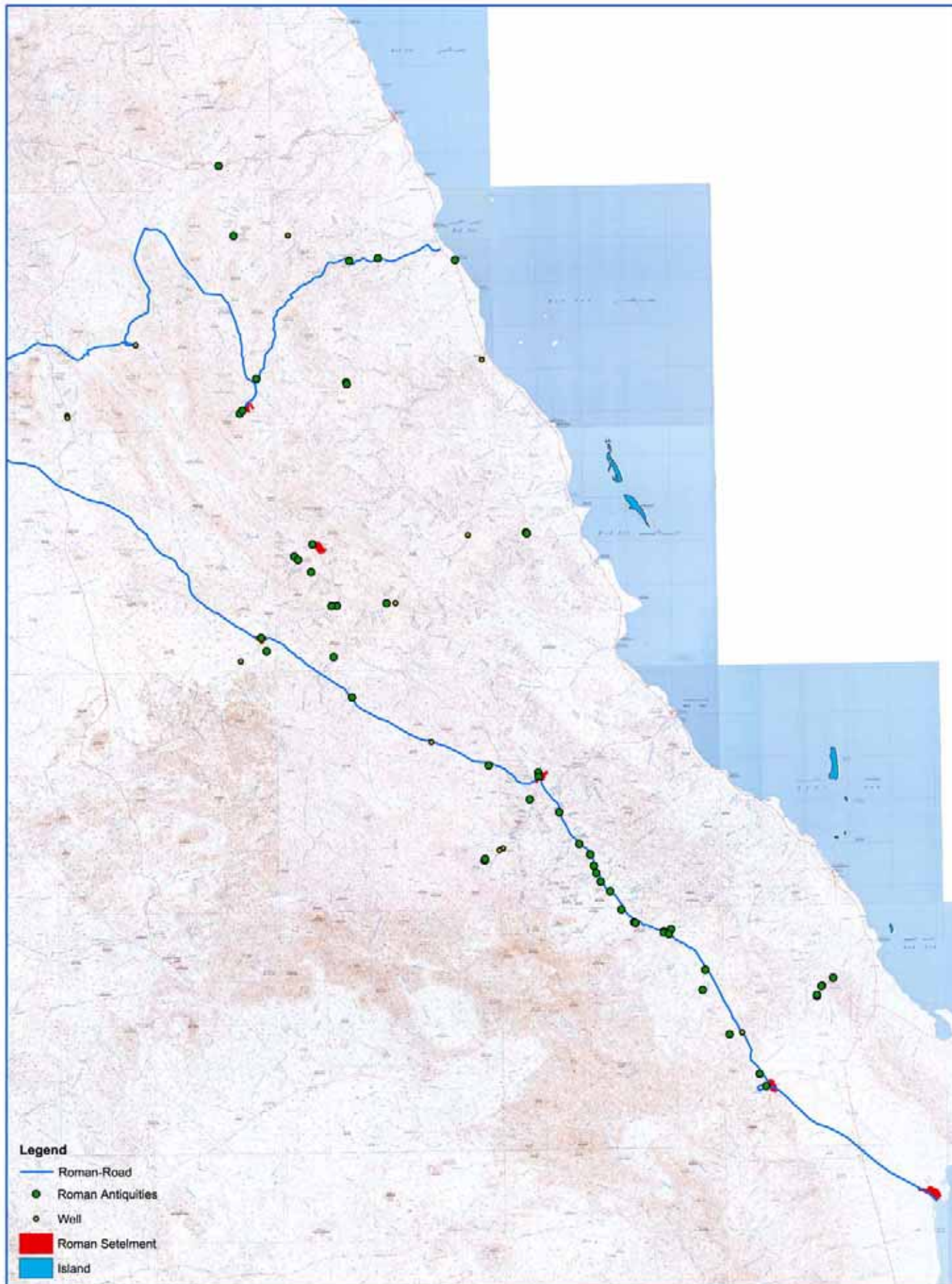
In addition to the above, there are numerous Islamic sites located throughout the Red Sea area south of Marsa Alam. The majority of these sites are tombs and shrines that have both cultural and religious significance.

The rich cultural history of this area contrasts sharply with the paucity of present-day permanent human settlements. The socio-economic assessment described in Part One examined ways in which indigenous people might be able to interact positively with the visitors that future tourism development will bring to their area.

Local residents suggested including tourists in activities that they already perform, or using skills they already possess, or using resources found in their immediate surroundings. For example, local residents showed interest in arranging various recreational activities such as visits to wadis or “nomad nights.” Some residents would like to host tourists who are interested in learning about their customs and traditions; they believe they could entertain these visitors by providing them with traditional food such as locally caught fish, or by baking traditional bread and serving traditional coffee. The knowledge and skills they wish to offer are based on living in close proximity to nature and on their tribal upbringing. In addition to working as desert guides or with diving groups, interest was shown in playing traditional musical instruments, singing traditional tribal songs, and reciting poems. Another artistic skill offered was the production of handicrafts like the weaving of kelims, and making bead jewelry or traditional leather goods.

One hotel manager in the planning area indicated that the opening of the Marsa Alam International Airport has resulted in a more diversified clientele for the hotel. The manager said, “We increasingly have non-diving guests and families that would be very much interested in activities that are not related to diving, such as walks, visits to local villages and communities and in nature exploration activities. Few such services currently exist.”





Red Sea Sustainable  
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United States Agency for  
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Tourism Development  
Authority

## Antiquities & Cultural Heritage Resources

Red Sea Sustainable Tourism Initiative (RSSTI)  
Southern Region of the Red Sea - Egypt



0 1 2 3 4 5 6 7 8 9 10  
Kilometers

## PART THREE: ECOLOGICAL ZONES AND SUB-ZONES (KEY HABITATS)

### 3.1 Introduction

Environmental information plays two vital roles in planning for tourism development. First, an environmental inventory of natural attractions is essential for determining an area's potential for becoming a viable tourism destination. Second, environmental information concerning the sensitivity or vulnerability of an area to human activity identifies critical environmental management issues that need to be addressed in order to achieve sustainability.

Essentially, the “products” that tourism offers are the unique collections of natural and cultural resources offered by a particular area. The environmental characteristics that are unique to the Red Sea area south of Marsa Alam need to be defined and understood in terms of complete ecosystems or key habitats. This need exists because the natural environment of the Red Sea and the adjacent area south of Marsa Alam is the foundation upon which tourism experiences rely. Successful tourism development will, therefore, depend upon sustaining the area's environmental integrity and preserving its cultural resources. Consequently, land use management planning begins with an evaluation of the environment in terms of viable habitats and ecosystems.

As noted in Part Two, the term “study area” encompasses the area bounded by Marsa Alam in the north, Ras Banas in the south, the summits of the Red Sea mountains in the west, and the Red Sea in the east.

#### 3.1.1 Characteristics of the Study Area

The Red Sea area south of Marsa Alam is best characterized as a land of extreme contrasts. Most notably, this is one of the world's most arid regions, but it is located directly adjacent to a major body of water, the Red Sea. High mountain peaks offer stark contrasts to the expansive coastal plains at the edge of the Red Sea. The abundance of water and marine life in the Red Sea contrasts sharply with the hyper-aridity of the Eastern Desert and its scarcity of biological species. The topography is a maze of mountains, canyon lands, escarpments, wadis, and oases. The animal species that do inhabit the Eastern Desert are exceedingly rare and therefore offer considerable attraction to tourists. The biology of the area is further augmented by a remarkable diversity of botanical species that surprise visitors with their bright colors and adaptability to arid conditions. Contrasts such as these have the potential for providing genuinely unique tourism experiences.

#### 3.1.2 Watersheds – Environmental Planning Units

The most important and scarce resource in the Red Sea area south of Marsa Alam is water; therefore the most appropriate and useful definition of an environmental planning unit for the area is a watershed. Specifically, a watershed is defined as a major drainage basin comprising one or more sub-basins that serve as a complete water catchment area. The catchment area begins at the highest elevation at which rainfall is received and extends until the flow empties into the sea. This definition accurately represents an ecologically complete environmental planning unit that affords equal management importance to both land and marine resources.

The dynamics of seasonal climatic change, oceanographic events, foliage, wildlife migratory events, and wildlife predator-prey relationships are all dominated by the availability of water. The choice of the watershed as the environmental planning unit for tourism development in the Red Sea area South of Marsa Alam thus acknowledges the importance of water as the single most important and scarce natural resource in the area.

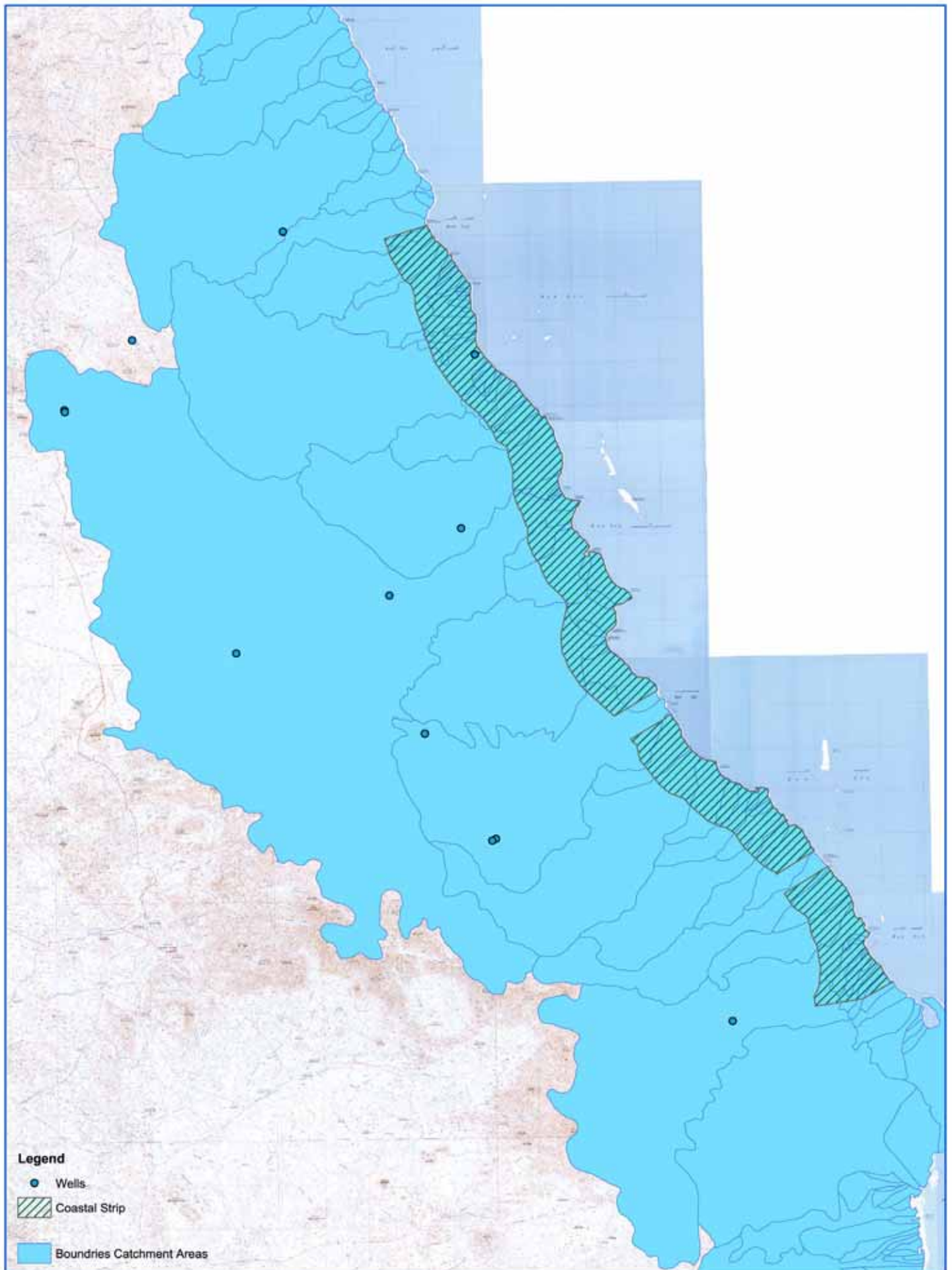
The Red Sea area south of Marsa Alam encompasses 32 watersheds and parts of others. The three largest watersheds are Wadi Ghadir in the north, Wadi El Gemal in the center, and Wadi Lahmi in the south.

The map entitled Watershed Planning Units provides an illustration of the application of readily available topographic and hydrologic information. The watershed environmental planning unit can potentially be managed in accordance with sustainability principles because it has ecological integrity. It is readily apparent from this map that all human activity in the upland areas of the watershed will have potential impacts on the environmental conditions of the drainage areas - the wadis and mangroves - and on the condition of the fringe reef and the aquatic life offshore. A diversity of nature-based outdoor recreation activities can be proposed for this region, but it is equally evident that they will need to be well planned and managed in order to sustain the environmental quality of the watershed.



*Dramatic Mountain Scene*





Red Sea Sustainable  
Tourism Initiative



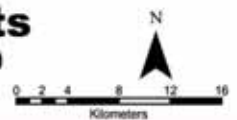
United States agency for  
International Development



Tourism Development  
Authority

## Watershed Planning Units

Red Sea Sustainable Tourism Initiative (RSSTI)  
Southern Region of the Red Sea  
Egypt



### 3.1.3 Ecological Zones and Sub-Zones

Based on extensive field research in preparation for the Land Use Management Plan, five ecological zones within each watershed were identified. These five zones are distinguished by the ways in which topography, climate, and geology influence the development and prosperity of plant and animal populations within each zone. Each of the five ecological zones requires tourism development and environmental management techniques that are best suited to protect their unique conditions.

The five ecological zones were also examined in terms of the edge conditions found between adjacent zones that invariably overlap. These overlapping zones create a transition area or ecotone that contains plant and animal communities identified in adjacent ecological zones. The direct correlation between microclimates and environmental factors such as climate and geology supported the need to thoroughly investigate these relationships in order to establish sustainable tourism planning principles.

Given the need to perform detailed site analyses in support of TDA's tourism development goals, ecological distinctions within each of the five zones were evaluated and defined. This process resulted in the determination that a number of environmentally important natural sub-zones and key habitats also deserved planning consideration.

Both the ecological zones and the sub-zones are discussed in the remainder of Part Three.

## 3.2 Ecological Zones

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The five ecological zones are:

- Zone One: Mountains and Wadi Floor
- Zone Two: Coastal Plain
- Zone Three: Intertidal
- Zone Four: Offshore Marine
- Zone Five: Offshore Islands

### 3.2.1 ZONE ONE: Mountains and Wadi Floor

#### **Mountains**

This part of zone one begins at the uppermost ridgeline of the mountains and extends to approximately three meters above the wadi floor. Although rich in mineral deposits, the mountains are austere and unable to support few if any life forms. The distance between the mountains and the Red Sea does not allow moisture from the coast to reach the Red Sea mountain range and therefore creates a condition of hyper-aridity.

**Flora.** Vegetation cannot survive the extreme temperatures, unstable soils, and aridity of the upper elevations.

**Fauna.** Although little food is available for animals in these desert mountains, rocky boulders provide shelter for many reptiles and animals (i.e., the Hyrax, *Procavia capensis*, a small mammal that lives in colonies among the rocks). The mountains also serve as migratory routes and safe havens from predators for animals such as the very rare Nubian ibex, *Capra nubiana*, and the elusive Dorcas gazelle, *Gazella dorcas*.

#### **Wadi Floor**

This part of zone one extends from the wadi floor to a height of approximately three meters along the wadi's side walls. The term wadi in Egypt refers to a gully, canyon, valley, or dry streambed that conveys water at irregular intervals down the slope from the mountains to the shore. During infrequent times of rainfall, the wadis also carry alluvial deposits ranging from rubble to silt into the coastal plain, and support important freshwater functions. Drought periods of five to seven years and flooding due to intense desert rainstorms are factors that have contributed to the amazing adaptation displayed by the animal and plant communities in the wadis, despite these extreme climatic conditions.

Because the wadi systems contain scarce water resources, they also host the Eastern Desert's greatest biodiversity. In fact, Egypt's highest diversity of terrestrial flora and fauna occurs in the Eastern Desert.

**Flora.** The channels of the wadis usually have limited vegetation while the adjacent islands or terraces up to three meters above the wadi floor can be rich areas for high biodiversity of desert flora. As noted in the section on biotic resources, the dominant vegetative species of the wadi is the acacia tree. This tree and other plants play a vital role in sustaining life in the wadis by providing important food, cover, and nesting sites for animals, as well as medicines and utilitarian supplies for humans. The location and condition of wadi vegetation



Red Sea Mountains



Wadi Floor



also provide essential information regarding the location and quality of water resources.

**Fauna.** The animals that inhabit the wadis include many rare species of mammals and birds that are unique to the Eastern Desert. For example, the wadis provide habitat for the Dorcas gazelle and Nubian ibex. As a result of their adaptation to the habitat provided by wadis, and their isolation from human contact, the populations for each of these species are currently sustainable in this region. The critically endangered wild ass, *Equus asinus africanus*, also inhabits the wadis of the Eastern Desert. Wild camels are abundant, and rare camel species are frequently sighted. Numerous colorful lizards scurry about the area. Representative species include Gray's agama, *Agama spinosa*, the Nidus lizard, *Acanthodactylus scutellactus*, and the Egyptian gecko, *Tarentola annularis*.



Coastal Plain

### 3.2.2 ZONE TWO: Coastal Plain

This zone extends along the outlets of the wadis and stretches along flat lands that are variably between 3 to 15 kilometers from the Red Sea shoreline. The increased presence of vegetation and wildlife along the foothills demonstrates a less hostile environment that can support a wide variety of plant and animal communities. The dominant geomorphologic features of this zone are sand plains and uplifted fossil reef plateaus; these are discussed in the following section on sub-zones.

**Flora.** A series of watersheds and wadis drain from the mountains toward the sea, resulting in extensive alluvial plains or deltas. Soils are deposited along the coast as the rate of stream flow diminishes and plant establishment resembles a triangular pattern or “delta.” Part Two describes flora of the coastal plain in more detail.

**Fauna.** During the spring and autumn, a remarkable diversity of birds migrates along the Red Sea. This migratory corridor represents a critically important primary route for birds traveling between the northern and southern hemispheres. Aided by thermal uplifts and the food and cover offered by the Red Sea coastal environment, large numbers of birds travel between Europe and Africa. International recognition of the importance of this flyway has been established by Bird Life International, which has defined 34 “Important Bird Areas” in Egypt. Of these 34 critical habitats, seven are located in the immediate vicinity of the Wadi El Gemal-Hamata Protected Area. Gerbils (*Gerbillus pyramidum* and *Gerbillus gerbillus*) are the most commonly found herbivore mammals in the lowlands and on the coastal plain. Carnivores include the sand fox, *Vulpes rueppelli*, and sand cat, *Felis margarita*.



Intertidal Zone

### 3.2.3 ZONE THREE: Intertidal

This zone is a coastal mosaic of several ecosystems such as that of the mangrove trees and seagrasses that grow together along the shoreline. Other terrain associated with the intertidal zone includes salt marshes, sandy shores and beaches, and the rocky cliffs of uplifted fossil reef plateaus. Each of these areas is affected by tidal events.

**Mangroves.** The complex mangrove ecosystem is protected by the Egyptian government from development as mangroves not only provide natural habitat but they are also essential shoreline stabilizers in terms of flooding and rising sea levels. Mangrove trees are highly influenced by the seawater that inundates the intertidal zone on a regular basis. The vast network of roots within the mangrove thickets are nurseries for a number of marine crustaceans and fish. Mangroves also provide a stable breeding environment for several bird species, and suitable resting, roosting, and feeding places for thousands of migrating birds.

**Salt marshes.** Salt marshes (which support a rich diversity of vegetation types and are generally considered transition zones between marine and land habitats) are discussed in the section on sub-zones; Part Two describes salt marsh flora.

**Sandy shores and beaches.** Exposed sandy shores and beaches are a dominant feature of the upper edge of the intertidal zone. The sandy shores are only partially covered by seawater during the highest tides of the lunar cycle. Their ability to support plant and animal life is limited by extreme heat and tidal fluctuations. Close to the Red Sea, however, sandy areas are regularly left wet and dry and are able to support a number of burrowing mollusks, crustaceans, and echinoderms. These lower shore invertebrates are an important food source for wading birds.

**Rocky cliffs.** The uplifted fossil reef plateaus described in the section on sub-zones become sea-facing rocky cliffs at the water's edge. The rocky cliffs of the intertidal zone are especially rich in invertebrates.



Mangrove Trees



*Fringe Reef*

### 3.2.4 ZONE FOUR: Offshore Marine

Zone four encompasses the enclosed bays called marsas, the fringing reef that protects the shore, other types of coral reefs, seagrass beds, and sandy sea beds. This zone mediates the fluctuation in sea levels and provides habitat for an important collection of coral species and commercial fish.

**Fringe reef.** The fringe reef is the most extensive reef type along Egypt's Red Sea Coast (a large fringe reef extends along the coast from Marsa Alam to the Sudan). The fringe reef shelf is very wide extending in some places up to 500 meters with varying slopes. The reef generally protects the coastal area and experiences very little water movement, except when occasional swells from the west or north occur. Due to the higher concentration of salt and the geographical separation of the Red Sea from the Mediterranean Sea and from the Indian Ocean, the marine life associated with the fringe reef is largely endemic to the Red Sea. A 1998 GEF study found that the coral patches on this reef were 100 percent alive and showed high species diversity, with the number of coral species ranging from 23 to 35 per site. The fringe reef structure is intricately linked to the formation of the sandy bays and sheltered harbors (marsas) associated with wadis. Marsas are discussed in the section on sub-zones.

**Coral reefs.** Egypt's coral reefs are highly complex ecosystems that provide homes to thousands of species of different flora and fauna in any given area. Although it is the hard coral framework that builds the reef foundation, many plants and animals live in, on, or among this framework. Coral reefs are deemed most significant when considered as highly integrated ecosystems that include hard and soft corals, seaweeds, snails, slugs, crabs, shrimps, fish, etc., all of which live together in a coral reef. It is the collective community of reef-based plants and animals (which comprise an unparalleled world of color, texture, shape, and animation) that make coral reefs such a special place to experience.

Coral reefs are of both an important economic and biologic value as the reefs directly and indirectly contribute to the economy of Egypt and contain one of the highest known manifestations of plant and animal diversity on the planet. They support approximately 400 fish species that utilize coral for shelter, food, or as a breeding ground, as well as a thriving recreational diving/tourism industry.

**Seagrass beds and sandy sea beds.** The sea floor beyond the fringe reef consists of coarse sand interrupted in many areas by seagrass beds and coral patches. Seagrass beds and sandy sea beds are described in the section on sub-zones.



*Wadi El Gemal Island*

### 3.2.5 ZONE FIVE: Offshore Islands

The islands off the Red Sea coast have been declared protected areas. The largest island is Wadi El Gemal Island, which is located about five kilometers from the shore. Wadi El Gemal Island is formed mainly of uplifted coral, about five to ten meters above the sea level. The island's western side has a long sandy beach. Mangrove trees grow in the southeastern corner in a pocket of old reef. A large number of coral patches are located at the eastern side, while the western side faces a navigation channel and is rockier with fringed coral. A large area of submerged reef is located slightly to the north of the island. Being acceptably protected from predators and surrounded by shoals of marine animals and fish, the island is a haven for breeding seabirds, and is a resting and feeding post for winter visitors and passage migrants.

**Flora.** Mangrove trees are the primary vegetation.

**Fauna.** Over one thousand species of birds visit this island each year, many of which nest on its remote shores. The island supports globally significant bird species and it has been classified as an "Important Bird Area" by Bird Life International and similarly renowned environmental organizations. In addition to the bird populations, two species of turtles (green turtles and hawksbill turtles) use the island for nesting grounds and dolphins are commonly seen swimming around the island. As noted in Part Two, dugongs have also been observed in the area of Wadi El Gemal Island. Almost all of the common species of reef fish are found along the reef areas around the island.

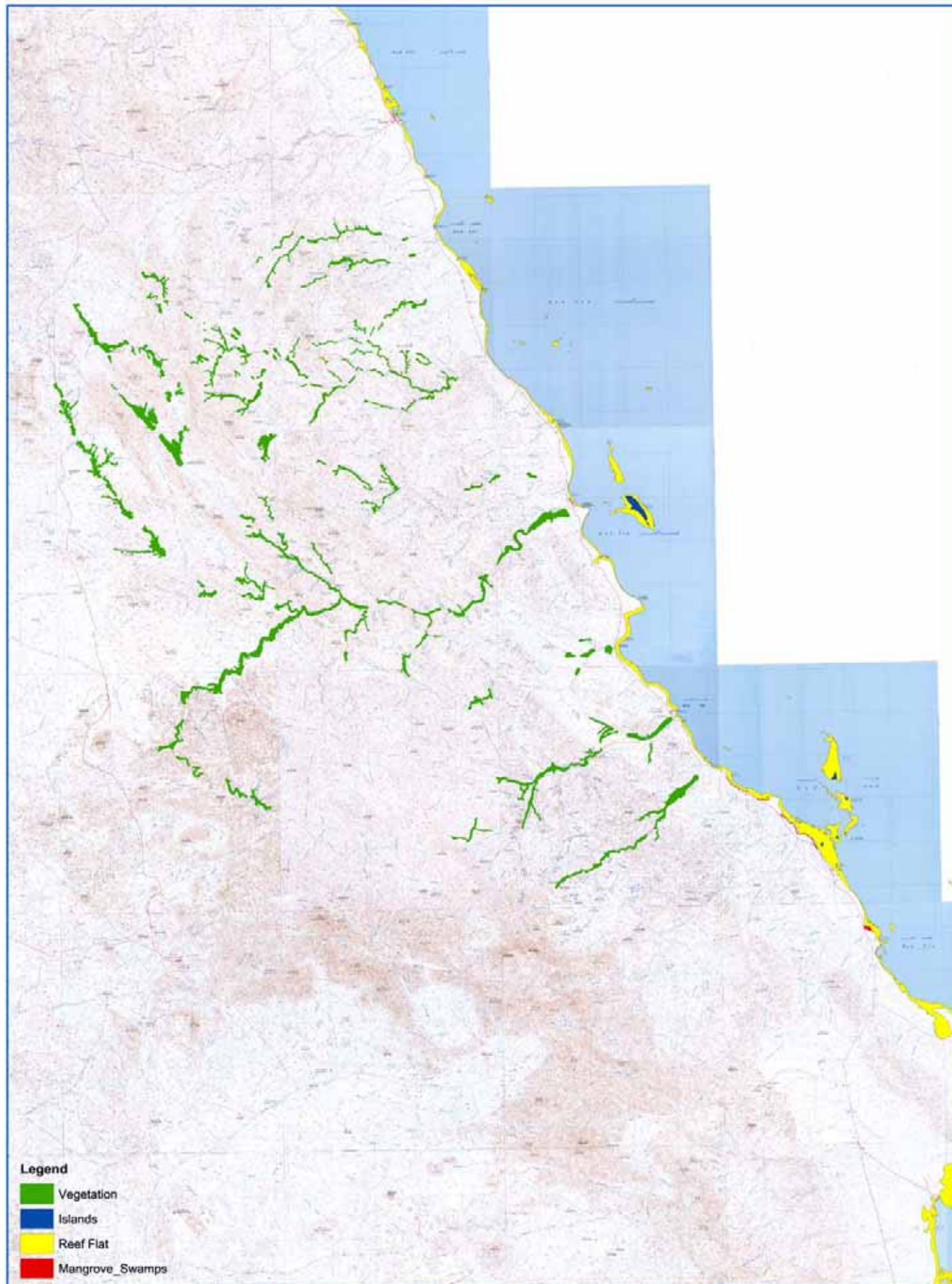
(See map entitled Critical Habitats.)

## 3.3 Natural Sub-Zones (Key Habitats)

### **Rocky Mountains**

The coastal strip south of Marsa Alam is bounded from the western side by a backdrop of rugged mountains running parallel to the shore. These mountains create a series of seaward draining watersheds. The Red Sea mountains are strikingly beautiful with unique and unusual geological formations and phenomena. Their rocky areas contains habitats, shelters, and movement







corridors that are important for terrestrial animals like the Nubian ibex, Dorcas gazelle, and hyrax, and for a large number of reptiles.

#### ***Rugged Lands***

Rugged lands extend parallel to the coastal plain with average depth varying between 1 to 3 kilometers from the shore line. Rugged lands consist mainly of sedimentary rocks and are dominated by granite, limestone, and sandstone. One of the features of this sub-zone is the presence of *cuestas* (a *cuesta* is a land elevation with a gentle slope on one side and a cliff on the other). Because rugged lands can not be built upon, they represent a constraint to tourism development.

#### ***Gravel Tablelands***

Gravel tablelands are flat elevated areas covered with gravels, cobbles, and other stones varying in size from .5 to 20 centimeters. These materials are cemented together with salt, gypsum, lime, and/or silicate, and are often coated with dehydrated ferric hydroxide and manganese that given them a “desert varnish,” i.e., a lacquered or polished appearance. The gravel tablelands are generally barren and constitute one of the ecologically poorest sub-zones of the planning area.

#### ***Wadis***

The coastal area is subdivided by a number of major wadis that empty into the sea in a series of natural bays (*marsas*). The drainage areas of the wadis range from a few hundred square kilometers to more than 1,800 square kilometers. Seepage from the wadis supplies fresh water to the shallow groundwater reservoir which supports wadi trees and vegetations. The wadis have a relatively rich and diverse vegetation cover of annual plants. During part of the year, however, vegetation is considerably reduced and a few species of perennial plants depend on subsurface water. The wadis are dry on the surface and feature sand and fine alluvial deposits. Wadis that host particularly significant habitats and migration corridors are Wadi El Gemal, Wadi El Ringa, and Wadi Umm El Abbas. Wadi El Gemal, in particular, is well known for its rich diversity of fauna and flora. The wadis in the planning area are classified as main, secondary, and small in accordance with their catchment areas and potential for flash floods.

#### ***Coastal Sand Plains***

Sand plains dominate a large portion of the coastal area. They extend up to four or five kilometers in width at places like Ras Dorry and Wadi Umm El Abbas. The mobile and abrasive nature of sand plains means that few organisms can live on them.

#### ***Desert Sand Plains (Sahl)***

Desert sand plains are extensive flat areas covered by sand running from northwest to southeast between the rugged lands and mountains in the central and southern part of the planning area. Sparse vegetation includes acacia trees and annual plants. The sand plains act as running and linking corridors for wildlife between wadis. The contrast between the wide sandy basin and the surrounding colorful mountains and hills make these sand plains one of the unique features of the natural beauty of the planning area. Sites include Sahl El Luli Al Andidibat, and Naga Haboni.

#### ***Uplifted Fossil Reef Plateaus***

Uplifted fossil reefs with sea-facing promontories 5 to 15 meters above mean sea level characterize a long portion of the shoreline. The uplifted fossil reef area is broken by flash flooding in the watershed line, forming the alluvial fans of the wadis. Ras Hankorab is a good example of the uplifted fossil reef plateau.

#### ***Mangroves***

As noted in the section on the intertidal zone, mangrove communities are environmentally significant for many reasons and are an important feature of Red Sea coastal-marine biodiversity.

Mangroves are located mainly in four areas: a 14 kilometer stretch of shoreline between Sheikh Zarrouk tomb and Hamata, the area north of Ras Baghdadi, the area of Wadi Lahmi, and on Wadi El Gemal Island. The most important mangrove system is found in the area of Qulaan and Hamata, where it benefits from the wadi's discharge and the more protected sedimentary coastline.

#### ***Salt Marshes***

The alluvial plains of some wadis form extensive areas of wet sand and mud salt marshes. There is brackish, saline, subsurface water in the riverbeds that can support a rich variety of halophytic plants and native Eastern Desert vegetation. These low-lying areas are generally considered transition zones between marine and land habitats.

Salt marshes are important elements of the coastal wetland communities. Their vegetation is adapted to life in salty and saturated soil conditions and produces

surplus organic matter that is a food source for many species. The most significant salt marsh is in Ras Baghdadi. Others include those in Sharm El Luli, Wadi Umm El Abbas, Wadi Qulaan, North Hamata, and Wadi Lahmi.

#### ***Coral Reefs***

The combination of warm clear water and limited freshwater runoff from arid lands has contributed to extensive coral reef development throughout the Red Sea region. More than 300 species of hard and soft corals have been recorded in the Red Sea. As noted in the section on Zone Four, Egypt's coral reefs provide shelter and food for a great deal of marine life. Some of the best-developed reefs are off Sharm El Luli, Lahmi, and north Ras Baghdadi. Coral reefs also occur around the three offshore islands of the planning area.

#### ***Enclosed Bays (Marsas)***

The continuous fringing reef has natural breaks leading to enclosed bays (marsas) with sheltered shorelines and sandy bottoms. The marsas are deep enough to provide exceptional opportunities for swimming, snorkeling, and diving activities and can accommodate sea-going vessels as well. Sandy sea beds are the main feature of the bottom with sea grass beds in large patches. The planning area includes three enclosed bays: Marsa Naqari, Sharm Al Foqiry, and Sharm El Luli. Sharm El Luli also contains a well-developed salt marsh and patches of mangrove trees.

#### ***Seagrass Beds***

Seagrass beds have a fundamental role as primary production and maintenance grounds for fisheries resources. Many important species shelter, feed, and breed among the grasses. Like mangroves, seagrass beds help protect and stabilize the coast with their extensive root systems. The seagrass beds and sandy beaches found in the areas of Ras Baghdadi and Wadi Umm El Abbas are important as nesting and feeding areas of marine turtles and shorebirds. The slow moving, herbivorous dugongs also rely on seagrass beds as an important food source.

#### ***Sandy Sea Beds***

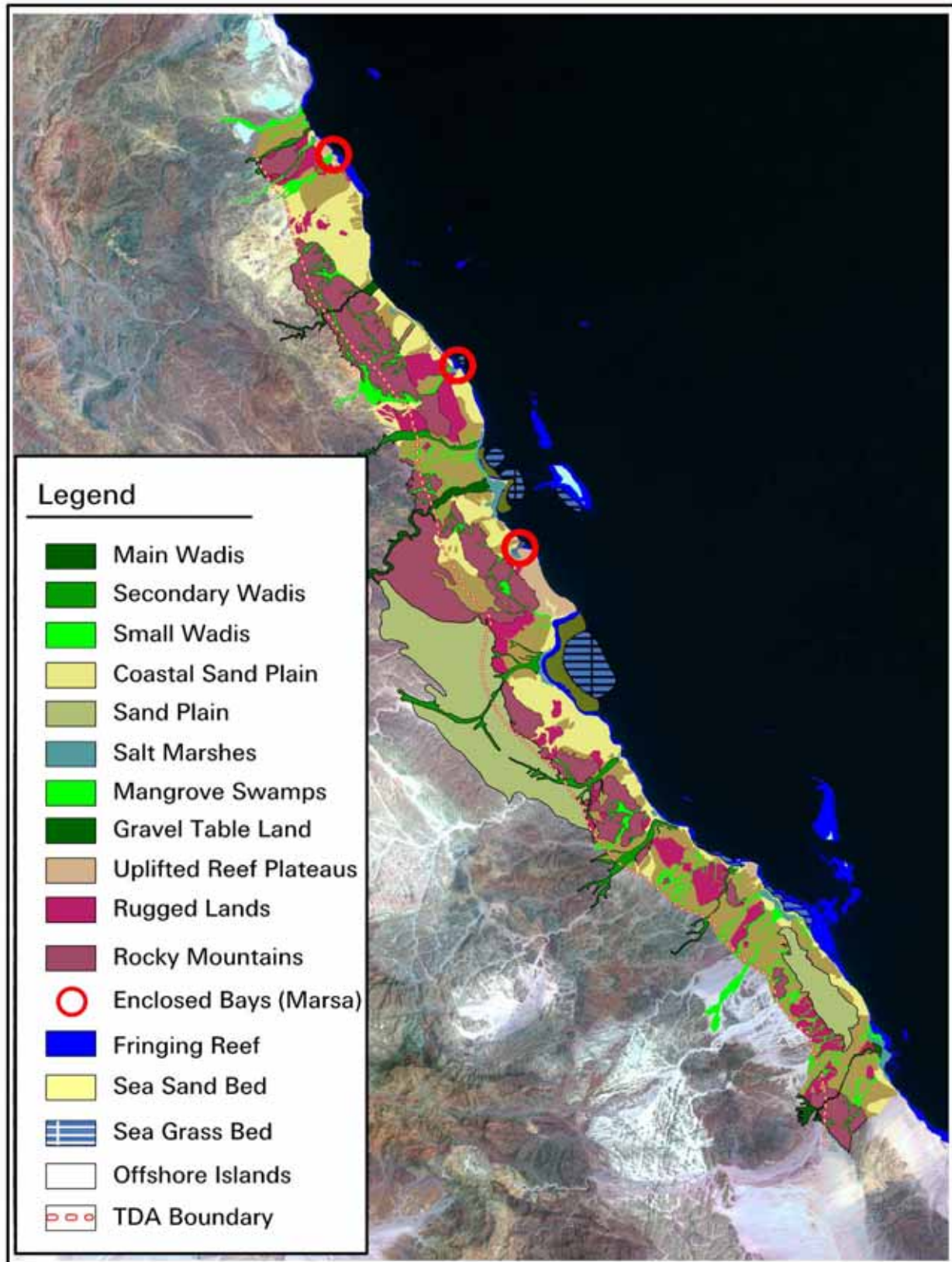
Below the low-tide level, sandy sea beds are fairly stable and are usually densely populated by invertebrates such as worms and mollusks. These are important food sources for many species of fish, particularly the larger species that rest in big schools on the reef by day. Sharm El Luli has an extensive sandy bottom and is evidently much used as a feeding ground by fish, since several large aggregations of groupers, emperors, and sweet lips have been observed nesting on both sides of seaward and leeward reefs around this bay. Other areas with sandy sea beds include Ras Baghdadi and Marsa Umm El Abbas.

#### ***Offshore Islands***

Three islands are located in the planning area: Wadi El Gemal, Shwarit, and Mahabis. These islands frequently represent natural laboratories where ecological processes may be studied free from many of the complexities found on the mainland. Wadi El Gemal Island (located about five kilometers from the shore) is the largest island and has the largest populations of various flora and fauna. The mangrove stands on the island, though small, are considered one of the best ecosystems of the Red Sea coastal area. As noted previously, Wadi El Gemal Island plays a vital role as a nesting, feeding, and/or breeding area for marine turtles, dugongs, and sea birds.

(See map entitled Homogenous Sub-Zones.)

# Homogeneous Sub Zones



Scale  
10 0 10 20 30 40 Kilometers



Red Sea Sustainable Tourism Initiative



Managed by:  
Government Services, Inc.



Financed by:  
United States Agency for  
International Development (USAID)



Implemented by:  
Tourism Development Authority (TDA)





## **4.1 Sensitivity Analysis**

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In this section, each natural sub-zone is analyzed to determine its sensitivity according to established criteria and then ranked to determine the most to the least environmentally sensitive areas.

This is a useful first step towards preparing a zoning plan as critical areas requiring protection and those areas most suitable for development (with minimum environmental impacts) are broadly defined.

Environmentally sensitive areas (ESAs) are defined as those areas that have one or more of the following characteristics:

- Areas that contain rare or endangered species.
- Areas that contain large blocks of habitats.
- Areas that perform critical life cycle functions such as migration corridors, flyways, and the resting, nesting, and breeding areas of wildlife species.
- Places that support vital ecological functions or are representative samples of different ecosystems or community types within a biogeographical area.
- Areas that contain representative samples of ecological succession.
- Areas of high diversity.
- Areas with high quality communities.
- Headwaters that support critical functions for the hydrological system.
- Unique geological or geomorphological features, formations, and processes.
- Aesthetically attractive environments.
- Areas of high potential for outdoor recreation.
- Areas of highly dependent traditional uses by indigenous people.

In the Red Sea area south of Marsa Alam, examples of ESAs would be turtle nesting beaches, wadis, dugong feeding areas, mangroves, coral reefs, salt marshes, marsas, and dolphin feeding and migration routes.

### **4.1.1 Methodology**

Internationally accepted criteria (IUCN and other) were applied to each of the sub-zones. The method used to rank each sub-zone was as follows: after reviewing all the relevant data, experts assigned a number for each criterion to each of the sub-zones. The scores for each sub-zone were totaled and the sub-zones were ranked according to their inherent sensitivity as Very High, High, Medium, or Low. In this way, it was possible to more objectively establish each sub-zone's priority for protection, restoration, enhancement, and/or development. This method was applied for several reasons:

- The need to establish a rational and systematic approach to establishing protected areas to reduce subjectivity.
- The need for quantitative evaluation of all criteria in relation to each other and to summarize the implications of all the criteria being applied to all sub-zones;
- The need for iterative processes to "weight" the criteria differently in order to test the sensitivity of the analysis;
- The need to be able to change the "weight" of certain criteria values without disrupting the whole analysis.
- The need to be able to add or eliminate criteria and test the results of the analysis

### **4.1.2 Criteria**

Ten criteria drawn from IUCN and other international sources were identified and applied to each sub-zone. The sub-zones were ranked according to these criteria by specialists during round-table discussions. Brief descriptions of the criteria used are presented below.

**Diversity.** Diversity can be represented by the number of species, populations, and communities. Higher numbers of species and of communities is desirable. The diversity scale is high, medium, or low.

**Rarity.** The area provides habitats for rare species or those that are endangered locally, regionally, or nationally. The rarity scale is classified according to the number of endangered, threatened, rare, or dominant species within a geographical area.

**Fragility.** This criterion deals with the sensitivity of communities, species, and associated habitats to environmental changes. Different communities have different degrees of sensitivity to environmental changes. Priority should be given to those that are least able to withstand alteration. The fragility scale is classified as reversible or irreversible in terms of impacts on the natural resources. (Fragile habitats include nesting, feeding, and breeding sites of the key species in a certain area.)

**Ecological function.** The ecological function of an area is vital to the healthy maintenance of a natural system beyond its boundaries, such as serving as an important wildlife migratory stopover, concentration point, or a linkage of suitable habitat between natural biological communities. Ecological function addresses ecosystem integration, succession, headwater function, trophic relationships, etc. This criterion scale is classified as vital, medium, or low ecological function.

**Naturalness.** The ecosystems with the least amount of human-caused alteration. The abundance and dominance of introduced species is one measure of naturalness. The naturalness scale is classified as virgin, semi-virgin, or altered ecosystem.

**Typicalness.** The ability of the site to represent a large number of the characteristic ecosystems of a geographic area. It is important to include representative sites with a conservation system plan. These typical or commonplace communities may be widespread in distribution. The rarity scale is classified as representative, semi-representative, or common ecosystem.

**Scientific value.** Suitability of the site for scientific research and conservation education purposes. The communities with long histories of scientific research are important for their opportunities to document long-term trends. The scientific scale is classified as high, medium, or low.

**Size.** The largest sites are capable of supporting species with larger area requirements and potentially affording a habitat for species that require extensive blocks of suitable habitats. The importance of a site increases with the geographical area which it serves. The larger the site, the more value it has for environmental conservation. The size scale is classified as large, medium, or small.

**Scenic value.** This criterion is one that the most easily understood and accepted by the general public. A combination of landforms and habitats is identified as having high scenic value in the context of surrounding landscape. This criterion scale is classified as high, medium, or low scenic value.

**Significance.** The level of significance of the natural resources on a global, national, or local level. The environmental significance scale is classified as global, national, or local significance.

The table on the following page presents the weighted sensitivity analysis by sub-zone/habitat and by criteria.

**Table 8. Weighted Sensitivity Analysis**

SUB-ZONE/ HABITAT	SITE(S)	DIVERSITY	RARITY	FRAGILITY	ECOLOGICAL FUNCTION	TYPICALNESS	NATURALNESS	SCIENTIFIC VALUE	ENVIRONMENTAL SIGNIFICANCE	SCENIC VALUE	SIZE	TOTAL
	<b>WEIGHT</b>	<b>15%</b>	<b>15%</b>	<b>15%</b>	<b>15%</b>	<b>10%</b>	<b>10%</b>	<b>5%</b>	<b>5%</b>	<b>5%</b>	<b>5%</b>	<b>100</b>
<b>MAIN WADIS</b>	WADI EL GEMAL	14	12	12	12	7.5	7.5	4	3	5	5	82
	WADI GHADIR	9	10	7.5	7.5	7.5	7.5	4	3	2	3	61
	WADI LAHMI	6	5	5	5	5	9	2	2	1	3	43
<b>SECONDARY WADIS</b>	WADI EREAAR	10	10	10	10	7	7	3	3	3	2	65
	WADI RINGA	5	5	5	5	5	7	2	2	2	2	40
	WADI EL ABBAS	7.5	7.5	7.5	7.5	5	7.5	3	3	3	2	52
	WADI GHUSUN	5	5	5	5	5	4	2	2	4	2	39
	WADI QULAAN	5	5	5	5	3	8	2	2	2	1	38
	WADI HAMATA	5	5	5	5	3	5	2	2	2	2	36
	WADI ANBAAOUT	5	5	5	5	3	5	2	2	2	2	36
<b>SMALL WADIS</b>	WADI EL FOQIRY	3	3	3	3	1	4	1	1	1	1	21
	WADI NAQARI											
	WADI SABKHAI											
	UMM TONDOBA											
	UMM EL RAMAREM											
<b>SALT MARSHES</b>	BAGHDADI	12	12	12	12	9	7	4	4	4	5	81
	LULI	10	12	10	12	8	7	3	3	3	2	71
	UMM EL ABBAS	7.5	7.5	10	10	8	8	4	4	4	3	66
	RINGA	4	4	4	4	4	5	2	2	1	2	32
	QULAAN	4	5	9	9	7.5	7.5	4	4	3	2	55
	NORTH HAMATA	4	5	9	9	7.5	7.5	4	4	3	4	57
	LAHMI	7.5	7.5	7.5	7.5	7.5	2	2	2	2.5	4	50
	SMALL SABKHAS	1	1	1	1	3	2	2	2	1	1	14.5
<b>MANGROVE SWAMPS</b>	NORTH BAGHDADI	10	12	12	12	7.5	6	4	4	3	2	72.5
	EL GEMAL ISLAND	10	12	12	12	7.5	8	4	4	4	3	76.5
	HAMATA/QULAAN	10	12	12	12	7.5	8	4	4	4	5	78.5
	LULI	10	12	12	10	5	5	4	3	2	1	64
	LAHMI	10	12	12	12	7.5	4	4	4	3	2	70.5
<b>COASTAL SAND PLAINS</b>	DORRY	4	2	2	2	3	4	2	1	1	4	26
	SOUTH GHADIR											
	SOUTH FOQIRY											
	NORTH LULI											
	S. UMM EL ABBAS											
<b>SAND PLAINS ( SAHL )</b>	S. GHUSUN											
	SAHL AL LULI	6	4	4	4	6	5	2	2	3	4	40
<b>UPLIFTED REEF PLATEAUS</b>	AL ANDIDIBAT											
	NAGA HABONI											
<b>GRAVEL TABLELANDS</b>	HANKORAB	1	1	1	4	4	5	2	2	1	1	22
<b>RUGGED LANDS AND CUESTAS</b>	EREAAAR, RINGA, LAHMI	1	1	1	2	2	3	1	1	1	1	14
<b>ROCKY MOUNTAIN</b>		1	1	1	1	7	7	1	1	3	2	25
<b>ENCLOSED BAYS SHARM / MARS</b>		5	7.5	1	7.5	-	-	3	3	4	5	36
<b>FRINGING REEF</b>	SHARM EL LULI	15	14	10	13	10	8	4	4	3	5	86
	SHARM FOQIRY	6	9	10	9	8	5	3	2	2	3	57
	MARSA NAQARI	10	10	10	10	8	5	2	2	2	2	61
<b>SEA SAND BED</b>		12	10	9	13	10	7	4	4	3	5	77
<b>SEA GRASS BED</b>	SOUTH BAGHDADI	7	0	13	6	7	7	3	3	2	3	51
	S. HANKORAB	4	0	0	3	5	3	1	1	2	3	22
	UMM EL ABBAS	3	0	2	2	2	2	1	2	1	2	16
	SHARM LULI	4	-	-	3	5	5	2	3	2	2	26
<b>SEA GRASS BED</b>	S. BAGHDADI	5	10	10	10	7	5	3	3	2	3	58
	UMM EL ABBAS	5	10	10	10	7	5	3	3	2	3	58
	SHARM FOQIRY	4	5	4	4	4	2	2	2	3	2	32

**DIVERSITY:** HIGH, MED, LOW (NO OF SPECIES)  
**RARITY:** ENDANGERED, THREATENED, RARE, DOMINANT (STATUS)  
**FRAGILITY:** NESTING, FEEDING, BREEDING...REVERSIBLE, IRREVERSIBLE  
**TYPICALNESS:** REPRESENTATIVE, SEMI REPRESENTATIVE, COMMON  
**ECOLOGICAL FUNCTION:** VITAL, MED, LOW

**SIGNIFICANCE:** GLOBAL, NATIONAL, LOCAL  
**SCIENTIFIC VALUE:** HIGH, MED, LOW  
**SCENIC VALUE:** HIGH, MED, LOW  
**NATURALNESS:** VIRGIN, SEMI-VIRGIN, ALTERED  
**SIZE:** LARGE, MED, SMALL



## 4.2 Sensitivity Ranking

Based on the sensitivity analysis, areas with “Very High” and “High” sensitivity levels are identified as conservation zones and areas with “Medium” and “Low” sensitivity rankings are designated as controlled development and development zones. The sum of all the numbers for all the criteria represents the level of sensitivity of each sub-zone.

The sensitivity levels are categorized as follows:

<b><u>LEVEL</u></b>	<b><u>TOTAL SCORE</u></b>
Very High:	More than 70 %
High:	50 to 69 %
Medium:	25 to 49 %
Low:	Less than 25 %

The Sensitivity map illustrates these rankings. The table below presents the area and percentage of land at each sensitivity level.

**Table 9. Land Area by Sensitivity Level**

<b>Sensitivity Level</b>	<b>Total Area (m<sup>2</sup>)</b>	<b>% Composition</b>
Very high	11969964.95	2.13%
High	11384291.02	1.94%
Medium	207455213.1	37.47%
Low	323632090.9	58.01%
<b>Total</b>	<b>588303461.5</b>	<b>100%</b>

A summary of the sites in the planning area follows.

### 4.2.1 Areas with Very High Sensitivity

Areas with very high sensitivity represent 2.13% of the planning area (11969964.95 square meters) and include the following sites:

- Wadi El Gemal (upstream, midstream, downstream).
- Mangrove Areas: The mangrove swamps of Hamata-Qulaan, Wadi El Gemal Island, Ras Baghdadi, and Sharm El Luli.
- Salt marshes: Ras Baghdadi and Sharm El Luli.
- All fringing, pillar, and patch reefs off Shaab Baghdadi and Wadi El Gemal Island; all reef flats facing mangrove swamps (as fish nurseries).
- Archeological sites: Naqari.

### 4.2.2 Areas with High Sensitivity

Areas with high sensitivity represent 1.94% of the planning area (11384291.02 square meters) and include the following sites:

- Wadis: Wadi Ereaar, Wadi Ghadir, and Wadi Umm El Abbas
- Salt marshes: Lahmi and Umm El Abbas
- Sharm El Luli as last undeveloped sharm on the Red Sea coast.
- Sharms: Sharm El Luli and Marsa Naqari
- Fringing Reef: all fringing reef along the coast including reef flats, reef crests, and reef faces.
- Sea sand bed: South Baghdadi, Umm El Abbas, and Sharm El Luli
- Seagrass beds: Umm El Abbas, Ras Baghdadi, Naqari, Wadi El Gemal Island, and Sharm El Luli

### 4.2.3 Areas with Medium Sensitivity

Areas with medium sensitivity represent 37.47% of the planning area (207475213.1 square meters) and include the following sites:

- Wadis: Wadi Lahmi, Wadi Ringa, Wadi Hamata, Wadi Anbaaout, and Wadi Qulaan.
- Salt marshes: Ringa.
- Sand plains: Sahl El Luli, Al Andidibat and Naga Haboni.
- Rocky mountains as a shelter for land mammals such as the Hyrax and especially for endangered species like the Nubian ibex and Dorcas gazelle.
- Seagrass beds: Sharm El Foqiry.

#### 4.2.4 Areas with Low Sensitivity

Areas with low sensitivity represent 58.01% of the planning area (323632090.9 square meters) and include the following sites:

- Small Wadis: Wadi Foqiry, Wadi Naqari, Wadi Sabkhai, Umm Tondoba, and Wadi Umm El Ramarem.
- Coastal plains: Dorry, South Ghadir, South Foqiry, North Luli, South Umm El Abbas, and South Ghusun.
- Small sabkhas.
- Uplifted reef plateaus
- Gravel tablelands: Ereaar, Ringa, and Lahmi.
- Gypsum and limestone cuestas and rugged lands
- Sea sand bed: South Hankorab.

The table below presents sensitivity rankings by sub-zone/habitat.

**Table 10. Ranking of Sensitivity by Category**

SUB-ZONE / HABITAT	VERY HIGH	HIGH	MEDIUM	LOW
MAIN WADIS	•	•	•	
SECONDARY WADIS		•	•	
SMALL WADIS				•
SALT MARSHES	•	•	•	
MANGROVE SWAMPS	•	•		
COASTAL SAND PLAIN				•
SAND PLAIN (SAHL)			•	
UPLIFTED REEF PLATEAU				•
GRAVEL TABLELANDS				•
RUGGED LANDS				•
GYP/LIMESTONE CUESTAS				
ROCKY MOUNTAINS			•	
SEA SAND BEDS				•
SEAGRASS BEDS		•	•	
ENCLOSED BAYS	•	•		
FRINGING REEF	•	•		
REEF PATCH		•	•	

### 4.3 Significant Resources

Significant resources are usually those resources that are particularly sensitive to human uses and activities or have international, national, or regional importance. The resources that are considered most significant in and around the planning area include the following:

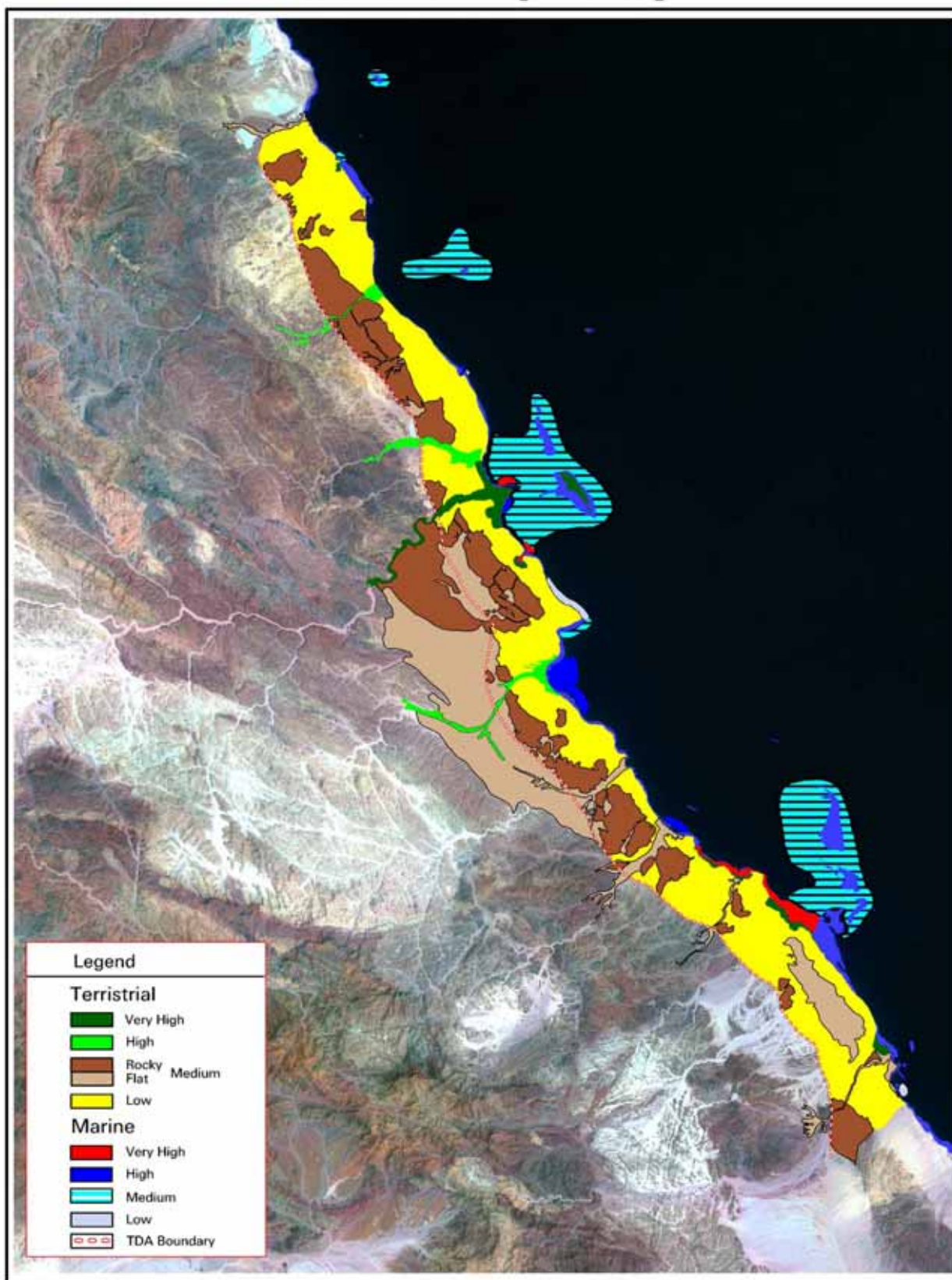
- The wadis of the Red Sea area south of Marsa Alam—especially the Wadi El Gemal floodplain—contain some of the most diverse representations of floodplain plant species in the eastern desert and the largest collection of *Salvadora persica* (arak), *Balanites aegyptiaca* (Ijljij), *Calatropis procera* (Oshar), *Solenostemma argel* (Hargal) and *Hyphaene thebaica* (the Doum or Dome Palm).
- The Wadi El Gemal, Wadi Ringa, Wadi Ereaar, and Wadi Umm El Abbas floodplains contain endangered species of land mammals such as the Dorcas gazelle (*Gazella dorcas*), Nubian ibex (*Capra nubiana*), Umm Rishat (*Caracal caracal*), and Wild Ass (*Equus asinus*) as well as other species such as the Sand Cat (*Felis margarita*) and Hyrax (*Procavia capensis*).
- Wadi El Gemal serves a vital ecological function and is a representative sample of three integrated ecosystems within a biogeographical area: the wadi ecosystem,

coastal ecosystem, and island ecosystem.

- The areas of Qulaan, Hamata, Lahmi, and Wadi El Gemal Island contain numerous rare examples of globally significant mangrove communities and represent the northernmost latitude limit for mangroves. The mangrove communities are an important feature of the Red Sea coastal-marine biodiversity.
- The planning area and its immediate surrounding are a relatively undisturbed habitat, and a good example of an unaltered environmental area.
- Wadi El Gemal Island is known for its importance as a nesting, breeding, and/or feeding area for green turtles (endangered), dugongs (vulnerable), and a large number of bird species.
- The coastal areas of Wadi Umm El Abbas and Ras Baghdadi are known as on-shore nesting and breeding areas for green turtles.
- Wadi Ghadir contains one of the few internationally renowned sites of pillow lava ophiolitic sequence.
- The Red Sea area south of Marsa Alam area contains some of the world's oldest gem-quality emerald mines located in Wadi Nuqrus and Wadi Sekeit. These areas were mined extensively by the ancient Egyptians and then later by the Romans for an approximately two thousand-year period BC. Human settlement of these wadis began during this time.
- The Red Sea area south of Marsa Alam contains numerous archeological sites and ruins of the Roman era.



# Sensitivity Map



Red Sea Sustainable Tourism Initiative



Managed by:  
Government Services, Inc.



Financed by:  
United States Agency for  
International Development (USAID)



Implemented by:  
Tourism Development Authority (TDA)



## PART FIVE: DEVELOPMENT OPPORTUNITIES AND CONSTRAINTS

The Red Sea area south of Marsa Alam offers significant opportunities for tourism development because of its unique natural and cultural attractions. The beauty and recreational opportunities created by the remote, wilderness character of the South Marsa Alam area also constitute substantial concerns and constraints for tourism development. The scarcity of water, access to deep water, a local work force, infrastructure, emergency services, suppliers and service providers, telecommunications, and emergency transportation services represent significant constraints to tourism development.

Environmental hazards such as severe heat, occasional flash flooding, climatic extremes, and sand storms comprise still other operational challenges. With careful planning and consideration, all of these challenges can be successfully accommodated. The primary challenge is the need to safely provide recreational experiences. The hyper-aridity and harsh conditions of the South Marsa Alam area require 1) specialized recreation service delivery techniques, 2) appropriately designed facilities, and 3) highly trained personnel to ensure the safety of visitors. The information presented in Part Five of the Land Use Management Plan has been assembled to provide public officials, tourism developers, and environmental managers with some essential information needed to provide a safe and enjoyable tourism experience for visitors to the South Marsa Alam area of the Red Sea.

### 5.1 Tourism Development Opportunities

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#### Tourism Attractions

The natural, heritage, and cultural resources of the Red Sea area South of Marsa Alam are world class and there are definitely tourist markets that would be interested in visiting this region. Appropriate access to the natural, antiquity, and cultural resources of this area potentially offers a significant departure from the conventional tourism development techniques currently being used by existing resort hotels now located along the Red Sea. Traditional tourism and diversification towards ecotourism can become economically important to Egypt.

The significant distinction between traditional tourism and ecotourism is that the primary attractions for the tourist are authentically provided, personal experiences that are unique to a particular area. The tourist's personal experiences include some combination of nature-, culture-, and heritage-based activities that are further reinforced by accommodations that accurately reflect the culture and heritage of the locality, cuisine, amenities, and various personal services that characterize the host community.

The attractions in the study area can be divided into three categories: focal, secondary, and supporting attractions.

**Focal Attractions:** The focal attractions of the study area refer to distinctive features of the local and regional natural and cultural heritage; they are the basic assets of the study area that the local community can offer to tourists. The focal attractions in the study area include the following:

- Diving activities and enjoyment of marine biodiversity (corals and fish).
- Pharaonic and Roman archeological sites (Sekeit, Nuqrus, Naqari, etc.).
- Desert safari activities (mountain climbing and hiking, desert trekking, wadi trails, horse and camel riding, etc.).
- The Mangrove communities of Qulaan, Hamata, and Wadi El Gemal Island.
- Bird watching.
- The geologic and geomorphologic features of the Red Sea mountains, which are especially appealing to nature photographers and geologists.

**Secondary Attractions:** The secondary attractions also refer to the natural and cultural heritage elements of the study area, but do not possess the degree of distinctiveness of focal attractions. In other words, they alone are not enough to motivate a tourist to visit the study area. They constitute reasons for further interest and added value to the tourist, contributing to richer and more diverse tourism experiences. The secondary attractions in the study area include the following:

- Wildlife observation in the Wadis (fauna and flora).
- Direct contact with communities' life styles (i.e, the Ababda and Bashari tribes).
- Water sports activities (small sailboats, windsurfing, single-line fishing).

**Supporting Attractions:** The supporting attractions are man-made elements (facilities and services) that serve specific needs of tourists and satisfy practical requirements of ecotourists. These facilities and services exist only peripherally to the main environmental appeal of the study area, and could not exist independently of the focal and secondary attractions. Ecotourism supporting facilities in the future might include the following: ecolodges, interpretive and visitor centers, handcrafts centers, camping sites and picnicking, special services for bird watching, medical services, restaurants and rest stations, exhibits, etc.

## Natural Entry to Deep Water (Marsas)

The continuous fringing reef has a natural break leading to beautiful, naturally enclosed bays (marsas) with sandy bottoms. These marsas are deep enough to provide exceptional opportunities for swimming and water sports and accommodate seafaring vessels. Local fishermen usually use these marsas for the protection they offer against wave action when anchoring their boats. Three marsas in the study area (Marsa Sharm Al Foqiry, Marsa Naqari, and Marsa Sharm El Luli) provide a depth of 3-8 meters and are equipped with natural channels that allow for the safe passage of boats up to 15 meters in length. These marsas represent the only suitable access to deep water and linkage between the terrestrial and marine activities.

## Offshore Mooring - Dive Sites

Seven main offshore diving sites are located in the south Marsa Alam area—Shaab Ghadir, Shaab Baghdadi, Wadi El Gemal Island, Siyul, Shwarit Island, Mahabis Island, and Lahmi—and five shore diving sites—Marsa Naqari, Sharm El Foqiry, Sharm El Luli, Hankorab, and Lahmi. Each diving site has a carrying capacity for diving activities, which when exceeded, will result in long-term damage to the site. Diving sites represent a natural capital investment in the area that brings in tourists. If the quality of the sites ceases to be appealing—as will happen if the carrying capacity is exceeded—then the natural capital will be lost. The challenge is how to manage these sites to satisfy the increase in tourist demand without sacrificing the environmental carrying capacity and damaging the ecosystem and resources.

## Accessibility

Tourists will be able to access the South Marsa Alam Area from two major transport centers. The City of Hurghada in the north currently offers international commercial air service and extensive marina facilities that enable easy and convenient access for large numbers of tourists to the Red Sea. Regularly scheduled commercial flights transport tourists from all over the world. This convenient travel is further enhanced by extremely affordable airfares between various European countries and Egypt.

Access to the South Marsa Alam region has been significantly improved by the recent completion of a major international airport and enormous private marina facility. These facilities are located approximately 70 kilometers north of the town of Marsa Alam. The Marsa Alam International Airport is currently providing regularly scheduled commercial service to Italy and Germany. Egypt Air is providing access to and from Cairo.

The new marina facility, Port Ghalib, is operational will ultimately have a mooring capacity for 1,800 vessels. If this capacity were to be fully realized Port Ghalib would become one of the world's largest marinas.

## 5.2 Hazards and Risks

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Tourism developers and operators must recognize that a truly wild place has a variety of natural hazards that require planning and management. The biodiversity and physical character of south Marsa Alam area not only represent potential attractions for tourists, but can also represent environmental hazards to humans, ecosystems and investments that need to be included as essential information for the Land Use Management Plan.

### Climatic Extremes

Climate is perhaps the largest issue in terms of visitor safety and comfort. Given the extremity of heat and the scarcity of water, visitor safety is a major concern. During the September to March period it is possible to safely conduct tourism activities by means of adequate preparation and supplies. During the summer months, it would be extremely dangerous to expose tourists to the climatic conditions of the South Marsa Alam area. The intense heat conditions, particularly during the summer months, can cause dehydration, heat exhaustion, and heat stroke.

For most of the year, the South Marsa Alam area is exposed to intense sunlight and, during certain seasons, intense heat. The most dramatic impacts of these extremely high temperatures on environmental conditions is the temperature of the rocks that often exceed 77° C (170° F) and the fact that all moisture, including perspiration, evaporates and dries instantly.

### Floods

Floods, although infrequent, can transform the wadis of the South Marsa Alam area into a funnel creating extreme safety concerns in terms of visitation in the event of a flash flood. Signage can be used along roadsides and paths to provide precautionary measures for guests by directing visitors to safety during these infrequent but deadly flood events. This environmental hazard threatens road systems, properties, human activities, and investment. Table 11 presents the hydrological data of the main wadis



in the study area.

**Table 11. Hydrological Data of Main Wadis**

WADI	AREA KM <sup>2</sup>	LENGTH KM	PEAK DISCHARGE M <sup>3</sup>	HOURS OF FLOOD CONCENTRATION
WADI UM TONDOBA	80.97	24.65	1,518,111	2.25
WADI SABKHAI	18.97	12.6	355,698	1.5
WADI NAQARI	57.59	16.05	1,007,890	1.5
WADI EL ANBAAOUT	101.53	22.68	1,903,644	2
WADI GHADIR	506.96	44.55	10,404,347	3
WADI EREAR	276.458	32.15	5,183,588	4.5
WADI EL GEMAL	1850.86	79.23	39,330,710	5
WADI UMM EL ABBAS	260.5	25.27	4,558,831	3.5
WADI EL RINGA	269.79	40.03	5,058,720	4
WADI QULAN	129.72	37.98	2,270,133	4
WADI UMM RAMAREM	57.24	19.99	1,001,651	2.5
WADI LAHMI	554.412	54.11	11,434,710	2.75
WADI ABU GHUSUN	381.52	31.12	763,0342	3

### Potential Risks to Humans

Most threats to humans can result in medical emergencies and the remoteness of the South Marsa Alam Area presents many challenges in this regard. The evacuation of injured persons is complicated by the ruggedness of the terrain, the inability of vehicles to travel safely at high speeds across that terrain, and the considerable distances from telecommunication and emergency medical aid facilities. These obstacles can be reduced by effective communication systems with medical personnel and the strategic stationing and mobilization of emergency response vehicles. Potential threats to humans include:

- Extreme heat
- Rockslides
- Scarcity of water
- Sand storms
- Roughness of terrain
- Sea currents
- Poisonous Insects
- Flash flood
- Poisonous snakes
- Seismic activity

Poisonous insects and snakes are a significant danger to humans in the mountainous areas of the South Marsa Alam region. Anti-venoms must be refrigerated to maintain their effectiveness due to extreme temperatures.

## 5.3 Tourism Development Constraints and Concerns

The following are some potential threats to ecosystems posed by tourism development.

- Water pollution.
- Intrusions on nesting bird colonies.
- Vulnerability of Mangroves to pollution and human activity.
- Possibility of harm to scarce vegetation in the wadis.
- Critical habitat areas in the wadis and mountains could be damaged.

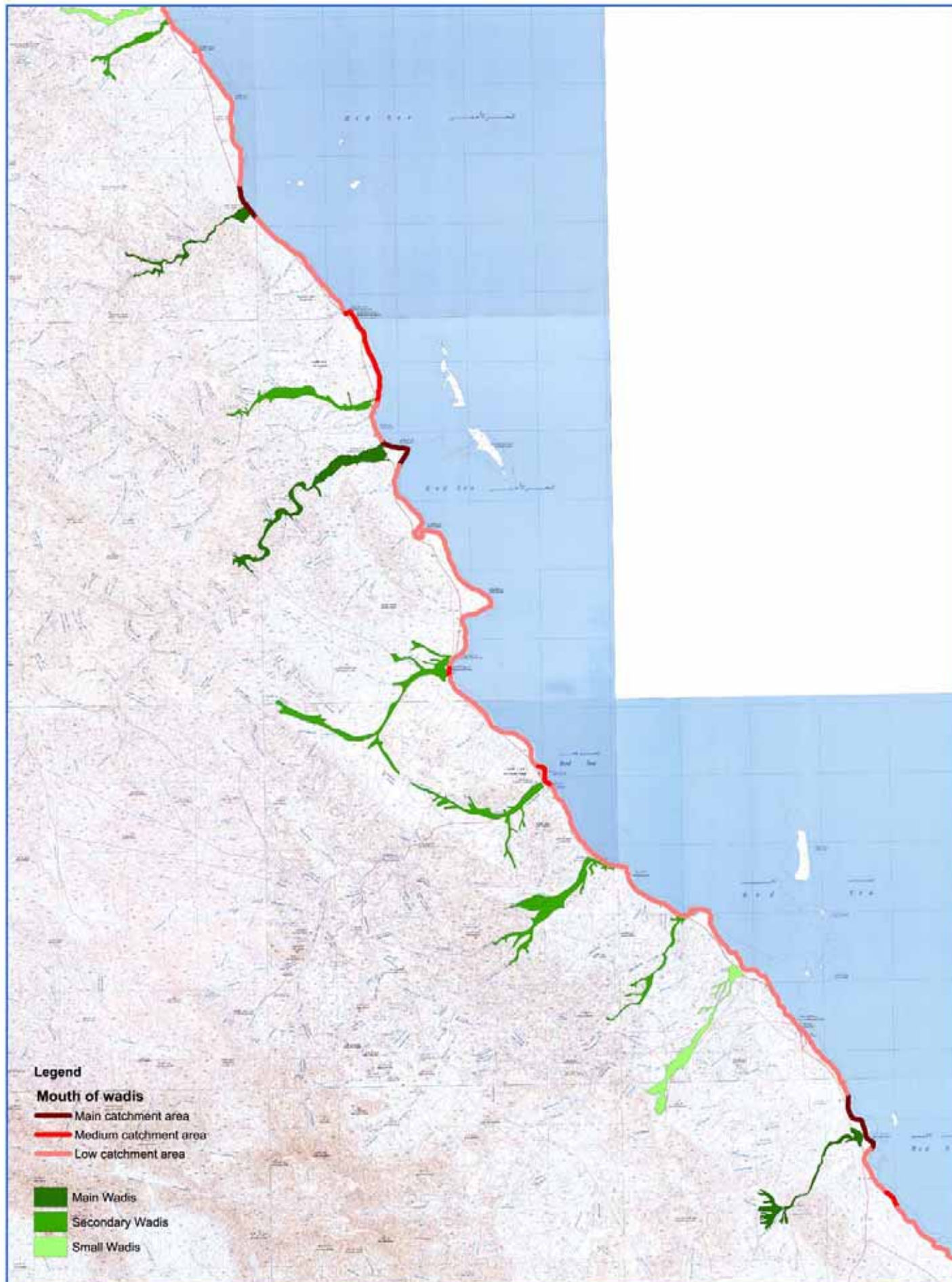
Additional constraints and concerns are discussed below.

### Access to Deep Water

Access to the deep water for swimming and diving is difficult in the areas of wide reef flat because of the shallowness and the hard, rocky bottom. In addition, the outer reef edge is exposed to severe wave action and can be dangerous for swimmers accessing the deep water from the edge of the reef flat. The difficult access to deep water from the shallow reef flats creates an impetus to focus all swimming, boating, and water sports activities, other than diving, in the areas of the natural marsas.

### Existing Regional Road

The current coastal highway will become increasingly inadequate as the region develops. This is easily apparent considering it would need to support not only direct tourism flows, but also those related to the construction and operation of tourist facilities. Furthermore, it is the principal link of Egypt to the Sudan performing both trade and military/security functions. It is assumed that the new airport north of



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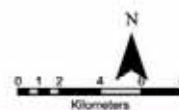
United States agency for  
International Development



Tourism Development  
Authority

## Flooding Potential

Red Sea Sustainable Tourism Initiative (RSSTI)  
Southern Region of the Red Sea  
Egypt



Marsa Alam and eventually the current military airport in Berenice will provide air access to the region for the foreseeable future. The inevitable congestion on the current road would produce travel time to the airports that would be unacceptable to most resort visitors. Furthermore, the current road blocks the natural flow of water supporting the mangroves and other coastal vegetation and reduces the attractiveness of the Protected Areas at the mouth of Wadi El Gemal and in the Qulaan/Hamata region.

### Alteration of Natural Habitats

The development of tourism facilities may result in environmental stress on important habitats for a variety of birds and breeding areas for terrestrial and marine wildlife. The following are potentially serious threats to important wildlife and their habitats:

- Mining activities in important habitats without proper management plans to mitigate their effects on the natural habitats, particularly in the main wadis.
- Proposed tourism lodging facilities along the coast at Marsa Um El Abbas could cause damage to the fragile turtle nesting areas along the shoreline during the processes of site work, construction, and operation unless proper setbacks and other precautions are observed.
- Intensive, mass tourism development projects covering about 30 million square meters as currently proposed for the region between Marsa Alam and Wadi Lahmi may result in the destruction of the natural features throughout the entire region and may adversely affect the wildlife of the study area.

### Absence of Health and Safety Infrastructure

The absence of human settlement in the South Marsa Alam area has resulted in an absence of infrastructure. The climatic conditions of hyper-aridity and the topographic conditions of the mountainous areas further contribute to this lack of infrastructure. Currently, the only small infrastructure capacities are those associated with the new resorts or the few Red Sea towns. This infrastructure is only sufficient for the immediate needs of these enterprises and thus has no capacity for additional tourism development. As a consequence of this circumstance, it is essential for the tourism investor to realize that potable water, wastewater, solid waste disposal, electrical energy, and telecommunication systems virtually do not exist in the South Marsa Alam Area. The TDA development lands represent areas in which selected infrastructure has either been built or is planned. However, any tourism development that may be proposed in the mountainous regions will not only have to put in new systems, but also be certain that those systems can tolerate the extreme environmental conditions.

### Hunting and Fishing

Dorcas gazelle and Nubian Ibex are frequently hunted in the wadis of the area south Marsa Alam. Other mammals and reptiles are collected by professional hunters to be sold to private collectors and zoos. Fishermen from the Delta come to the area to collect marine turtles, shellfish, and sea cucumbers (*Holothurians arta*) which threatens the remaining few numbers of these species. These uncontrolled activities are destroying wildlife in the area.

### Absence of a Conservation Management Plan

The Red Sea area south of Marsa Alam is suffering from the absence of an environmental conservation management plan. To date, a monitoring and patrolling system of the area does not exist.

### Absence of Interpretive Programs

There are many missed interpretive opportunities in the southern area of Marsa Alam. Most tourists leave with little understanding of the area's natural significance or without an appreciation of the themes that give perspective to the value of this natural habitat as it relates to the human condition. The scope of existing interpretive programs allows only a few visitors to understand the unique contribution this area makes to the Red Sea region.

### Protection of Antiquities

Unexplored ruins from the Pharaonic and Greco-Roman eras, especially in Wadi El Gemal, are being illegally excavated and vandalized. The archeological sites of the study area face two main problems:

- Lack of protection systems (including preservation and conservation policies) for known archeological sites.
- Insufficient archeological excavation efforts.



## 5.4 Summary of Information for Decision Makers

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The purpose of this summary is to provide valuable information to decision makers that accurately characterize the facts about the South Marsa Alam Planning Area.

1. The Red Sea area south of Marsa Alam is a vast wilderness area that offers valuable opportunities for tourism development.
2. The South Marsa Alam area's resources include extraordinary antiquities, mineral wealth, important biodiversity especially along the coast, and remarkable scenic beauty.
3. With the exception of a few coastal communities, there are virtually no permanent residents living in this vast area.
4. The few people who do reside in the Red Sea area south of Marsa Alam depend on the region's scarce natural resources for their survival, but they are interested in participating in tourism by guiding tourists through this region, or by hosting visitors to their communities in the fashion briefly described in section 2.4.3.
5. The mountains of this area can be exceedingly dangerous because of severe heat, lack of water, poisonous snakes and insects, unstable slopes, and the labyrinth wadis within which people can get easily lost.
6. For the first time in modern history, the Egyptian Government is seriously planning to allow entry of foreigners into this region of Egypt. Security issues need to be resolved in order to realize the region's tourism potential.
7. The lack of a permanent population means that there are only a few hundred people who have a competent knowledge of this area. The implication is that there is a severe shortage of potential guides and drivers who can lead tourists through this region.
8. Although the resources of the Red Sea area south of Marsa Alam are valuable, they are not well known. Therefore, the most important facilities that should be developed are visitor centers and educational and research facilities.
9. The severe heat and lack of water means that there will be only seasonal use of the South Marsa Alam area. The heat will prevent tourists from staying in the back country during the months of May through September. Day trips may be conducted during early morning and evening hours during this hot time.
10. The intense heat and lack of sufficient annual occupancy might result in operational costs greatly exceeding revenues and thus might not attract investment.
11. If Egypt wishes to attract foreign tourists to this wilderness area, then the unique and sometimes dangerous conditions found in the South Marsa Alam Area will require government authorities to establish a safety and communication infrastructure unlike anything else they have in the nation.
12. The target market that would be attracted to the South Marsa Alam area's attractions is complex. This market comprises several distinct categories of persons pursuing various recreational activities characterized by levels of expenditures and visitor behavior. In summary:
  - The high-end ecotourism market is characterized by persons who are approximately 50 to 65 years of age with high educational attainment, considerable discretionary income, and an inclination for recreational activities conducted by well-trained guides and naturalists.
  - The mid-range ecotourism market is typified by persons who have a substantial desire to pursue their specialized, nature-based recreational activity. For example, this individual typically saves their scarce financial and time resources to participate in nature-based activities in unique and remote locations.
  - The low-end ecotourism market are those persons whose primary motivation is to inexpensively experience nature. This market segment is generally characterized by young people with few financial resources, but a willingness to "rough it" via camping or working temporary jobs in order to pursue nature-based recreation activities such as snorkeling, hiking, backpacking, and mountain climbing. Successfully attracting this market segment can potentially lead to potentially long-term visitation.

## PART SIX: PROPOSED LAND USE ZONING PLAN

The land use zoning plan for the Red Sea area south of Marsa Alam must be a positive model for an ecologically sustainable and unique example of combining both the environment and development. Given the sensitive ecosystem of the planning area, there is an opportunity and an obligation to create a showcase of sustainability and build a development pattern that is socially and economically viable within a framework of strict environmental control. This will include different grades of development and preservation programs to comply with ecological sensitivity.

Two things attract people to the great destination of the world: beauty and the soul. Beauty can be either natural or man-made. Soul is more difficult to define but is just as important. Combined, these components form a “place.” It is the “essence of place” that unites its people, their culture, and history. A vision of the Land Use Management Plan (LUMP) is to combine both beauty and soul to sustain development and attract investors.

The land use zoning plan tries to bring together beauty as hardware and soul as software. The assets of the planning area include 1) the hardware, i.e., “built and physical environment” and 2) the software, i.e., “activities and interpretation,” “the people,” and “culture and traditions.” The hardware includes the planning, landscape, and architectural regulations, sensitive areas, and archaeological sites. The software includes the interpretive themes, the visitor experience, activities of compelling natural and cultural interest, and education. The people include interaction between tourists and local people.

A land use zoning system for the planning area has been created, with the purpose of identifying, evaluating, and classifying the natural sub-zones according to levels of sensitivity and corresponding suitable activities for each zone, such as traditional tourism, ecotourism, mining, nature conservation and research, etc. The zoning system includes corresponding management directives for each area that address environmental and tourism issues. Each zone specifies a particular combination of physical, biological, social, and management criteria.

Each type of zone indicates where and what type of physical infrastructure and services should be provided. A clear categorization of modality and intensity of land use is needed to minimize negative impacts on the natural and cultural environment, as well as to optimize the tourism experience.

The proposed management zones identify the following essential items:

- What must be preserved and what degree of protection is needed to accomplish this.
- Types of experiences and activities to be offered to tourists.
- Location of and concentration of physical facilities.
- Areas where facilities are prohibited.

### 6.1 Zoning Principles

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A set of planning principles to identify the management zones of the planning area were developed as follows:

1. The zoning scheme should be as compatible as possible with the existing land allocations of the Tourism Development Authority (TDA) to the Integrated Development Centers (IDCs) in the planning area.
2. The management zones should be based on a detailed understanding of the ecosystems and the natural resources of the coastal areas.
3. The management zones must be based on a thorough review of site geology, geomorphology, soil, ground and surface water, climate, marine life, terrestrial wild life, and vegetation.
4. The management zones must keep typical and characteristic landscape features in their structural and visual appearance intact within the development itself and the surrounding landscape. Each property will include buffer areas to minimize visual conflict and maximize the attraction of the coastal area.
5. The zoning scheme is designed to avoid massive development areas, using instead a system of structuring landscape and open space features that serve as buffer and transition zones between IDCs to keep a sense of “place,” with accessible beaches and natural bays

### 6.2 Zoning Boundaries

---

The delineation of zone boundaries is critical, as it involves consideration of a number of biological, landscape, ecological, and political factors. The zones have boundaries that are distinguishable in the field. Drainage areas, topographic features, landforms, roads and other identifiable features are used as zone boundaries. The most important factors in determining the boundaries were:

- The visibility of biological community boundaries.

- The potential impact on adjacent land uses.
- The territory of the home range of rare or otherwise critically important species.
- The natural boundaries of changing environmental features such as tides, flood plains, erosion areas, and depositional areas.
- The ecological integrity of communities that are close together but not in direct contact. In such cases, linkages were considered.
- The number or diversity of community types that are desirable for long-term protection.
- Recent or proposed tourism development land allocation in the area.

### 6.3 Proposed Management Zones

Apart from allocating areas for different uses and services based on the carrying capacity of the natural and cultural resources, as well as other biophysical and climatic conditions, the zoning of the planning area should support efforts to conserve the area's natural and cultural resources and also contribute to enhancing the quality of the tourism experience.

The zoning scheme is based on the limits of acceptable change (LAC) and the limits of acceptable use (LAU) system. This system accepts that some change in nature is inevitable, and represents a framework within which acceptable types and levels of environmental impacts are defined by resource monitoring managers. The LAC and LAU system places primary emphasis on the conditions desired in the planning area rather than on the maximum amount of use the area can tolerate. This system must be based on establishing a monitoring mechanism that provides quantitative guidance ensuring that the desired conditions are not causing unacceptable impacts and resource damage.

The Sensitivity map in Part Four rates the most sensitive resources for their resilience to the impacts of use. This illustrates an important issue: in general, the resources that the visitors want to see are often those that cannot withstand the impacts of use. The challenge for this zoning scheme is to accommodate use near or in the resources while minimizing or eliminating the impacts.

Each of the proposed management zones corresponds to a specific management plan in accordance with administrative objectives of the natural and cultural ecosystems. The following zoning scheme is proposed for the planning area:

1. Core Zone (Absolute Reserve Areas)
2. Buffer Zone (Restricted Wilderness Areas)
3. Transition Zone (Ecotourism Zone)
4. Low Intensive Development Zone (Coastal Eco-Resort Zone)
5. Moderate Intensive Development Zone
6. Special Development Zones

The Land Use Zoning Plan map illustrates the zones applied to specific areas. Table 12 presents the area and percentage of land in each zone.

**Table 12. Development Land Use Budget**

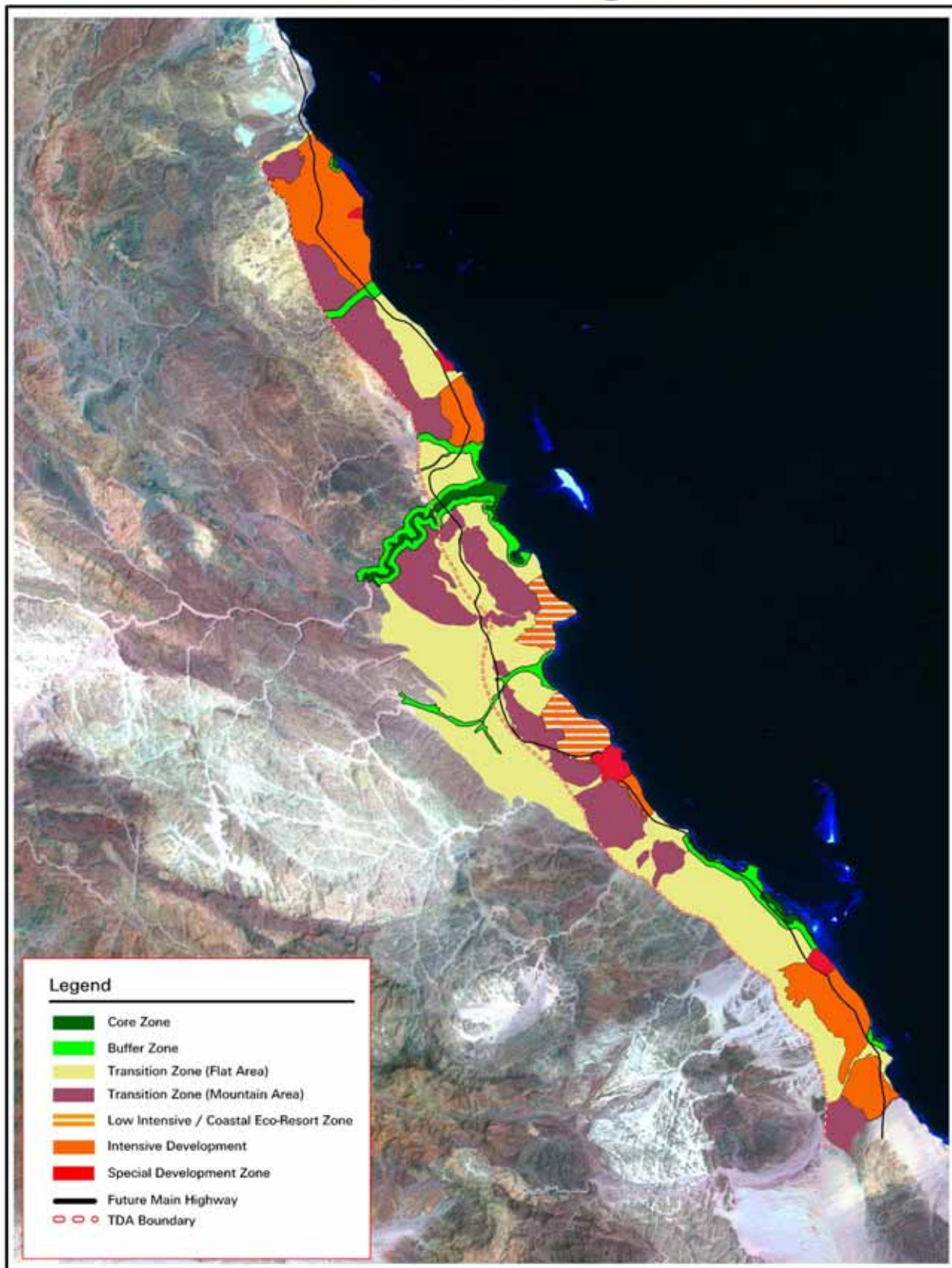
Zone	Total Area (m <sup>2</sup> )	% Composition
Core Zone	11969964.95	2.03%
Buffer Zone	36928445.19	6.28%
Transition Zone (Flat)	231555001.8	39.36%
Transition Zone (Mountain)	146527182.5	24.91%
Low Intensive Development Zone	36903161.94	6.27%
Moderate Intensive Development Zone	120432745.1	20.47%
Special Development Zones	3059419.256	0.52%
<b>Total</b>	<b>588303461.5</b>	<b>100 %</b>

#### 6.3.1 Core Zone (Absolute Reserve Areas)

This zone represents areas of very high sensitivity within the planning area that could be easily disturbed or areas where the presence of people would significantly impact important visual resources. Access to these areas would be restricted with permitted access only for the purpose of research, traditional cultural activities, or other well-justified uses with a limited number of visitors accompanied by a guide or park ranger.

Core zone areas would provide maximum preservation of fragile and/or unique resources, endangered species, archeological sites, etc. Although access would be restricted, visitors

# Land Use Zoning Plan



Red Sea Sustainable Tourism Initiative



Managed by:  
Government Services, Inc.



Financed by:  
United States Agency for  
International Development (USAID)



Implemented by:  
Tourism Development Authority (TDA)





could benefit from off-site interpretive programs and from the experience of learning about sites protected for future generations.

Proposed core zone areas include:

- Bird sanctuaries
  - The shallow mudflats and salt marshes of Ras Baghdadi.
  - The bird nesting area of Wadi El Gemal, Mahabis, and Shwarit Islands.
- Mangrove areas
  - The Mangrove swamps of Hamata/Qulaan, Wadi El Gemal Island, north Baghdadi, Sharm El Luli and Wadi Lahmi.
- Salt Marshes
  - The shallow mudflats and salt marshes of Ras Baghdadi, Sharm El Luli, Lahmi, and Qulaan.
- Wadi habitats
  - The habitats of land mammals and reptiles (shelter, feeding, breeding, and corridor areas) in Wadi El Gemal.
- Marine reserves
  - Breeding, feeding, and nesting areas of green turtles at Wadi El Gemal Island, Ras Baghdadi, and Umm El Abbas.
  - Feeding area of dugongs at Wadi El Gemal Island.
  - The sheltered bay of Sharm El Luli.
  - The fringing reef of Shaab Baghdadi.
- Archeological site
  - The archeological site of Marsa Naqari.

### 6.3.2 Buffer Zone (Restricted Wilderness Areas)

This zone represents areas of high sensitivity within the planning area. The buffer zone areas would offer visitors a fairly structured experience with on-site interpretation and education. The opportunity for independence, closeness to nature, tranquility, solitude, and application of outdoor skills would be common. The probability of encountering other visitors would be medium. This zone primarily accommodates four-wheel drive experiences, and gives a sense of being in wild lands with trails, with minimal maintenance facilities. The number of visitors is limited and monitored, and impact is minimized through regulations and pre-entrance orientations. No paved roads are permitted, and off-trail use of the park is prohibited.

Proposed buffer zone areas include the following:

- The area around the shoreline of the shallow areas and mud flats, Wadi El Gemal Island, as well as the protected and sheltered embayments like Sharm El Luli.
- The area around turtle nesting areas along the shoreline of Umm El Abbas.
- The area around wildlife habitats of Wadi El Gemal, including 500 meters of the rocky mountains on both sides of the wadi and its branches.
- The flood plain of Wadi Umm El Abbas, Wadi Erecar, and Wadi Ghadir including 500 meters of the rocky mountains on the both sides of the wadis and their branches.
- The salt marsh area of Marsa Umm El Abbas.
- The area around the salt marshes of the mangroves between Qulaan and Hamata.

### 6.3.3 Transition Zone (Ecotourism Zone)

This zone represents peripheral areas, with moderate-to-low levels of environmental sensitivity. The transition zone encompasses both flat and mountainous terrain. Visitors to this zoning level are encouraged to carry out diverse activities compatible with the natural and cultural environment via environmental education and ecological awareness programs. Areas in this zone may have limited low-impact tourist services (mainly of an interpretive nature). The main ecotourism facilities will be concentrated in the transition zones, i.e., visitor centers, ecolodges, campgrounds, and heavily used trail corridors. Vehicles allowed in this area must be low-impact and low speed, with primary mobility achieved on foot, camel, bicycle, or horseback.

The transition zone includes the following areas:

- The medium and small wadis of the planning area including Wadi Ringa, Wadi Abu Ghusun, Wadi Qulaan, Wadi Hamata, and Wadi Anbaout, and the area

between Wadi El Gemal and Sharm El Luli.

- The coastal uplifted reef area of Qulaan.
- The enclosed sand basins (sahl) of El Luli, Naga Haboni, Al Andidibat, and El Foqiry.
- The rugged lands and rocky mountains around the medium and small wadis that form a watershed area.
- The coastal plain near Sharm El Foqiry, Sharm El Luli, Marsa Umm El Abbas, and Hamata.

#### 6.3.4 Low Intensive Development Zone (Coastal Eco-Resort Zone)

The areas adjacent to the Wadi El Gemal-Hamata Protected Area, including Ras Hankorab and south Marsa Umm El Abbas, are examples of suitable low intensive development/coastal eco-resort zones. Development in this zone will follow similar guidelines to those of the ecotourism/transition zone. Only restricted development will be allowed in the low intensive zoning category due to the environmental sensitivity of adjacent areas.

#### 6.3.5 Moderate Intensive Development Zone

This zone encompasses TDA IDCs which will include the major tourism facilities (lodging, services and infrastructure). This zone will provide many social experiences, with a high rate of encountering other visitors. The buildings, structures, sights and sound of human activities and vehicles are predominant.

This moderate intensive development zone includes the following areas:

- The coastal area between the southern boundary of Marsa Alam city and Wadi Ghadir.
- The coastal area between Sharm El Foqiry to Wadi Ereaar.
- The coastal area between the southern boundary of Abu Ghusun village and Wadi Ringa.
- The coastal area between the southern boundary of Hamata village and Wadi Lahmi.

#### 6.3.6 Special Development Zones

Special development zones are areas requiring special consideration such as Gebel Dorry, the nearby hills, the ridge north of Sharm El Foqiry, the municipalities of Abu Ghusun and Hamata, and the Bedouin settlement of Qulaan.

Action plans will be needed for these special development zones to identify zoning codes, evaluate land uses and regulations for these areas on a case-by-case basis, and strengthen their relationship with Land Use Management Plan. The action plans of the special development zones will provide direction for the location and scale of uses and development on the coastal strip by restructuring coastal settlements (Abu Ghusun, Qulaan, and Hamata), identifying activity nodes, and protecting the essential character of coastal scenic landscape.

The purpose of the special areas action plans is to provide a model for the establishment, management, and appropriate use of these special areas, in order to achieve the following objectives:

- Maintain and restore the unique natural features and landmarks of the coastal area.
- Provide landmark points and nodes of development.
- Involve the indigenous people in the development process.
- Bring the uses of land areas under the municipalities more in line with the Land Use Management plan.
- Enhance integration across governmental jurisdiction boundaries (TDA, EEAA, RSG) by coordinating the action plans with planning schemes at the local, sector, and regional levels.
- Protect representative examples of natural landscapes and ecosystems and restrain the construction of large structures.
- Identify the quality and quantity standards and concrete specifications that must be complied with and satisfied to enhance the development and management of these areas.

## PART SEVEN: LAND USE MANAGEMENT CRITERIA AND REGULATIONS

Tourism development in the Red Sea area south of Marsa Alam should be based on sustainability criteria that include:

- Long-term ecological viability.
- Long-term economic viability.
- Ethical use of resources.
- Equitability with local communities.
- Compliance with EEAA guidelines and Environmental Law 4/1994.

The sections below list general regulations for the management of zones to safeguard the planning area from urban expansion and to assure the best investment of environmental and cultural resources and the preservation of ecological balance.

Table 13 at the end of this section provides an overview of the zones and their regulations.

### 7.1 CORE ZONE (ABSOLUTE RESERVE AREAS)

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- The core zone will be applied to highly sensitive areas such as Wadi El Gemal, the Marsa Naqari archaeological site, Sharm El Luli, all mangroves, and some of their salt flats.
- Management and use of this zone will be directed with a minimum of interference to the life cycles of plant, animal, and marine communities. Management may be restricted to the prevention of a natural disaster or unacceptable hazard to the important ecosystems of the area.

#### 7.1.1 Permitted Uses

- Nature observation.
- Interpretation and guided walking trips in daylight hours.
- Scientific research with permits.
- See Annex B for specific suggested regulations to maximize protection of flora and fauna and other natural resources in core zone areas.

#### 7.1.2 Excluded Uses

- Permanent lodging or any construction or development activities.
- Mining.
- Animal grazing.
- Hunting or disturbing wildlife.
- Collecting or damaging natural materials, vegetation, or habitats.

#### 7.1.3 Other Restrictions

- Visitation only with authorization, and with orientation and accompaniment by experienced, well-trained, naturalist guide.
- The guide-to-group size ratio never exceeds 1 to 10.
- The maximum size of a visiting group will depend upon the fragility of the surroundings.
- Authorized vehicles only.
- All authorizations by EEAA.
- No paved roads.

#### 7.1.4 Development

Setback: Not Applicable.

Net Density: Not Applicable.

Height: Not Applicable.

Lot Size: Not Applicable.

Other: In case of allocated concessions for investors, no new fixed construction or land fill will be allowed on any salt marshes or on wet or soft soils. Only light construction on piles will be allowed.

### 7.2 BUFFER ZONE (RESTRICTED WILDERNESS AREAS)

---

Buffer zone areas normally extend into larger and open areas where cooperative activities are developed between researchers, managers, and the local population, with a view to ensuring appropriate environmental planning and sustainable development of

resources. All forms of mass tourism should be avoided in the restricted wilderness areas which require strict protection. Only limited ecotourism activities will be allowed in buffer zones.

#### 7.2.1 Permitted Uses

- Traditional uses of indigenous Bedouin.
- Hiking trails.
- Special services for ecotourism.
- Mobile camps.
- Emergency services are allowed.
- Controlled and regulated fishing for local fishermen.

#### 7.2.2 Excluded Uses

- Fixed accommodation.
- Mining activity.
- Hunting or disturbing of wildlife.
- Collecting or damaging vegetation or habitats.

#### 7.2.3 Other Restrictions

- Visitation only with authorization, and with orientation and accompaniment by experienced, well-trained, naturalist guide.
- The guide-to-group size ratio never exceeds 1 to 10.
- The maximum size of a visiting group will depend upon the fragility of the surroundings and the seasonality of species.
- Authorized vehicles only.
- All authorizations by EEAA.
- No new paved roads.

#### 7.2.4 Development

Height: Not Applicable.

Setback: Not Applicable.

Lot Size: Not Applicable.

Other: No construction will be allowed in the buffer zone. Only the construction of monitoring and control stations will be permitted.

A shoreline buffer of no less than 500 meters from the highest high-tidal waterline will be created in restricted wilderness areas.

### 7.3 TRANSITION ZONE (ECOTOURISM ZONE)

---

The transition zone will comprise moderately sensitive flat and mountainous peripheral areas. These include the watersheds of Wadi Abu Ghusun, Wadi Ringa, and Wadi Lahmi, all intermediate wadis, the coastal plains around Sharm El Luli and Marsa Umm El Abbas, and the Hamata mangroves area. This zone will be exclusively for ecotourism facilities.

#### 7.3.1 Permitted Uses

- Resource management activities.
- Ecotourism activities:
  - Site orientation and interpretive kiosks will be placed at designated staging areas throughout the planning area. These exhibits will provide detailed site orientation to the ecotourism zone, as well as an overview of the special features and attributes encountered throughout the planning area.
  - In some cases, wayside exhibits can be placed along trails to provide more in-depth treatment of the most significant interpretive themes. These low profile exhibits would be used on a limited basis inside the transition zone, and they would be designed to blend with the environment.
  - Guided walks and programs led by trained guides will be offered and enhanced in the staging areas.
- Ecotourism facilities:
  - A limited number of small ecolodges (i.e., not exceeding 50 rooms each) will be accepted in the transition areas.
  - The total carrying capacity of these lodges should not exceed 50 rooms



per million square meters in the back areas or the maximum of one lodging unit per one acre in the coastal areas.

- Environmental best practices should be followed by proposed ecolodges in all aspects: the development process, the design, implementation, and operational phases, including waste management, recycling, and energy use.

- Pre-existing settlements of local people.
- Animal grazing.
- Pre-existing mining activities.

See Annex C for specific suggested regulations for the transition/ecotourism zone.

### 7.3.2 Excluded Uses

- Hunting and disturbing wildlife.
- Collecting or damaging natural resources.
- New mining activities.
- Traditional development activities.

### 7.3.3 Other Restrictions

- Visitation only with EEAA authorization inside park boundaries or with TDA authorization outside park boundaries.
- Authorizations for activities and facilities inside the park by EEAA and TDA; and by TDA for activities and facilities outside park boundaries.
- Approval of ecolodges inside park boundaries by EEAA and TDA, and by TDA for ecolodges outside park boundaries.

### 7.3.4 Development

Net Density: 5 to 7% of ecolodge site, in accordance with the area designated for development and its natural features

Height: 1 to 2 floors.

Lot Size: Maximum 200,000 square meters.

Setback: 200 meters from highest high-level water mark.

## 7.4 LOW INTENSIVE DEVELOPMENT ZONE (COASTAL ECO-RESORT ZONE)

---

Only restricted development is allowed in this zone. The areas adjacent to the Wadi El Gemal-Hamata Protected Area, including Ras Hankorab and south Marsa Umm El Abbas, are designated low intensive development/coastal eco-resort zones in the zoning scheme.

### 7.4.1 Permitted Uses

- One to two story eco-resorts.
- Restaurants and shops.
- Bird watching centers.
- Dive and aqua centers.
- Theme parks.
- Recreation facilities.
- Infrastructure.
- Community services.
- Maintenance facilities.
- Traditional uses of local Bedouin.
- Handicrafts centers and exhibitions.

### 7.4.2 Excluded Uses

- Non-sustainable, non-productive, or environmentally destructive activities and facilities.
- Heavy industry.
- Mining.

#### 7.4.3 Other Restrictions

- All significant vegetation must be preserved.
- Topographical features greater than 5 meters in height may not be altered without special permission.
- Land movement must be minimized and not produce erosion.
- Natural drainage must be maintained.
- A beach walk must run parallel to coastline in all hotel and commercial areas, and public beach access maintained.
- A strategic environmental impact assessment will be required for each IDC in low intensive development zones.
- Master plans for IDCs must provide for beach access corridors not less than 25 meters wide at 1000 meter intervals.
- No lodging facilities are permitted on coastal strip areas fringed by shallow reef flats inadequate for swimming or with access only to deep water subject to high-energy wave action.
- Building and road access may not alter existing contours by more than two meters.
- Total cut and fill must be equal.
- No individual building block may have a dimension greater than 30 meters.

#### 7.4.4 Development

Net Density: Resorts: maximum 10 %. Other: Per IDC master plan.

Height: 1-2 floors maximum.

Lot Size: Hotels: 250,000 square meters. Other: Per IDC master plan.

Setback: 200 meters from highest high-level water mark.

### 7.5 MODERATE INTENSIVE DEVELOPMENT ZONE

---

This zoning category indicates a normal development zone for traditional resort development and other compatible uses with variable building densities and height development standards in accordance with an approved master plan for each IDC.

#### 7.5.1 Permitted Uses

- Hotels.
- Multi- and single-family residences.
- Residences.
- Restaurants.
- Dive and aqua centers.
- Shops.
- Theme parks.
- Recreation facilities.
- Infrastructure.
- Offices.
- Community services.
- Maintenance facilities.
- Agriculture.

#### 7.5.2 Excluded Uses

- Heavy industry.
- Mining.

#### 7.5.3 Other Restrictions

- Construction within small wadis must be temporary or flood protected.
- No construction will be allowed in the areas subject to high and moderate risk floods.
- All significant vegetation must be preserved.
- Topographical features greater than 5 meters in height may not be altered without special permission.

- Land movement must be minimized and not produce erosion.
- Natural drainage must be maintained.
- A beach walk must run parallel to coastline in all hotel and commercial areas, and public beach access maintained.
- Master plans for IDCs must provide for beach access corridors not less than 25 meters wide at 1000 meter intervals.
- No lodging facilities are permitted on coastal strip areas fringed by shallow reef flats inadequate for swimming or with access only to deep water subject to high-energy wave action.
- Building and road access may not alter existing contours by more than 2 meters.
- Total cut and fill must be equal.
- No individual building block may have a dimension greater than 30 meters.

#### 7.5.4 Development

Net Density: Hotels within 500 meters of sea: 12 % Other: Per IDC master plan.

Height: 1 floor maximum, generally, and within 200 meters of setback.  
2 floors for the next 200 meters.  
3 floors more than 400 meters from setback.

Lot Size: Per IDC master plan.

Setback: 100-200 meters from highest high-level water mark.

### 7.6 SPECIAL DEVELOPMENT ZONES

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Special development zones are areas requiring special consideration such as Gebel Dorry, the nearby hills, the ridge north of Sharm El Foqiry, the municipalities of Abu Ghusun and Hamata, and the Bedouin settlement of Qulaan.

Action plans will be needed for these special development zones to identify zoning codes, evaluate land uses and regulations for these areas on a case-by-case basis, and strengthen their relationship with Land Use Management Plan. The action plans of the special development zones will provide direction for the location and scale of uses and development on the coastal strip by restructuring coastal settlements (Abu Ghusun, Qulaan, and Hamata), identifying activity nodes, and protecting the essential character of coastal scenic landscape.

The purpose of the special areas action plans is to provide a model for the establishment, management, and appropriate use of these special areas, in order to achieve the following objectives:

- Maintain and restore the unique natural features and landmarks of the coastal area.
- Provide landmark points and nodes of development.
- Involve the indigenous people in the development process.
- Bring the uses of land areas under the municipalities more in line with the Land Use Management plan.
- Enhance integration across governmental jurisdiction boundaries (TDA, EEAA, RSG) by coordinating the action plans with planning schemes at the local, sector, and regional levels.
- Protect representative examples of natural landscapes and ecosystems and restrain the construction of large structures.
- Identify the quality and quantity standards and concrete specifications that must be complied with and satisfied to enhance the development and management of these areas.

TABLE 13. ZONING REGULATIONS

Zone	Core Zone (Absolute Reserve Areas)	Buffer Zone (Restricted Wilderness Areas)	Transition Zone / Flat & Mountain (Ecotourism Zone)	Low Intensive Development Zone (Coastal Eco-Resort Zone)	Moderate Intensive Development Zone	Special Development Zones
<b>Description</b>	Very high sensitivity areas that could be easily disturbed such as: - Wadi El Gemal. - All mangroves, and their salt flats (Ras Baghdadi, Sharm El Luli, Qulaan, Hamata, and Wadi Lahmi). - The archaeological site of Marsa Naqari. - The turtle nesting area of Marsa Umm Al Abbas - Offshore islands..	Highly sensitive areas such as: - The areas around the core zone with depth not less than 500 m. - The wadi floor of Wadi Umm El Abbas, Wadi Ercour, Wadi Ghadir and Wadi Al Ringa. - The salt marsh of Marsa Umm El Abbas. - This zone would offer visitors a fairly structured experience with on site interpretation and education.	Moderately sensitive peripheral areas including: - The watersheds of Wadi Ghadir, Wadi El Gemal, and Wadi Lahmi - All intermediate and small wadis. - The coastal plains near Sharm El Luli, Marsa Umm El Abbas, and the Hamata mangroves. - Enclosed sand plains (sahl).	Eco-resort development zones with low intensive development adjacent to Protected Areas including Ras Hankorab and south Marsa Umm El Abbas.	Moderately intensive resort development zones between the shoreline and the base of the coastal mountain range.	Development zones requiring special consideration such as Gebel Dorry, the nearby hills, the ridge north of Sharm El Foqiry, the municipalities of Abu Ghusun and Hamata, and the settlement of Qulaan..
<b>Permitted Uses</b>	- Scientific research. Low impact ecotourism visitation. - Resource management facilities.	- Low impact ecotourism activities. - Traditional uses of indigenous Bedouins. - Primarily accommodates four-wheel drive experiences. - Mobile camps. - Hiking & nature walk trails. - Emergency services.	Resource management and ecotourism activities and facilities such as ecolodges, visitor centers, bird watching facilities, eco-stations, pre-existing settlements, animal grazing, authorized mining.	One to two story environmentally friendly resorts, restaurants, dive centers, shops, theme parks, bird watching centers, handicraft centers, recreation facilities, and infrastructure.	-Hotels, multi-family and single-family residences, restaurants, dive centers, shops, theme parks, recreation facilities, and infrastructure. -Offices and community services, maintenance facilities, agriculture, and silva culture	As determined by specific plans.
<b>Excluded Uses</b>	All other activities and facilities including permanent lodging, mining, and animal grazing. Off-trail use of the park is prohibited.	All other activities and facilities including permanent lodging, mining, and animal grazing.	All other activities and facilities, new mining activities.	Heavy industry, mining.	Heavy industry, mining.	As determined by specific plans.
<b>Net Density (Max Land Coverage / lot)</b>	N/A	N/A	Ecolodges: 5% to 7%.	Hotels: maximum 10 %. Other: Per IDC master plan.	Hotels within 500 meters of sea: 12%. Other: Per IDC master plan.	As determined by specific plans.
<b>Height Restrictions (Maximum)</b>	N/A	N/A	1-2 floors.	1-2 floors.	1-3 floors.	As determined by specific plans.
<b>Lot Size (Minimum)</b>	N/A	N/A	200,000 square meters.	-Hotels: 250,000 square meters. -Other uses: per IDC master plan.	Per IDC master plan.	As determined by specific plans.
<b>Other Restrictions</b>	- Number of visitors is limited and monitored -Visitation only with authorization, and accompanied by guide or park rangers. - The guide-to-group size ratio does not exceeds 1/10 - Authorized vehicles only. Visitation subject to suspension, seasonal/temporary. - All authorizations by EEAA. - No new paved roads except the proposed road.	-No new paved roads accept the proposed road. -All authorizations by EEAA.	-Visitation authorized by EEAA inside park boundaries, TDA outside park boundaries. -Authorizations for activities, facilities, and ecolodges inside the park by EEAA and TDA, and by TDA outside park boundaries.	-All authorizations for land allocation and development control by TDA.	As determined by specific plans prepared by TDA.	As determined by specific plans.



## **Annexes**

## **Annex A**

### **MAPPING METHODOLOGY**

Different resources have different abilities to accommodate various tourism activities. Identifying the most sensitive resources or key resources of the planning area is an initial step in insuring provision of appropriate types and levels of tourist uses.

Specific actions are needed to identify sensitive resource boundaries in the planning area. Using standard mapping and GIS technology, the abiotic and biotic factors responsible for sensitive resource distribution are identified, and the condition and trends of selected sensitive resources are assessed. Sensitivity mapping plays a vital role in implementing management actions necessary to protect and restore sensitive communities.

The sensitivity mapping includes main three steps for assessing the resources sensitivity of the planning area:

1. Collect the data of the existing conditions for each resource as a separate GIS layer.
2. Subdivide the planning area into homogenous natural sub-zone/habitats through combining all layers of the natural resources.
3. Classify the sub-zones/habitats based on ranges of weighted values. The grades of sensitivity are evaluated as having low, medium, high, and very high sensitivity to tourism use and ranked by subject matter experts (based on professional judgment).

### **Collection of Data**

Preparing maps of the existing conditions was the first step towards the preparation of sensitivity maps and the Land Use Management Plan. These maps utilized as their principal basis the 1/50,000 scale maps of the Egyptian General Survey Authority (EGSA) and satellite imagery. In addition, observations from extensive fieldwork, reference to original photographic documentation, and GPS readings were utilized to compensate for the limitations of the scale.

The TDA lands between Marsa Alam and Wadi Lahmi were surveyed principally with respect to the conditions of their natural resources, categorized as follows:

- Shoreline habitats
- Biotic resources
- Abiotic resources
- 

In addition to information on these natural features, the maps indicate the following:

- Sheltered areas suitable for piers and anchorages.
- The approximate location of all types of existing structures including archeological sites, military posts, hotels, and private dwellings.
- The points where photographs were taken during the fieldwork.
- The location of the survey stations of the GEF study.
- The accessibility for shore dives along the coast.

Background information, as well as the methods of data collection and presentation, is summarized in the sections that follow.

### **Shoreline Habitats**

Prediction of the tourism development impact on the shoreline habitats of the planning area is based on an understanding of the dynamics of the coastal ecosystem, not just the substrate type and grain size. The vulnerability of a particular inter-tidal habitat is an integration of the following factors:

- Shoreline types/components (morphology and texture): substrate, grain size, origin, and width.
- Exposure to wave and tidal energy.
- Biological diversity, productivity, and sensitivity.
- Tidal elevation zones: vertical reference levels of supra-tidal, inter-tidal, and sub-tidal.

All of these factors are used to determine the relativity of inter-tidal habitats. Key to the sensitivity ranking is an understanding of the relationships between physical process, substrate, shoreline type, product type, fate and effect, and sediment transport pattern. These concepts have been used in the development of the sensitivity mapping, which ranks

shoreline environments in terms of their relative sensitivity to tourism development.

The list below includes the shoreline habitats delineated for the shoreline of the planning area:

- Eroding ridges
- Fine grained, medium-to coarse sand beaches
- Mixed sand and gravel beaches
- Gravel beaches
- Rocky beds
- Exposed tidal flats
- Sheltered tidal flats

## **Biotic Resources**

Information collected and depicted on the maps denotes the key biological resources that are most likely at risk from tourism development. Seven major categories of biological resources were considered during production of the maps: marine mammals, terrestrial mammals, birds, reptiles, fish, shellfish, and habitats.

Spatial distribution of the species on the maps is represented by polygons, lines, and points as appropriate. Associated with each of these representations is an icon depicting the types of plants or animals that are present. Species have been divided into groups and subgroups based on their behavior and taxonomic classification. The icons reflect this grouping scheme. The groups are color coded, and the subgroups are represented by different icons as shown on the legend.

### **Terrestrial Habitats**

- Wadis and terrestrial vegetation
  - Downstream
  - Midstream
  - Upstream
  - Side tributaries
  - Phytogenic mounds
- Littoral salt and brackish water marshes
- Mangrove swamps
- Coastal plain (sand flats, gravel beds, gentle slopes)
- Rocky mountains and rugged lands (sedimentary and fire rocks)

### **Terrestrial Species**

- Terrestrial mammals
- Reptiles
- Birds
  - Diving birds
  - Gulls and terns
  - Raptors
  - Shorebirds
  - Wading birds
  - Waterfowl

### **Marine Habitats**

- Tidal zone (supra-tidal, inter-tidal, sub-tidal)
- Fringing, patch, and pillar reefs
- Sea grass beds
- Sea sand beds
- Open sea

### **Marine Species**

- Marine mammals
  - Dolphins
  - Dugong
- Fish
- Shellfish
  - Bivalves
  - Cephalopods
  - Crabs
  - Gastropods
  - Lobsters
- Reptiles
  - Turtles

## **Abiotic Resources**

Information collected and depicted on the maps denotes the key abiotic features that represent the natural heritage and visual image of the planning area and are most likely at risk from tourism development. Four major categories of abiotic features were considered during production of the maps: Geologic features, geomorphologic features, hydrology/water resources, and surface soil.

### **Geologic Features**

- Geologic sequences, phenomena
- Geologic formations and deposits
- Mineral resources
- Outcrops

### **Geomorphologic Features**

- Wadis
  - Main wadis
  - Secondary wadis
  - Shallow short wadis
  - Catchment basins
- Coastal plain
  - Sand flats
  - Gravel plains
  - Mixed sand/gravel plains
  - Coastal plateaus
  - Coastal rugged lands
  - Sand accumulations
- Mountains
  - Steep slopes/terraced areas
  - Cliffs
  - Rocky mountains
  - Rugged lands

### **Hydrology/Water Resources**

- Catchment basins
- Drainage patterns
- Flood discharge
- Flood hazards

### **Surface Soil**

- Sandy soil
- Sand/gravel soil
- Gravel soil
- Sabkha/salty soil
- Rocky soil



## **Annex B**

### **SUGGESTED REGULATIONS FOR PROTECTION OF NATURAL RESOURCES IN THE CORE ZONE**

#### **Protection of Flora and Habitats**

- No disturbance to the local environment, including vegetation, natural water flows, drainage patterns, sediments, landscapes, and cultural heritage sites.
- Disturbed or damaged areas are rehabilitated to restore ecological processes.
- Walking through vegetation or on fragile soils like those in mangrove swamp areas is prohibited.
- All endangered species are protected.
- Foreign species of plants or animals must not be introduced into the core zone areas.

#### **Wildlife (Fauna) Protection**

- Hunting is prohibited in the core zone areas.
- All endangered species are protected.
- Visitors are not allowed to surround animals or birds.
- Visitors must remain alert to avoid getting between animal/bird parents and their young or isolating one individual from its group.
- Visitors must be cautious to maintain appropriate distances from animals, allowing for adequate escape distances, which vary according to the animal.
- Disturbing wildlife in any way is prohibited, including touching, feeding, chasing, capturing, hunting, or selling.
- Introduction of foreign species is prohibited.
- Visiting breeding sites during breeding seasons must be avoided.
- All visitors must stay on the periphery of bird assemblages.
- Visitors must approach wild animals and birds slowly and quietly, and avoid sudden movements.
- All visitors must respect the buffers and boundaries indicated around the core area sites.
- Nestlings should be viewed only through binoculars or telescopes at considerable distance from the nest.
- Photography of birds should never include the removal of nestlings or young from the nest or removal of foliage or camouflage from close to the breeding site.
- Removal of animals from burrows, dens, caves, or tree cavities must be prohibited at all time
- Relentlessly following or harassing birds for the sake of a photograph is not allowed. Linger obtrusively in close proximity to a nesting site, or preventing birds from returning to the site, are both forbidden.

#### **Transportation and Trails**

- Motorized vehicles of all types (including motorized boats) are restricted in the core zone areas and limited to permitted vehicles only.
- Walking is encouraged, or other forms of minimal-impact transportation, such as horses, donkeys, or camels.
- Designated trails must be followed, and will be clearly marked and color coded.
- No construction of highways, asphalt roads, or other motorways will be allowed in core areas.
- All trail networks within core areas will respect wildlife movement patterns and habitat requirements as well as location, growth, and expansion patterns of local flora.
- Natural trails should be clearly delineated in order to contain tourists in controlled areas only.
- The width of the trails should not exceed 5 meters within core areas. Wider trails become veritable barriers for wildlife mobility and also mar the natural landscape.
- Natural permeable materials will be utilized in the construction of the trails. Using low impact and low profile techniques is desirable.
- Smaller footpaths to designated points of interest will branch off the main trails. Each path will require initial surveying to comply with the general regulation of not disturbing wildlife movement and growth patterns.
- All main trails should incorporate appropriate buffer zones between the trail tread and nearby sensitive resources.

**SUGGESTED REGULATIONS FOR THE TRANSITION ZONE (ECOTOURISM ZONE)****Land Allocation**

- Land allocation for this zone will be based on large concession areas for a fixed period to ensure the suitable use and management of the natural resources.
- The allocated areas for each concession will be not less than 2 million square meters.
- The concession area may include parts of the buffer and transition zones. The boundaries of the concession are primarily determined by the physical features of the site, with the aim of each site representing a natural unit.
- Core areas can be part of the concessions but will be managed by protectorate staff rangers as a part of the patrolling system of the protectorate.
- Each concession applicant must submit in its technical documents plans for the interpretive themes and services the applicant will offer to visitors. Information used for interpretive materials must be relevant and appropriate to the site and audience, and verified as accurate by references to credible sources.
- The natural resource characteristics and the history of the area should determine the interpretive themes presented at the site. These themes, in turn, should determine how the story of the mountains, wadis, reefs, flora, fauna, the local community, and the site history is told and what type of interpretive media, exhibits, and personal services are most appropriate.
- Visitors would have the opportunity to gain a new awareness and understanding of the resources of the concession areas.

**Facilities**

- Facilities for the convenience of visitors such as parking areas, restrooms, picnic areas, and campgrounds may be located near a feature but not so close as to detract from a feature or its setting.
- Visitor services such as campgrounds, trails, stores, restaurants, eco-services stations, etc. should be located in reasonably attractive surroundings where the services available will assist in enjoyment of the natural features. Such areas should not occupy or encroach upon outstanding natural features.
- The protected area management compound and other purely service establishments should be sited where the buildings and activities can be completely concealed.
- A self-guided trail brochure will be distributed at all visitor entrances. This brochure can be used in association with an improved way-finding system to ensure that trail users have the opportunity to plan their stay and move through the area with ease. The brochure will interpret prominent or representative examples of key natural and cultural resources that can be viewed or experienced along trails.

**Lodging Facilities**

The ecolodges in this area must meet the following criteria:

- Site location of the ecolodges must be set at least 150 meters away from the nearest water drainage patterns and from the boundary of the buffer zone.
- The number of rooms per ecolodge is determined by the concession area it serves. The number of rooms should not exceed 50 per million square meters in the back areas or a maximum of one lodging unit per acre in the coastal areas. The maximum number of rooms per ecolodge is 50.
- Buildings should utilize local construction techniques, recycled or locally produced materials, local craftsmen, and cultural images wherever that approach is environmentally sound. Structures and buildings must be painted in colors that do not sharply contrast or conflict with the landscape.
- Building forms should be in harmony with the natural environment.
- Building practices should respect local cultural standards and morals.
- Involvement of local inhabitants should be encouraged to provide input for the designer as well as a sense of ownership and acceptance by local residents. The number of local employees must not be less than 25% of the total staff.
- Low-tech design solutions should be used wherever possible as well as solar or alternative energies.
- Some form of environmental education must be provided.
- Part of profits should be allocated to local conservation efforts (not less than .5%).

- Wastewater should be recycled.
- Locally grown and produced foods and beverages should be served.
- Handicrafts of local artisans should be displayed and/or sold.
- External lighting should be kept to the minimum needed for orientation, security, and safety.

#### **Transportation and Trails**

- Vehicles must be painted in colors that do not sharply contrast or conflict with the landscape.
- A series of pedestrian trails should be created off the main multi-use trails to facilitate a slower-pace and more intimate experience with the area's resources and to reduce the number of encounters with other user groups. The trail system must follow existing and old nomadic movement patterns. Trail widths should accommodate a mixture of hikers, equestrians, and nature walkers. Trails should be carefully designed to avoid adversely affecting sensitive resources. A demonstration trail in the transition zone should be implemented and monitored to determine the success of this concept, as measured by public satisfaction, interest, and the outcome of resource monitoring studies. The following are preliminary regulations that would be expanded and refined.
  - Educational signs at intersections of the main trails must be provided, explaining the concept of the loop trails and the sensitivity of the resources.
  - Where trails do not exist, creating new trails must be approved by both EEAA and TDA.
  - Using steps, rocks, or native vegetation to mark transitions from the main trail to the sub-trails is desirable.
  - A tread width of 1 meter or less, commensurate with a slower moving pedestrian experience, is desired.
  - No obtrusive signs will be allowed, only signs that are low to the ground and constructed of natural materials.
  - A program to monitor the impact of the trails on the condition of sensitive resources must be instituted and reports submitted on a regular basis to EEAA and TDA for review.
  - The trail network must be simply marked with painted rocks following a color-coded mapping system.
  - Information, special advice, and instructions must be mentioned in the ecotourist guide brochures. Maps and directional signs at the beginning of the main trails and footpaths for self-guided tours should indicate horseback, camel trekking, or hiking trails as well as the length of the trail and the average time it takes to walk its full length. In addition, certain footpaths should be marked for experienced walkers only, and other instructions such as carrying sufficient water and wearing suitable shoes, should also be given.
  - Pre-planned underwater trails designed to minimize environmental impacts must be provided for snorkelers and divers.