MOBIS Task Order No. 263-M-00-03-00002-00

U.S. Agency for International Development

Program Support Unit

Egyptian Environmental Policy Program

Fisheries Management Plan for the Red Sea

BY

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Photo of Grouper by Mike Colby

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Washington, DC

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Acronyms and Abbreviations

ARTFISH	Acronym for software developed by the FAO
E	east
EEAA	Egyptian Environmental Affairs Agency
EEPP	Egyptian Environmental Policy Program.
FAO	Food And Agriculture Organization (of the UN)
FLD	Fishermen License Database
FMC	Fisheries Management Committee
FVLD	Fishing Vessel License Database
FVRD	Fishing Vessel Registration Database
GAFRD	General Authority for Fish Resources Development
GEF	Global Environmental Facility (of the UN)
hp	horsepower
kg	kilogram
km	kilometer
LE	Egyptian Pound(s) (currency)
m	meter(s)
MCS	Monitoring, Control, and Surveillance
mm	millimeter(s)
MSEA	Ministry of State for Environmental Affairs
N	north
PSU	Program Support Unit
UN	United Nations
UNCLOS	UN Convention of the Law of the Sea

Summary

This report is an overview of the current status of fisheries in the area between Hurghada and Ras Banas on the Red Sea. It provides information to assist in predicting the environmental consequences of fishing in the study area and to develop a proposed management plan to alleviate the detrimental effects of this activity on the marine environment.

Field visits to 21 landing sites in the study area were made where fishermen and Coast Guard personnel were interviewed. Published scientific studies and local and national experts provided part of the presented data.

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

- Official fisheries statistical data
- Landing sites
- Fishing fleet and fishing gears
- Catch and target species
- Nursery grounds
- Fishermen
- Wadi el-Gemal–Hamata protected area
- Fish handling and marketing
- Fisheries legislation.

The spatial distribution of fishing activities per fishery as well as important nursery and spawning areas are illustrated on maps that follow the text.

The local administration faces difficulty in trying to collect accurate data on fisheries due to the mobility of the fleet, with a relatively large number of boats moving through different areas at different times. The government lacks both trained enumerators and the transportation facilities to provide complete data. In addition, there are a considerable numbers of amateur fishermen scattered along the coast, so available data does not include the actual landed quantities of fish. Tourist boats are known to fish as well, creating conflicts between tourist boats operators and professional artisan fishermen as they compete on the same fishing grounds.

Hurghada’s fishing port, Sakala, is considered to be distinct landing site, with Safaga’s port lying further south. The fishing fleet operating in the study area is composed of 9

purse-seiners and 420 deck boats with inboard or outboard engines. The principal artisan fishing methods are hand lining, long-lining, gill nets, and trammel nets. In the south protected area, gray mullet are fished using veranda nets.

Fishermen coming from Fayoum Governorate have introduced illegal gill nets called *sabeeb*, which have a smaller mesh size than the stipulated minimum size. They also use ring nets on the coral reefs that cause serious damage.

The main fishing grounds are concentrated in the northern protected area of the study area along the coast and around the Hurghada Islands. Small fishing grounds scattered southward are mainly fished using hand and long lines.

All habitats are being fished, including coral reefs, hard substrate, soft bottoms, mangroves, and deep water. The study area fisheries are dominated by reef fishing. Purse-seiners and artisan vessels operate in the vicinity of the Hurghada Islands and along the coast, landing pelagic species. There is a marked difference in the catch down the coast, due primarily to different habitats, but also due to the different gear used.

Twenty-three nursery grounds were identified within the study area. Seventeen of them are threatened by the fishing and tourism activities. Two mangrove nursery grounds are located in the marine park, but are being used for animals grazing. The remaining four nursery grounds are not being used for any activities. Serious action should be taken to protect and conserve the nursery grounds.

Fisheries resources in the study area are targeted by three groups: local fishermen, migratory fishermen from other governorates, and visitor fishermen from the Nile Delta who operate purse-seiners in fishing season, then return to their home villages. Traditional local fishermen are increasingly leaving for more lucrative opportunities in tourism, working in the diving industry or in hotels. Newcomers who replace them have less knowledge about the local ecology and use unsustainable fishing practices. This has led to an increase in habitat destruction from net damage. Traditional local fishing knowledge is being irreversibly lost.

The Wadi el-Gemal–Hamata protected area includes three landing sites:

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

Fisheries are governed by laws that dictate the terms and conditions under which fishing activities may take place and provide for the protection and conservation of living marine resources. Regulations (or bylaws) set out details concerning fishing activities and

restrictions that apply. Unfortunately, most laws do not have the strength and clarity needed for effective management or for monitoring, control, and surveillance (MCS). Penalties for infringements are frequently far too low, undermining respect for management and control, since there is minimal deterrence. Licensing systems are often inadequate and poor coordination between governmental bodies results in overlapping responsibilities and jurisdictions for the implementation of legislation for the marine environment and coastal zone.

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

- Registering fishing vessels
- Licensing fishermen
- Licensing fishing vessels
- Recommending regulatory measures for targeted species and Sea Cucumbers
- Improving data collection systems for monitoring and assessment.

Finally, the report identifies steps to be taken to put the Management Plan into action.

1. Introduction

Within the Egyptian Environmental Policy Program (EEPP), the Program Support Unit (PSU) provides technical assistance to the Egyptian Environmental Affairs Agency (EEAA) in the Ministry of State for Environmental Affairs (MSEA). The PSU also has certain cross-cutting functions related to helping the EEPP as a programmatic whole. To help it fulfill its role, the PSU sought the services of two specialists in order to describe the present status of the inshore and offshore fisheries from Hurghada to Ras Banas with particular focus on the proposed Wadi el-Gemal protected area.

Dr. Ahmed Barrania and Dr. Ashraf Ibrahim were nominated to perform the following tasks over a period of 3 months:

- **Task 1—Field surveys and data gathering** (undertaken by Dr. Ashraf Ibrahim). The task consists of fieldwork and desktop study to:
  - List the most recent fishing landing information for the study area.
  - Summarize current Egyptian fisheries legislation and regulations pertaining to the Red Sea, with emphasis on reef-based fisheries.
  - List and describe the types of fisheries (defined according to gear type, habitat fished, and whether fishermen were local or visitors).
  - List primary target species.
  - Illustrate the spatial distribution of fishing activity, per fishery in the study area.
  - Illustrate important nursery and spawning areas as indicated by the fishermen.
  - Estimate the temporal distribution of fishing activity per fishery.
  - Estimate the approximate number of fishermen and boats per fishery.
  - Describe the incidence of Dugong and turtle by-catch.
  - Describe the incidence of destructive fishing techniques.
- **Task2—Report preparation and management recommendations** (undertaken by Dr. Ahmed Barrania). This included analysis and description of the fieldwork results and preparation of a fisheries management plan.

Objectives

The objective of this report is to present an overview of the current status of fisheries in the study area and to provide information to assist the PSU–EEAA and their EEAA partners to predict the environmental consequences of fishing in the study area. Further, management actions to alleviate the detrimental effects of this activity on the marine environment are proposed.

Study Area

The study area focused on the coastal and near shore marine areas on the Egyptian side of the Red Sea and the area's seasonal fishing grounds, as shown in map 1, appendix 1. It spanned a distance of about 520 kilometers (km) between 60 km north of Hurghada (Gemsha) and north of latitude 23°. This includes the Wadi el-Gemal protected area. For the purposes of this report the study area has been divided into four sectors as shown in map 2, appendix 1. These are:

1. Sector I extends from north of Hurghada to south of Om el-Hoitata, including six landing sites: El-Ahiaa, El-Dahar, Hurghada fishing port, Safaga, Safaga Port, and Om el-Hoitata, as shown in map 3, appendix 1.
2. Sector II extends from El-Gweeh, north of latitude 26.20 to Sharm el-Kebly, north of latitude 25.50, and includes four landing sites: El-Gweeh, Quseir, Sharm el-Bahary, and Sharm el-Kebly, as shown in map 4, appendix 1.
3. Sector III extends from Marsa Umm Gheg to Marsa Alam, and includes four landing sites: El-Shekh Malak, Marsa Umm Gheg, Marsa Alam (old jetty), and Marsa Alam Port, as shown in map 5, appendix 1.
4. Sector IV extend from 24 km south of Marsa Alam to Ras Banas, including seven landing sites: Kilo 24, South Marsa Alam, Sharm el-Loly, Cul'an Village and Hamata Port, Sataieh, Ras Banas 1, and Ras Banas 2, as shown in map 6, appendix 1.

Three landing sites (Sharm el-Loly, Cul'an Village, and Hamata Port) are located within the Wadi el-Gemal Protected Area.

Gathering Local Data

Dr. Ashraf Ibrahim and Mr. Salah Soliman PSU Community Consultant spent 18 days visiting 21 landing sites within the study area. They interviewed fishermen, community leaders, and Coast Guard personnel, asking about the fisheries and fishing operations. Specific questions elicited information about fishing gear, fishing boats, the number of fishermen in each area and their origins, fish species targeted, estimates of the catch, fishing grounds, nurseries, and spawning areas.

National data was obtained from relevant authorities and experts and from previously published scientific reports.

2. Background

The Red Sea coast is about 780 km in length and extends from the southern protected area of the Gulf of Suez to the Egyptian–Sudanese border. It has an average width of approximately 240 km. Because of the presence of coral reefs, fishing takes place in grounds ranging from a low of 3–5 square miles in area to a high of 10–15 square miles. Such large areas are transit regions for many species during specific seasons.

Most of Egypt's Red Sea coast is bordered by more or less flat lands, 3–20 km wide, some of which can look like depressions (El-Mallaha). Behind these lands are the chain of Red Sea Mountains. They have some extensions along the coast.

Flat lands along the sea are normally a positive factor for good communications, which are essential for marketing fish over long distances. They are also interesting areas for the development of aquaculture in earth ponds. Protected bays resulting from coastal chains of mountains are interesting areas for aquaculture in floating cages.

There are seven islands adjacent to Hurghada: Giftun Keber, Giftun Saghier, Abu Mingar, Abu Ramada, Magawish Keber, and Magwish Saghier. This group lies 5-15 km from shore. The other, Safaga Island, lies approximately 5 km from Safaga.

This group of islands receives various types of pollutants from both sea and land based sources. A considerable amount of garbage, plastics, and tar balls can be found in shallow water all around the islands. There is a persistent threat of heavy oil from tanker traffic.

Fishermen in the Hurghada area catch both coral reef and pelagic fishes above the reefs around the islands.

The most important economic centers in the study area are:

1. Hurghada, the capital of the Red Sea Governorate. Its main activity is tourism and fishing. Hurghada was associated with the initial tourism boom that took place during the early 1980s, and is the main center associated with ongoing tourism developments.
2. Safaga is an important center for the extraction and export of phosphate from its commercial port. Tourism in Safaga lies mostly to the north of the urban settlement while the reef areas south of Safaga have good potential for dive tourism.
3. Quseir is an important mining center. Lately, there have been attempts to expand tourism and many tourism projects are being established.

The study area displays a wide range of habitats due to the coral reef systems with their complex and diverse associated fauna. Most are situated along the coast and surrounding offshore islands. Coral reefs play an important role in the coastal ecosystem, providing habitats for a wide variety of marine species. They also protect coastal lands from erosion and storm damage. Corals also create a protected environment for the development of coastal vegetation such as sea grasses and salt marshes. Mangrove systems contributing their high primary productivity to the ecosystems of the area and provide important nursery grounds for a wide range of marine and terrestrial fauna. Sandy beaches provide nesting grounds for sea turtles. Sea grasses constitute highly productive ecosystems where many species of living marine resources a abound. They provide important feeding ground for the marine turtle and many species of Sea Cucumbers that have begun to form the basis of a new and important artisan fishery in the area recently.

The socio-economic importance of fisheries to the rural communities in the area is significant. Fishing is dominated by small-scale, artisan activities. Such fisheries are, by their nature, notoriously difficult to monitor due to the large number of small craft, and the wide range of landing sites used. Reliable data in many cases are often difficult to obtain.

The area around Hurghada is intensively fished. It has the largest fishermen's cooperative society in the study area, with 691 members and more than 100 nonmember fishermen, but there are many other low intensity fishing communities spread through the area. The accelerated growth and expansion in urban coastal centers during the 1980s, coupled with a wide range of human activities—especially tourism and over fishing—have increased the risk of environmental degradation and depletion of fisheries resources.

Fish production activities in the Red Sea are regulated by the Fisheries Department in Hurghada, Red Sea Branch, affiliated to the Central Fisheries Department, Red Sea Region, located in Suez. Both departments are under the supervision of the General Authority for Fish Resources Development (GAFRD) in Cairo. The Hurghada Fisheries Department has four divisions: Statistics, Fishermen's Cooperatives, Fisheries, Marine Aquaculture, and Financial & Administrative Affairs.

3. Official Fishery Statistical Data for the Red Sea

GAFRD publishes fisheries statistics (monthly and annual yield, fishing vessels and gear, and number of involved fishermen) based on a database of information collected from official landing centers in Hurghada, Safaga, Quseir, Baranis, Shalatin, and Abou Ramad.

Fisheries Department in Hurghada

Under the supervision of GAFRD, the Hurghada office is responsible for collecting fishery statistics for the Red Sea. Twenty-two enumerators are involved in collecting data on species composition at main landing sites. These enumerators include five for Hurghada, two for Safaga, one for Quseir, six for Baranis, and four each for Shalatin and Abou Ramad in the south.

Effort data are taken from license allocations. The Fisheries Department maintains vessel registers on vessel specifications, gear, and license conditions. However, it was reported that many vessels in the southern protected area of the Red Sea coast are unlicensed.

Coast Guard authorities maintain data from fishing vessel logbooks completed by each boat's skipper with regard to ground fished and trip dates.

Official figures for landings in main sites are composed of recorded and unrecorded fish landings. The estimates of unrecorded fish catch include the catch taken by both artisan fishing boats and tourism boats. Unrecorded landings represent about 60 percent of the total landings of Hurghada, 95 percent of Safaga, 92 percent in Quseir, and 15 percent of the Baranis landings.

According to 2002's official estimates, the fish catch taken by tourism boats were about 5,400 tons in Hurghada, 300 tons in Safaga, 450 tons in Quseir, and 1,440 tons in Baranis.

Reports indicate that around 900 tourist boats fish in Hurghada, 50 in Safaga, 75 in Quseir, and 240 in Baranis. This situation creates a conflict between tourist boat operators and professional artisan fishermen as they compete on the same fishing grounds.

One of the problems facing the local administration in trying to collect accurate data on artisan fisheries is the mobility of the fleet, with a relatively large number of boats moving to different areas at different times depending on weather and availability of fish. Furthermore, due to the shortage of enumerators and transportation facilities, available data does not include the actual landed quantities. Another difficulty arises from the numbers of amateur, part-time fishermen scattered a long the coast.

Fish Production

Based on official statistics from the Fisheries Department in Hurghada, the estimated fish production taken from the study area was about 5,700 tons in 2002. This estimate excludes fish taken by tourist boats. The distribution of the landings by main fishing areas was as shown in table 1.

Table 1 2002 Fish Production by Landing

Fishing Area	Ton	%
Hurghada	3,000	52
Safaga	400	7
Quseir	1,800	32
Marsa Alam–Ras Banas	500	9
Total	5,700	100

Catch Composition

Composition of the landings in the Hurghada area was Parrotfish (*Scaridea*) 27 percent, Emperor (*Lethrnidae*) 20 percent, Grouper (*Serranidoe*) 18 percent, and Sea Cucumber (*Holothuriodea*) 17 percent. Other species represent less than 5percent each of the total landings. These include Red Mullet (Goat Fish), Sardinellas, and Tiger Fish.

Composition of landings in the Safaga area was Jacks (*Carangidae*) 34 percent, Emperor (*Lethrnidea*) 27 percent, Parrotfish (*Scarida*) 15 percent, Grouper (*Serranidae*) 13 percent, and Mullet (*Mugilidea*) 8 percent.

In the Quseir area, the landings consisted of Mullet (*Mugilidae*) 24 percent, Parrotfish (*Scaridae*) 19 percent, Grouper (*Serranidae*) 15 percent, Jacks (*Carangidae*) 11 percent, and Snapper (*Lutjandae*) 8 percent. Other species included Emperor (*Lethrnidae*) and Mojarras (*Gerridae*).

In the Ras Bans area, Mullet (*Mugilidae*), Mojarras (*Gerridae*), and Parrotfish (*Scaridae*) are the dominate species.

Many of the species are pictured in appendix 2.

4. Fieldwork Findings

Landing Sites

The locations of fishing landing sites are shown in the maps for each sector in appendix 1. The landing sites are listed in table 2 in decreasing order of size based on the number of fishing boats.

Table 2 Fishing Landing Sites

Major Landing Sites		Minor Landing Sites
(50–100 boats)	**(20–40 boats)**	**(Fewer than 20 boats)**
Hurghada Fishing Port (150)	Quseir (40)	Ras Banas 2 (17)
Safaga Port (100)	El-Ahiaa (20)	Om el-Hoitata (15)
El-Dahar (50)	El-Gweeh (20)	Sharm el-Loly (11)
Safaga (50)	Marsa Alam Old Jetty (20)	Marsa Umm Gheg (10)
	Marsa Alam Port (20)	Hamata Port (10)
		El-Sheikh Malak (6)
		Sharm el-Bahary (5)
		Cul'an Village (4)
		Sataieh (4)
		Ras Banas 1 (4)
		Sharm el-Kebly (2)
		Kils 24 South Marsa Alam (2)

Hurghada Fishing Port (Sakkala Port) is considered to be a distinct landing site. The Port of Sakkala is well located in a bay, has a100-meter quay, and serves the navy as well as fishing vessels. This site is the base for an important fishing fleet composed not only of small motorized units, but also of purse-seiners and trawlers, especially from Suez, that fish in the south in Foul Bay. A fuel store is located at the site, and ice and cold storage facilities are located 1 km distant. The existing slipway, of the sliding type, is a primitive structure.

Safaga Port is the largest Egyptian commercial Red Sea port as well as serving fishing vessels. Quseir landing site has a quay for fishing boats that fish the nearby islands and,

seasonally, southward. The other landing sites are simply beaching sites with no onshore facilities. Ice facilities are centered in Safaga and Quseir.

Table 3 shows the location of the landing sites.

Table 3 Location of Landings and Number of Boats in the Study Area

Landing Site	Position	Number of Boats
El-Ahiaa	17.06 N 33.46.22 E	20
Hurghada Fishing Port	13.51 N 33.50.41E	150
El-Dahar	15.42 N 33.49.08 E	50
Safaga Ferry	45.56 N 33.56.42 E	50
Safaga Landing Site	43.33 N 33.56.17 E	100
Om el-Hwitat	38.42 N 33.58.08 E	15
El-Gweeh	22.30N 34.07.58 E	20
Quseir Landing Site	06.12 N 34.17.07 E	40
Om Geish	43.01 N 34.33.12 E	10
Sharm el-Bahari	52.07 N 34.24.50E	5
Sharm el-Kably	50.48 N 34.25.43 E	2
El-Shekh Malek	43.51 N 34.32.36 E	6
Marsa Alam Old Jetty	05.05 N 34.53.04 E	20
Marsa Alam Landing Site	25.04.03 N 34.53.58 E	20
Kilo 24 South Marsa Alam	57.48 N 34.56.08 E	2
Sharm el-Looly	36.35 N 22.06 E	11
Wadi el-Kalaan	24.21.27 N 35.18.21 E	4
Hamata	17.52 N 35.22.06 E	10

Landing Site	Position	Number of Boats
Sataih	00.07 N 35.38.51 E	4
Ras Banas 1	23.55.20 N 35.45.55 E	17
Ras Banas 2	56.00 N 35.43.56 E	4

Fishing Fleet

The fishing fleet operating in the study area is composed of:

- **Purse-seiners**—These boats have a typical Mediterranean design, are 26–30 m in length, and are powered with inboard motors ranging from 300–450 horsepower (hp). They operate in the fishing grounds near the Hurghada islands by night during the dark of the moon. The vessels use butagaz lamps placed in two, 6-meter dinghies to attract the fish (10 lamps on each dinghy). Lamps are also placed on the seiner. When enough fish are concentrated under the light, the lamps are put on board a third dinghy and a ring net is cast to surround each dinghy. The ring net has its bag in the middle with the purse rope in two parts. The net is hauled on board by hand, starting with the two wings. Mesh size is 50-mm (stretch) on the wing and 18-mm in the bag. The mixed polyamide/steel ropes have a diameter of 30-mm and are hauled by trawl winch and are coiled in two parts on the deck. There are nine of these boats.

  During the fishing period of approximately 20 days each month, purse-seiners make a number of trips, each lasting from 3-4 days. It was reported that the catch per trip is about 6 tons. From 8 to 10 fishing trips are made per year.

  The crew numbers between 25–30 and are generally hired for one season or even just one trip in Alexandria or Suez.

- **Trawlers**—These boats operate in the same fishing grounds as purse-seiners. Since their use is not permitted in this area, their catch is not significant. Foul Bay is the main fishing ground for trawlers in the Egyptian Red Sea.

- **Artisan Boats**–This fishing fleet is composed of about 100 deck boats ranging from 10–15 m in length, with diesel inboard engines of 25–45 hp. In addition there are about 320 smaller deck boats ranging from 6–7 m in length, equipped with outboard engines of 20–40 hp. There are about 140 craft ranging from 6–7 m in length that are powered by sails and oars, and 3 large sailing boats between 15-18 m. long.

  The principal artisan fishing methods are hand-lining, long-lining, gill netting, and trammel netting. To a lesser extent, ring nets and *lambara* are used. In southern part of the study area, mullet are fished with veranda nets—vertical and horizontally floating nets. One original fishing method is developing along the Red Sea coast. Foot fishing

involves a group of 7–10 men wading out onto the coral reef table and catching fish with nets. The group travels by vehicle, which carries men, nets, and fish. Motorcycles are also widely used as a mean of transportation to the fishing grounds, especially among non-professional and part-time fishermen, especially in the Quseir region. A motorcycle is usually used to carry two fishermen to the fishing site along the shore, where they fish mainly for lobster and other species. They use torches to attract the lobster and a spear and prong with four to five points, to catch it.

Fishing Gear

The most important gear used is shown in appendix 3. Classifying fishing boats by fishing methods is not particularly accurate because the boats can use several times of gear. A purse-seiner can fish with a trammel net during the day, or with hand lines at anchor. It is presently impossible to know the exact proportion of the by-catch produced by these switches.

Fishermen coming from Fayoum Governorate have introduced illegal gill nets called *sabeeb*. These have a smaller mesh size than the stipulated minimum. They also use ring nets on the corals, which cause serious damage.

Artisan vessels fish all along the coast and a fishing trip may last from 1–15 days depending on the location of the grounds fished as well as type of boat and gear used.

Fishing Grounds and Habitats

Main fishing grounds are concentrated in the northern part of the study area, between 27.50 N and 27.20 N latitude along the coast and around the Hurghada Islands. Hand and long lines are the dominate fishing gear used, followed by entangle nets. Lesser fishing grounds are used by purse-seiners. Small fishing grounds are scattered southward and are mainly fished using hand and long lines and to lesser extent entangle nets and purse-seining. Maps 3–6 in appendix 1 show these grounds while map 1 illustrates the distribution of the main fish species by fishing grounds.

Fishing habitats include the coral reefs, hard substrates, soft bottoms, mangrove forests, and deep water. Table 4 breaks out fishing habitat by landing sites.

Table 4 Fishing Habitat by Landing Sites

Coral	Mangrove	Hard Substrate	Soft Bottom	Deep Water
El-Ahiaa	Sharm el-Bahary	El-Dahar	Hurghada Port	Hamats Port
Safaga	Sharm el-Kebly	Safaga Port	Ras Banas 2	
Quseir	Cul'an Village	Om el-Hoitata		
Marsa Umm Gheg		El-Gweeh		

Coral	Mangrove	Hard Substrate	Soft Bottom	Deep Water
Marsa Alam Old Jetty		El-Shekh Malak		
Marsa Alam Port				
Kilo 24 South Marsa Alam				
Sharm el-Loly				
Cul'an Village				
Sataieh				
Ras Banas 1				

Catch and Target Species

A breakdown of annual catch estimates based on fieldwork is presented. Catch estimates for the study area indicate that the annual landings have been about 2,400 tons. Except in the vicinity of Hurghada, fishing activity is less significant, more scattered and limited. Hurghada's three landing sites (Fishing Port, El-Ahiaa and El-Dahar) alone account for 80 percent (1,940 tons) of the study area's total catch.

Study area fisheries are dominated by reef fish landings. Purse-seiners operating in the vicinity of the Hurghada Islands as well as artisan vessels fish along the coast of the area for pelagic species. There is a marked difference in catches down the coast, due primarily to different habitats, but also to the use of different gear.

Tables 5, 6, and 7 illustrate the target species according to fishing gear used in the study area.

Table 5 Target Species Fished using Entangle Nets (Trammel, Gill, and Veranda Nets)

Family/ Species	English name	Local name
Belonidae (Needlefish) *Tylosurus choram*	Red Sea Houndfish	*Khirman*
Hemiramphidae (Halfbeaks) *Hemiramphus far*	Spotted Halfbeak	*Gambrour*
Holocentridae (Squirrelfish) *Adioryx caudimaculatus* *Flammeo Sammara*	Crown Squirrelfish Spotfin Squirrelfish	*Bosili Ahmer* *Bosili Abid*
Serranidae (Grouper) *Plectropomus maculates* *Plectropomus turuncatus*	Roving Grouper Squaretail Grouper	*Trad* *Nagel*
Priacanthidae (Bigeyes) *Priacanthus hamrur*	Goggle-eye	*Abo Sharara*

Family/ Species	English name	Local name
Haemulidae (Grunts)		
Plectorhynchus gaterinus	Blackspotted Grunt	*Tahmal*
Plectorhynchus schotaf	Minstrel	*Tahmal*
Sparidae (Progies)		
Rhabdosargus sarba	Yellowfin Bream	*Botit*
Acanthopagrus bifsciatus	Doublebar Bream	*Rhabag*
Diplodus noct	Arabian Pinfish	*Abo nocta*
Mullidae		
Parupeneus macronema	Longbarbel Goatfish	*Embera*
Parupneus forsskali	Forsskal's Goatfish	*Embera*
Parupeneus cyclostomus	Yellowsaddle Goatfish	*Embera*
Parupeneus rubescens	Rosy Goatfish	*Embera*
Mulloides flavlineatus	Yellowstrip Goatfish	*Embera*
Mulloides vanicolensis	Yellowfin Goatfish	*Embera*
Gerriedae (Mojarras)		
Gerres oyena	Slenderspine Mojarras	*Gasa*
Mugilidae (Mullet)		
Crenimugil crenilabis	Fringelip Mullet	*Arabi*
Scaridae (Parrotfish)		
Hipposcarus harid	Longnose Parrotfish	*Wareig*
Cetoscarus bicolor	Bicolor Parrotfish	*Abohomar*
Scarus sordidus	Bullethead Parrotfish	*Haridaswed*
Scarus genazonatus	Purplestreak Parrotfish	*Hafar*
Scarus ghobban	Bluebarred Parrotfish	*Farhodi*
Scarus psiltacus	Palenose Parrotfish	*Baid*
Acanthuridae		
Acanthurus sohal	Sohal	*Sohal*
Zebersoma veliform	Sailfin Surgeonfish	*Flafel*
Naso unicornis	Bluespine Unicornfish	*Raho (Abo karn)*
Siganidae		
Siganus rivulatus	Rivulated Rabbitfish	*Sigan*
Siganus argentus	Forktail Rabbitfish	*Shbigy*
Siganus luridus	Squaretail Rabbitfish	*Hrofy*

Table 6 Target Species Fished using Hand and Long Lines

Family/ species	English name	Local name
Belonidae (Needlefish)		
Tylosursus choram	Red Sea Houndfish	*Khirman*
Hemiramphidae (Halfbeaks)		
Hemiramphus far	Spotted Halfbeak	*Gambarour*
Holocentridae (Squirrelfishes)		
Adiryx caudimaculatus	Silverspot Squirrelfish	*Kahaia*

Family/ species	English name	Local name
Serranidae (Grouper)		
Cephalopholis argus	Peacock Grouper	*Nagel*
Cephalopholis miniata	Halfspotted Grouper	*Homrany*
Cephalopholis hemstikotos	Coral Grouper	*Kosher helf*
Cephalopholis oligostica	Vermilion Grouper	*Kosher helf*
Epinephelus faciatus	Blacktip Grouper	*Abololo*
Epinephelus microdon	Smalltooth Grouper	*Karna*
Epinephelus fascoguttatus	Brownmarbeled Grouper	*Fark karna*
Epinephelus summana	Summana Grouper	*Bagog*
Epinephelus malabaricus	Malabar Grouper	*Tween*
Epinephelus areolatus	Areolate Grouper	*Kosher tina*
Epinephelus chlorostigma	Brownspotted Grouper	*Fanoos*
Variola louti	Lunertail Grouper	*Sherifa*
Plectropomus maculates	Roving Grouper	*Nagel Ahmer*
Plectropomus truncatus	Squaretail Grouper	*Tarad Shaib*
Carangidae (Jacks)		
Carangoid bajad	Orangespotted Jack	*Biad*
Carangods fulvoguttatus	Yellowspotted Jack	*Salikh*
Caranx melampygus	Bluefin Trevally	*Girm baiad*
Caranx sexfaciatus	Bigeye Trevelly	*Baiad*
Lutjandae (Snapper)		
Lutjanus flaviflamma	Dory Snapper	*Herby*
Lutjanus bohar	Twinspot Snapper	*Bohar*
Haemulidae (Grunt)		
Plectorhynchus gaterinus	Blackspotted Grunt	*Katreen*
Plectorhyncus pictus	Painted Grunt	*Shataf*
Lethrnidae(Emperor)		
Lethrinus elongates	Longnose Emperors	*Khirmy*
Lethrinus variegates	Variegated Emperor	*Dreeny*
Lethrinus lentjan	Redspot Emperor	*Khomkhom*
Lethrinus ramak	Yellowstripe Emperor	*Bongoz*
Lethrinus mahsena	Mahsena	*Mehsena*
Lethrinus nebulosus	Spangled Emperor	*Shoor*
Monotaxis grandoculis	Bigeye Emperor	*Aboeen*
Sparidae (Progies)		
Acanthopagrus bifasciatus	Doublebar Bream	*Rabag*
Spyraenidae (Burracudas)		
Sphyraenae barracuda	Great Barracuda	*Kenaya*
Sphyranae putnamiae	Chevron Barrcuda	*Ogaam*
Balistidae (Triggerfish)		
Pseudobalistes fuscus	Blue Triggerfish	*Shaaram*
Odnus niger	Redtooth Triggerfish	*Aboariba*

Table 7 Target Species of Fish for Purse-seiners

Family/Species	English name	Local name
Culpeidae *Sardinella melanura* *Clupea sirm* *Clupea leigoaster*	 Spotted Sardinella Golden striped Sardinella Red-eye Round Herring	 *Sardin mofater* *Sardin mofater asfer* *Moza*
Scombridae *Scomber japonicus* *Rasterelleger kanagurta*	 Houtuyn Indian Mackerel	 *Shak el-Zore* *Bagah*
Atherinidae *Atherina forskali*		 *Kashkosha*

Table 8 illustrates catch composition and fishing gear used in aggregation/season in different fishing grounds. Note that fishing operations are undertaken in spawning and feeding aggregation. Deep and detailed studies may be required to identify the proper fishing times to maximize both biological and economic yields and to ensure sustainability of the resources.

Table 8 Catch Composition, Fishing Gear, and Aggregation/Season by Fishing Grounds

Family/Species	Fishing Gear	Aggregation/Season	Sites
Serranidae *Epinephalus twina* *Twina*	Hook and line	Spawning aggregation (June and July)	Ras el-Gimsha, Abo Malh, and Twila
Carangidae *Caranx fullvoguttatus* *Slikakaady* *Decaperus helenae* *Shakora*	Hook and line Purse-seine	Feeding aggregation Winter months Spawning aggregation (May, June, and July)	Gobal, Shidwan Island, Ras Banas, and Abo Monkar
Mullidae *Mulloidicthys auriflamma* *Embera baldi*	Trammel and gill nets	Near shore feeding and spawning aggregation 15 days in May, June, and July	Sharm el-Arab, Dishatt Abo Monkar, Shatt el-Mina, Gaffateen, and Shidwan
Gerreidae *Gerres oyena* *Gasa*	Trammel and gill nets	Spawning aggregation February, March, April, and May	Sharm el-Arab, Dishatt, Abo Monkar, Shatt el-Mina, Gaffateen, Shidwan, and Ras Banas

Family/Species	Fishing Gear	Aggregation/Season	Sites
Lutjanidae *Lutjanus bohar* *Bohar*	Hook and line Trammel net	Spawning aggregation July, August, and September	Gobal and Shidwan
Sparidae *Argyrops spinifer* *Morgan*	Trawling Gill and trammel nets	Spawning aggregation Winter months	In the soft bottom near coral reefs in the study area
Letherindae *Letherinus nebulosus* *Shoor*	Hook and line Trammel net	Spawning aggregation 21 April–15 June	North Abo Nahas, Shidwanand, and Elhilook
Letherinus mahsena *Mahsena*	Hook and line Trammel net	Spawning aggregation 21 June–July	Between Giftun Island and El-Ereg el-Sogaier, Abo Monkar, and El-Ereg el-Keebeir
Scaridae *Scarus bicolor* *Biaady*	Gill and trammel nets	Spawning season July, August, and 15th September	Abo Monkar
Scombridae *Scomber japonicus* *Shak el-Zor*	Purse-seine	Spawning aggregation	Abo Monkar
Mugilidae	Veranda net	Spawning agreggation	El-Ahiaa to El-Esh

Nursery Grounds

General

The Importance of the sheltered marine coastal habitat as nursery grounds for the juvenile fishes is well-established in the literature and it has been shown that a large number of fish species are dependant on these area during the juvenile phase of their life cycle.[1]

Typically, juvenile fish enter the nursery areas after metamorphosis, having been spawned elsewhere in the sea. They remain in the nursery area for some time, often no more than a year before vacating it for their adult habitat. This pattern of habitat utilization is

[1] Bennett, B.A., "The Fish Community of the Moderately Exposed Beach on the South Western Cape Coast of South Africa and an Assessment of their Habitat as a Nursery Ground for Juvenile Fishes," *Estur. Coast. Shelf. Sci.*, 28:239-305, city, 1989.

considered to occur because sheltered habitat offer advantages over marine environment in the terms of protection from predators and an abundant food supply.[2] [3]

Nursery grounds for juvenile fish must have certain characteristic features. They must be rich in food and particularly high in temperature. They are usually found near the shore, i.e., in sheltered, shallow water. Gibson stated that juveniles are adapted to shallow water life that allow them to remain in the favorable position of the littoral zone, but the adults of their species are found in deeper water. Gibson summarized factors affecting the abundance of juveniles as salinity, temperature, turbulence and wave action, and food availability.[4] Blaber and Blaber summarized the factors affecting juvenile fish in the nursery grounds as physical and biological parameters, adding that predators are an important factor.[5]

The nursery grounds include estuaries and sheltered coastal marine habitat such as sandy shores, bays, and mangroves. These habitats serve as nursery areas for many juveniles of marine fish species.[6] Many authors have shown that a large number of species—perhaps 100—are dependent on these habitat during the juvenile phase of their life cycles.[7]

Ahmed studied the nursery grounds in the Gulf of Aqaba in the Egyptian Red Sea and found that that Sharm el-Mayia Bay and NABAQ mangroves are excellent nursery grounds for 13 commercial fish species.[8]

Nursery Grounds in the Study Area

Twenty-three nursery grounds have been identified in the study area. Maps 7–10 in appendix 1 and table 9 below illustrate their distribution by habitat. Seventeen nursery grounds are threatened by fishing and tourism activities, two mangrove grounds are located in marine parks, but are used for animal grazing, the rest are still unused for any activity. Serious actions should be taken to protect and conserve the nursery grounds.

Table 9 Nursery Grounds in the Study Area

Nursery	Position	Habitat	Activities
Gimsha	39.28 N 33.33.51 E	Seragrass and seaweed	Fishing

[2] Lenanton, R.C.J., "Alternative Non-estuarine Nursery Habitats for Some Commercially and Recreationally Important Fish Species of Southwestern Australia," *Australian Journal of Marine Freshwater Resources*, 33:881-900, city, 1982.
[3] Ahmed (other names), "Ecological and Biological Studies on the Juvenile Fishes in South Sinai," M.Sc. thesis, Suez Canal University, Suez, 1992.
[4] Gibson, R. N., "Recent Studies on the Biology of Inertial Fishes," Oceanographic Marine Biology Annual Review, 20:363-414, city, 1982.
[5] Blaber, S.J.M. and Blaber, I.G., "Factors Affecting the Distribution of Juvenile Estuaries and Inshore Fish," *Journal of Fish Biology*, 17:134-162, city, 1980.
[6] Bennett, 1989.
[7] Need to provide a reference for this one—the listed Blaber is 1980.
[8] Ahmed, 1992.

Nursery	Position	Habitat	Activities
Gobit Melaha	31.26 N 33.33.24 E	Seagrass	Fishing
Gobit el-Disha	02.47 N 33.53.22 E	Soft bottom	Tourism and fishing
Abo Makadig	59.40 N 33.53.56 E	Seagrass	Tourism and fishing
Sharm el-Arab	57.56 N 33.55.13 E	Seagrass and coral patches	Fishing
Soma Bay	50.09 N 33.57.00 E	Seaweed and Seagrass	Tourism
Mangrove Rehabilitation	36.56 N 34.00.41 E	Mangroves	Marine park
Abo Kalawi	30.32 N 34.03.59 E	Seagrass seaweed	Fishing
Mangrove	24.07 N 34.06.54 E	Mangroves	Marine park
Asil	56.31 N 34.23.15 E	Coral	Tourism
Marsa Wzer	47.09 N 34.29.11 E	Seaweed	None
South Om Geish	42.18 N 34.3.22 E	Soft bottom	None
Om el-Grifaat Lagoon	36.00 N 34.36.12 E		Tourism
South Abo Dabab	17.59 N 34.45.06 E	Soft bottom	None
Morein Lagoon	23.41 N 34.42.06 E		Tourism
Gabal el-Rosas	12.17 N 34.48.23 E	Soft bottom	None
South Gabal el-Rosas	09.11 N 34.51.00 E	Soft bottom	None
Kilo 7 South Marsa Alam	00.47 N 34.55.30 E	Seagrass	None
Sharm el-Loly	36.35 N 35.06.36 E	Soft bottom	Fishing
Wadi el-Kalaan Mangrove	21.27 N 35.18.21 E	Mangrove	Marine park, animal grazing, and fishing
Hamata	17.52 N 35.22.06 E	Mangrove	Marine park, over-grazing, and fishing
Wadi Lahmy	12.57 N 35.25.32 E	Mangrove	Tourism

Nursery	Position	Habitat	Activities
Kara el-Hartway	07.53 N 35.29.12 E	Mangrove	None

Fishermen

Based on fieldwork data, there are an estimated 2,800 fishermen operating in the study area. This figure represents regular fishermen operating from fishing vessels as well as those who use trucks to transport nets and fish to and from fishing grounds, i.e., foot fishermen. It does not include part-time fishermen or those who operate tourist boats who also fish.

A breakdown of fishermen by landing site is given. Approximately 46 percent or a total of 1,280 fishermen are based at the Hurghada region's landing sites, Al-Ahiaa, El-Dahar, and Hurghada Port. Approximately 90 percent of all fishermen are predominately artisan fishermen using hand and long lines, gill nets, trammel nets, and veranda nets.

Fisheries resources in the study area targeted by three groups:

1. Local fishermen who originally came from Upper Egypt and are based mainly in Hurghada, Safaga, and Quseir and settled Bedouin fishermen, belonging to the Bshari and Abada tribes who are living in Ras Banas in small groups. The latter group use mainly sail boats with veranda nets, cast nets, hand lines and longs lines. Production is consumed locally, with some fish salted or sun dried.
2. Migratory fishermen who came many years ago from Fayoum Governorate and settled mainly in Hurghada and Safaga. It was reported that about 195 fishermen are fishing from Hurghada and 15 from Safaga. They usually establish seasonal fishing camps and use fishing boats equipped with inboard engines. They introduced the use of gill nets that consist of 30 segments of 30 m. long in an illegal mesh size, which are highly destructive. They also use stand nets on corals, which cause serious damage to this important habitat. As to date the Red Sea fisheries are open to all, there is a trend toward gradually increasing their numbers That may present serious threats to fisheries in the area.
3. Visiting fishermen who operate purse-seiners during the fishing season and go back to their home villages in the Delta.

Most fishermen in the artisan fleets are related to or belong to one family. For the local fishermen, there is a noticeable trend toward leaving fishing to work in tourism and other sectors such as mining and petrol. Reasons cited include limiting fishing grounds and poor coastal zone management. There are already conflicts between tourism development and traditional fishing interests. The main coastal stakeholders affected by tourism and reef recreational activities in particular are the artisan fishing communities. A recent Global

Environmental Fund project survey, together with other project-related stakeholder analyses (MEP Report 540-R-12, 1998) showed the main issues to be:

- **Reduction in access to reef flat fisheries due to the construction of beach front hotels and water sports facilities.** Actual access to the beach is denied and most hotels actively prevent fishing in front of the hotel. In both Hurghada and Safaga, approximately 20 km of beach front are now effectively barred to local fishermen.
- **Displacement of fishing communities through hotel and water sport development.** New tourism activity sites are often designated and implemented without local consultation. In some cases (i.e., Barakah), fishing villages are displaced involuntarily. Favorable hotel development sites (i.e., adjacent to reef flats, in bays, or on headlands) are often productive fishing grounds that increase the chance of conflict unless appropriate investigation and compromise is made.
- **Favored dive sites become effectively barred**. Often located in traditional fishing grounds, these can be closed to artisan fishermen. Local fishermen also report that fish catches are markedly lower in sites that are frequently dived.
- **Traditional fishermen are leaving.** More lucrative opportunities exist in the dive and hotel sector for the traditional fishermen. Newcomers with less knowledge about the local ecology and with unsustainable fishing practices frequently replace them. This has led to an increase in habitat destruction from nets damage. There is also an irreversible loss of knowledge of traditional local fishing methods.[9]

It is necessary that some level of compromise be integrated into proposed shoreline management plans.

Based on information from interviewed fishermen at visited landing sites, the average monthly income from fishing activities was: Hurghada, LE 300–500; Safaga, LE 50–200; and other landing sites, LE 200–700.

The fishermen live in their own communities. In Hurghada they concentrate in the El-Sakkala region near the fishing port. Other main fishing communities are El-Gweeh Village, Quseir, Marsa Alam, Kilo 24 South Marsa Alam, Cul'an Village, Sataieh, and Ras Banas.

There are three fishermen's cooperative societies in the study area: Hurghada Cooperative with about 600 member fishermen, Safaga Cooperative with 129 members, and Quseir cooperative with 269 members. Fishing cooperatives are governed by Fishing Cooperative Law No. 123/1982, which stipulates the role of the cooperative in improving the economic, social, and professional status of members. Cooperatives provide a number of benefits and services, including supply of fishing gear and equipment, credit finance, and some basic social services. Migratory fishermen do not belong to the cooperatives as they are not accepted by local member fishermen. It is important to group the migratory

[9] Breika, 1997

fishermen in some kind of association to facilitate contact between them and other concerned bodies.

Wadi el-Gemal–Hamata Protected Area

The Wadi el-Gemal–Hamata Protected Area includes three landing sites:

1. Sharm el-Loly, with 55 local fishermen operating 11 boats equipped with 40 hp outboard engines and using trammel nets. The average annual landings are estimated at about 28 tons composed mainly of Slenderspine Mojarras (*Gasa*), Mullet (*Arabi*), Rabbit Fish (*Sigan*), Goat Fish (*Ember*), and Emperor (*Shoor*). The main fishing grounds are Hamraween, Abou Saan, and Wadi el-Gemal Island, which are also nursery grounds.
2. Cul'an Village, with 20 local fishermen operating four fishing boats equipped with 20–40 hp outboard engines and mainly using trammel nets. The average annual landings were estimated at 5 tons composed mainly of Mullet, Mojarras, Houndfish (*Kherman*), Parrotfish (*Harid*), and Grouper (*Koshar*). The main fishing grounds are mangrove habitats and Cul'an Island.
3. Hamata, with 50 local and migratory fishermen operating 10 fishing boats with 40 hp outboard engines and mainly using hand lines and trammel nets. The annual average landings were estimated at about 25 tons composed mainly of Snapper (*Fares*) and Jack (*Biad*). The main fishing grounds are the deep waters of Koraa el-Hartawi and Hamata. The latter is considered nursery ground.

Fish Handling and Marketing

Most of the fish is marketed fresh (iced), and a small part—mainly mullet—is salted while bigger fish may be dried. Fish are sorted and graded on the boats. The fishermen's cooperative society in Hurghada manages the marketing of fish caught by its members against a commission. A certain quantity of the catch has to be delivered to the Red Sea Governorate to be sold at a fixed price to local consumers.

At the other landing sites, the fishermen market their own catch directly to consumers comprised of mine workers, company officials, and tourism villages.

Salted fish are packed in metal tins (15–17 kg in each tin) and sent by truck to be sold to wholesale merchants mainly in Cairo. The wholesale merchants have their representatives in the main fishing centers (Hurghada, Quseir, and Baranis) that provide fishermen with tins and loans and manage salted fish collection and transportation.

Fisheries Legislation

Fisheries are governed by national laws that dictate the terms and conditions under which fishing activities may take place and provide for protection and conservation of living marine resources. Regulations (or by-laws) set out the details concerning fishing activities and restrictions that apply.

Law enforcement is the responsibility of GAFRD in cooperation with the Ministry of Defense Frontiers Guard. The Guard is based at the fishing ports and main landing sites. They issue permits to fishing vessels and record trip duration, area fished, and names of fishermen on each boat.

The GAFRD was created by Presidential Decree 190/1983. The chairman of the authority was given the status of first secretary, directly responsible to the Minister of Agriculture. Presidential Decree 465/83 gave the GAFRD the right and obligation to supervise, administer, and monitor the waters of Egypt. Presidential Decree 362/1984 declared that all license fees due from fishermen and fishing vessels are the property of the authority.

In 1983, two laws were created that dealt with the fisheries sector. The first was Law 123, dealing with fisheries cooperative societies. The second was 124, dealing with fishing, living aquatic resources, and fish farms.

Law 123 regulates the fishermen's cooperative societies, to which the majority of fishermen in Egypt now belong The law deals with the administration, meetings, elections of the board of directors, distribution of profits, and credit arrangements. It also established the Fishermen's Cooperative Union, to which all the cooperative societies belong.

Law 124 (Fisheries and Fish Farming Organizing Law) deals with all living aquatic resources, fishing grounds, vessels and methods, pollution, licensing, fees, penalties, and other matters.

These articles are relevant to the Red Sea:

- Article 2: All fishing boats must show clearly, both on their hull and their sail, their class, license number, and designated fishing area. The class of a boat (sailing and rowing) is designated according to the size and class of its crew—1st class will not exceed 27 fishermen crew, 2nd class will not exceed 13 fishermen crew, 3rd class will not exceed 4 fishermen crew.
- Article 7: All fishing is prohibited in areas and seasons as decreed by the Minister of Agriculture. Use of some fishing gear may be prohibited by such decree as well.
- Article 9: All unlawfull fishing gear is prohibited either on board of fishing boats or in the possession of persons in the fishing areas or nearby.
- Article 10: It is prohibited to catch, sell, or have undersized fish or other living aquatic species, whether fresh or dried and salted.
- Article 11: It is prohibited to catch ornamental fish without permission from GAFRD.

- Article 13: Using harmful materials, poisons, narcotics and explosives…is prohibited in fishing.
- Article 23: All fishing boats must be licensed. Fishermen, whether or not on a boat, are required to be licensed and to carry a fisherman's card. The number of vessels using each type of fishing gear is determined according to the by-law.

Sanctions

- A boat not showing the information identified in Article 2 shall be fined LE 20.
- A boat fishing without a license shall be fined LE 50 and the responsible shall be imprisoned for up to 3 months, or one of these two sanctions. In addition, the boat and fishing tools shall be confiscated.
- Use of unlawful fishing gear or fishing in closed areas or seasons shall be liable to a fine of LE 100–500, and imprisonment of 3–6 months, or one of these two sanctions.
- Use of poisons or explosives shall be liable to a fine of LE 500–1,000 and imprisonment of 6–24 months, or one of these two sanctions.

In addition to these specific regulations, the Minister of Agriculture has wide discretionary powers to regulate the issuance of licenses and to identify fishing areas and seasons.

In 1987, the Minister of Agriculture's Decree 303 was issued to implement Law124. The decree deals with detailed fishing methods, fishing grounds, fees, and penalties.

Other authorities have also issued regulations to control fishing activities in the Red Sea as well as to identify Wadi el-Gemal as a protected area. These as summarized in table 10:

Table 10 Principal Decisions Issued by the Red Sea Governor, the Chairman of GAFRD, and the Prime Minister Affecting Egypt's Fisheries

Decisions	Subject
Red Sea Governor	
No. 14/1998	Prohibition of any action or activity that will lead to the destruction or deterioration of the natural environment of islands and areas surrounding them as well as mangrove regions.
No. 46/1998	Prohibition against collecting, exposing, and marketing shells, coral, ornamental fish, and other protected marine species is the governorate.
No. 95/1998	Prohibiting harpoons for fishing in Egyptian waters.
No. 22/2003	Prohibition of Sea Cucumber fishing for 1 year starting in March 2003.
Chairman of GAFRD	

Decisions	Subject
No. 410/2001	Hurghada and its islands belong to the Red Sea (not to the Gulf of Suez) and it is permitted to use lines and net as follows: Ghabriat nets of 20 mesh size, Mowaghat nets with 2 layers of 6 mesh size for the outside layer and 17 mesh size for the other layer The number of segments of each net shall not exceed 12 units. It is forbidden to use this gear in coral reef regions.
No. 424/2001	Implementing Law 124/1983 in Hurghada Islands as in the case of Gulf of Suez, except that it is permitted to use lines and nets in the Hurghada region and its islands as follow: Nets for Borbon of 20 mesh size, Marabee nets of 14 mesh size, Mowagehat nets with 2 layers of 6 mesh size for the outside layer and 17 mesh size for the inside layer, provided that the number of segments do not exceed 12 units to ensure smooth operation of small boats.
No. 1741/2001	Closed season for the Gulf of Suez and the Hurghada region and its islands are as follow: From 1/6/2001 to 30/9/2001 for trawlers. From 5/6/2001 to 5/11/2001 for purse-seiners. From 1/8/2001 to 30/9/2001 for launches using lines (hooks). From 1/9/2001 to 30/9/2001 for small boats (faloukas) using lines (hooks). As for the Red Sea, closed to trawlers from 1/8/2001 to 4/10/2001.
No. 236/2001	Hurghada region and its islands are considered part of the Gulf of Suez. Lines are only permitted for fishing in this area. Nets of all kinds are not permitted.
No. 282/2002	Sea Cucumber fishing is permitted year around with the exception of April, May, and June (spawning period). 52 boats and 155 foot fishermen are licensed for fishing. The licenses are identified by region according to the attached list and through the fishermen's cooperatives and companies. They are responsible for the safety of divers during the operations. The fee to be paid by fishing boats with a maximum of 5 persons is LE 5,000/year and LE 500 for on-foot fisherman. The fee per individual Cucumber taken from Egyptian water is to be PT 15, distributed as follows: PT 2 for the cooperative, PT 2 for the Cooperative Union, and the rest for GAFRD. As for fishing boats taking Cucumbers from outside Egyptian waters and landing them in fishing ports along the Red Sea coast, the fee is to be LE 5 per fish box. Use of trawlers to catch Sea Cucumbers within Egyptian waters is prohibited.
Minister of Agriculture	
No. 410/2002	Prohibiting catching Sea Cucumbers in the protected areas and around the islands as well as in the coral reef regions of the Red Sea.

Decisions	Subject
Prime Minister	
No. 143/2003	Identifying the Wadi el-Gemal–Hamata Protected Area in compliance with Law 102/1983. The Governor of the Red Sea is to supervise the implementation of the decision in coordination with concerned authorities.

Other legislation and regulations that directly or indirectly regulate and protect marine resources in the Red Sea include:

- Minister of Defense Decree No. 56/1962 on the Cleanliness of Ports and Territorial Waters, in compliance with Public Law 280/1960 regulating ports and territorial waters
- Public Law 72/1968 on the Protection of Sea Water against Oil Pollution
- Presidential Decree 261/1981 concerning the establishment of a Shore Protection Authority (SPA)
- Ministry of Industry Decree 380/1982 concerning the Protection of the Environment against the Introduction of New Technologies
- Presidential Decree 1948/1985 establishing a Standing Committee for the Prevention of Marine Pollution by Oil, amending Decree 691/1972
- Conservation Law 102/1983 setting up the legislative framework for the creation of protectorates
- The legislative framework governing all new developments is the Law for the Environment (Law 4/1994) brought into effect by Executive Regulations issued by Prime Minister Decree 338/1995.

  The main provisions of this law can be summarized as:

  – Founding an agency with a clear mandate to protect the environment—the Egyptian Environmental Affairs Agency (EEAA).
  – Establishing and running environmental information and monitoring networks to guarantee an efficient implementation of the agency's mandate.
  – Centralizing pollution control and giving powers to EEAA in terms of pollution control and management.
  – Setting up an Environmental Protection Fund with sufficient resources and well defined expenditure items. The fund resources are devoted to research, technical analyses of the environment, environmental assessment studies, the establishment of environmental monitoring networks, the removal of pollutants, and other activities aiming at environmental protection.

– Setting up the principles and procedures to be followed in the preparation of environmental impact assessments of new projects and extensions to existing projects that have the potential of adversely affecting the environment.
– Establishing an Environmental Affairs Department in each governorate to help coordinate and implement EEAA's mandate at the local level.

Under the Executive Regulations virtually all new construction or extensions to previous construction require the consent of a competent administrative authority, which is one of various ministries or governorates depending on the nature and location of the construction. Each proposal must be accompanied by some form of environmental impact assessment. The competent administrative authority provides preliminary screening of the proposal and passes the environmental impact assessment to the EEAA for evaluation and comment. In the light of these comments, the competent administrative authority may approve, refuse, or request modifications to the project. There is an appeals procedure to which EEAA has input but is not otherwise involved in the final judgment.

Articles 59 and 60 of Law 4 have far-reaching implications for the design of new coastal resorts. Article 59 prohibits construction of any establishment within 200 m of the shoreline except with the approval of the General Shore Protection Authority in coordination with EEAA, following submission by the developer of a detailed environmental impact assessment of potential impacts to the coastal area and shoreline. Particular attention must be given to the precautions that are to be taken by the developer to avoid erosion, sedimentation, and alteration of coastal currents and pollution that could potentially result from the project. Article 60 prohibits all activities that cause alteration of the natural shoreline.

Appendix VIII of the Guidelines for Egyptian Environmental Impact Assessment (EEAA, 1997) gives specific guidelines for environmental impact assessments for offshore oil and gas establishments. Of particular relevance to the GEF Red Sea project is Section 4.2 (Coastal and Marine Ecosystems and Resources). The developer should consider the following issues:

- Fauna and flora, and rare or endangered species within or in areas adjacent to the project
- Sensitive habitats, coral reefs, wetlands, bays, lagoons, marshes, and mangrove swamps
- Species of commercial importance affected by the project
- In addition to the biological data, the EIA should consider water quality, currents, ability to assimilate discharges and maintain desired water quality, and other significant sources of pollution in the area.

Protected Areas Legislation

Initiatives include the Egyptian Conservation Law, Law 102/1983, which established the framework for the creation of protected areas. Implementation of some of the provision of this law is provided by a 1983 Prime Ministerial Decree.

The regulations defined in Article 11 of Law 102, deal with any action or activity that will lead to the destruction or deterioration of the natural environment or harm the biota, or detract from the aesthetic appeal of the protected areas. The rangers in charge of the day-to-day management of protected areas patrol to guard against the following actions, which are strictly prohibited:

- Hunting, transporting, killing, or disturbing living terrestrial and marine organisms, or carrying out activities that would lead to their destruction (i.e. spear fishing).
- Damaging, removing, or transporting any living organism or organic material such as shells, corals, rocks, or soil for any purpose.
- Damaging or transporting plants found in a protected area.
- Damaging or destroying geographic or geological formations of areas considered as habitats for animals and plants, or for their reproduction.
- Introducing foreign species into protected areas.
- Polluting the soil, water, or air of a protected areas.
- Construction of any building or establishment in a protected area without the permission of the relevant administrative body.

It is concluded that a common feature in the study area is that most laws do not have the strength and clarity needed for effective management and monitoring, control, and surveillance (MCS). Common concerns include inadequate definition of term such as ‘fishing vessel,’ ‘tourism vessel,’ or ‘fishing activities’ for sound administration and enforcement of the legal process. Penalties for infringements are frequently far too low, undermining respect for management and control, since there is minimal deterrence. Licensing systems are often inadequate. For example, it was reported that many fishing vessels operating in the study area—especially in the southern part—have no license.

Fisheries observers and enforcement officers’ powers, duties, and responsibilities are in some cases not described; procedures following seizure and arrest are not specified; and often there is no option of imposing an ‘administrative penalty’ by the minister responsible for fisheries rather than initiating a lengthy court process.

Poor coordination between different governmental bodies has often resulted in overlapping responsibilities and jurisdictions for the implementation of legislation for the marine environment and coastal zone.

National legislation should also be brought into line with current international initiatives to promote cooperation in management of shared stocks as required under the United Nations Convention of the Law of the Sea (UNCLOS) and facilitate implementation of the

Food and Agriculture Organization's (FAO) Code of Conduct for Responsible Fisheries and the Conservation and Management of Straddling Stocks Agreement.

5. Proposed Fisheries Management Plan for the Study Area

Introduction

The management plan defines how the marine resources of the study area, including the Wadi el-Gemal–Hamata Protected Area, will be managed. It tries to answer the following questions:

- What fisheries resources are available?
- How valuable are these resources?
- What is the best way to use these resources?
- Are the resources being overexploited and the environment being damaged?
- Are there resources that are being under-used? Should these be fished more?

The plan is based on information gained from a number of sources including existing documentation and interviews with officials, fishermen, managers of fishermen's cooperatives, and fish traders.

The plan indicates the key issues and constraints for sustainable fisheries development and conservation. It identifies objectives for the fisheries and the strategy to be employed in order to achieve those objectives. To be successful, the plan must have the active input, support, and acceptance from all stakeholders, especially the fishermen. A carefully planned public awareness program will be essential.

Key Issues and Constraints for Sustainable Fish Resources

There are a number of problems facing the fisheries in the Red Sea. These include inadequate information, ineffective management, uncontrolled use of resources, poor control of the resources, lack of planning, and inadequate training and public outreach activities.

Inadequate Information Base

Fisheries management must be based on an accurate understanding of the resource base and of the relationship between resources use and natural regeneration, that is the sustainability of fish levels and methods of exploitation. There is currently very little reliable data on which to base fishery specific management strategies and measures. Current data collection systems lack planning and transparency. Data formats are often not

amenable to effective stock assessment or monitoring of fisheries management. A lack of comprehensive biological and economic statistics is a major constraint to effective fisheries management. This is compounded by a lack of awareness or application of the precautionary approach principle.

A fundamental requirement for statistical information on artisan fisheries, for purposes of resources assessment, planning, and future management, is the establishment and implementation of an appropriate sampling program. This must be based on a new census of the size, location, and characteristics of the fishing fleet. The implementation of the program will require enumerators stationed at, or near the sites selected for sampling.

It is suggested therefore that the present arrangements for fisheries data collection and analysis be revised. Data should be collected that will allow routine catch, effort, and CPUE analysis at the species level.

Inadequate Effective Management

Fisheries management policies are not currently well defined, nor are they based on reliable scientific information. Modern guidelines such as the Code of Conduct for Responsible Fisheries are not part of legal framework. The adoption of the precautionary approach has considerable implications for fisheries management authorities. Scientific advice to fisheries managers should allow for uncertainty in both the understanding of the state of the stocks and the effect of future management actions. When less is known, fisheries management authorities should be more cautious. This requires a management approach less focused on and influenced by short-term considerations, and more concerned with long-term sustainability of fisheries resources and the environment. Over-fishing due to over-capacity and ineffective application of controls is the major problem facing Red Sea fisheries. Many factors attract new entrants from other governorates to the Red Sea fisheries, leading to uncontrolled effort expended on the resources.

Uncontrolled Expansion of Fishing Operations

Uncontrolled expansion of operations eventually leads to over-exploitation of the resources. The most appropriate way of regulating fishing is to limit the fishing fleet to a certain size. It is also appropriate to charge the tourist boats owners who fish for the right to exploit the common resources and recover some of the cost of managing the fisheries. This of course may also apply to the artisan fisheries in certain places.

There is anecdotal information concerning fishing and marketing of Sea Cucumber, but there are conflicting estimates of magnitude. Intensive surveillance could assist in quantifying the problem, but very little can be done about it without empowered enforcement officers.

Poor Monitoring, Control, and Surveillance

National authorities are currently unable to undertake effective MCS of artisan fisheries due to lack of equipment, recurrent financial problems, and a lack of suitably trained

personnel. The allocation of resources for enforcement as well as training of enforcement officers, particularly in areas of high fishing pressures, should be given priority. Implementing boat registration and licensing systems can assist surveillance of artisan fisheries.

Lack of Integrated Coastal Planning

Integrated coastal management is lacking: both the tourism and oil industries are afforded high priority, but the negative impacts of such activities on coral reefs, nursery grounds, spawning areas, and fishing grounds are not considered when policy is being made for these lucrative sectors.

There is a lack of effective communication between those formulating fisheries policy and the fishing industries and communities which are ultimately affected by the management measures imposed. This results in poor understanding of the need for and agreement with management measures. Considerable opportunity exists for increasing the involvement of fishing communities in the development and implementation of appropriate management measures for fisheries resources.

Lack of Extension, Training, and Public Awareness

Public awareness of the need for a balance between fisheries and environmental protection and conservation requires urgent attention. Many of the undesirable activities currently practiced (such as using gill nets with an illegal mesh size or dumping used gear at sea) could be reduced considerably if more attention were given to improving extension and training and public awareness campaigns.

Overall Objectives for Fisheries Management

Global objectives for management of fisheries resources should be designed to:

- Ensure that the fisheries are managed in accordance with the principles laid down in the FAO Code of Conduct for Responsible Fisheries, so that stakeholders enjoy maximum sustainable benefits.
- Promote cooperation between sectors so that fishery and marine resource management policies are integrated within the decision-making framework of the Coastal Zone Management Plan of the Red Sea.
- Integrate the many uses of marine resources so that they are managed for the equitable benefit of all stakeholders.

Management Strategy

The strategy to be employed in order to achieve the objectives must be:

- Simple, clear, and understandable to all interested parties
- Low in cost to implement and administer
- Based on elements of the existing national management system (e.g. licensing)

- Acceptable to the local fisheries societies.

The following strategy is recommended:

- Development of a sound information base on which to build a management system
- Adoption of a precautionary approach to decision making to ensure that harvesting of marine resources in the area is sustainable
- Adoption of a participatory approach to decision making so that wherever possible, management decisions are based on consensus among fishermen, authorities, and other interested parties
- Elevation of living standard for artisan fishermen by providing the means to improve processing, marketing, and distribution of marine products
- Encouraging exploitation of under-utilized marine resources
- Basing management primarily on controlling the fishing effort through the establishment of a vessel registration, implementation of licensing requirements already laid down in national law, and restriction of the number of licenses issued
- Development of a sound institutional foundation such as a Fisheries Management Committee.

Management Tasks and Options

Registration of Fishing Vessels

All fishing boats must be registered. The vessel's unique registration number must be fixed on both sides of the bow in accordance with existing legislation. No boat without a registration number should be permitted to obtain a license to fish commercially. The fishing vessel registration system would be based on the system already implemented. The registration system would form the main element of the proposed data collection system and be the main tool for regulating the fisheries.

Licensing Fishermen

Fishing licenses would be issued preferentially to applicants who are long-term study area residents. Fishermen from other places would be granted rights only if a license is available under the license allocation, and the management body—the Fisheries Management Committee—decides that the activities of the applicant will have no detrimental impact on the area license holders.

Licensing Fishing Vessels

All fishing boats used for commercial gain must be licensed in accordance with existing legislation. However, the terms and conditions of the license would specify the target species, allowable gear, and area/seasonal restrictions.

Regulatory Measures for Targeted Species and Sea Cucumbers

Based on information obtained during field visits as well as from fishery officials, the following regulatory measures are urgently needed:

- Prohibiting use of illegal gill nets called *sabeeb*
- Protecting inshore areas where spawning occurs
- Reducing possible growth of over-fishing by protecting juvenile fish
- Establishing areas known to be breeding grounds as 'no take zones' or closed areas.

It was reported that Sea Cucumbers fisheries are characterized by heavy exploitation. They were not subject to any form of management at all for a long period. Recently the Governor of the Red Sea issued a decision prohibiting Sea Cucumber fishing for the year starting March 2003.

Management measures imposed in Pacific Island fisheries include a minimum allowable size for dried products (Fiji), export quota restrictions (Solomon Islands), a system of 'crop rotation,' in which areas are harvested for a few months then left for the rest of year (New Caledonia and Fiji). There is little management experience around on which to base recommendations. However, the following management options should be investigated:

- Establish closed areas/seasons (crop rotation)
- Maintain a ban on SCUBA and snorkelling diving apparatus
- Introduce alternate year total bans for some areas, establishing marine reserves.

Improve Data Collection Systems for Monitoring and Assessment

The many dispersed landing sites, the multitude of species, variations in fish prices, and unrecorded subsistence catches combine to make data collection systems for artisan fisheries inaccurate and inordinately expensive in terms of the resources and manpower needed to maintain them. In addition, the multi-gear nature of many artisan fisheries makes estimating fishing effort difficult in most cases.

Establishing a system for the collection of reliable data is the single biggest issue to be addressed in planning for management and future development of the fisheries in the Red Sea.

A proposed system is built on the sample-based approach, introducing new sample data collection forms, as well as compulsory data reporting requirements for the fishermen and other related persons.

Objectives

The proposed data collection system would have as an overall objective the establishment of a system for the regular collection of catch, effort, economic, financial, and biological data that would allow monitoring of changes in the fishery and contribute to the assessment of the status and population dynamics of the resources being exploited.

At the end of 1 full year's collection and analysis of data, the system should be able to provide:

1. An inventory of fishing gear, fishing vessels, fishermen, and their distribution
2. An estimate of total weight of fish caught and fishing effort, broken down by principal species, fishing gear, and areas fished (to allow spatial mapping of catch-per-unit of effort) that would enable assessment of the impact of fishing effort for each of the targeted species groups relative to available stock, and assess sustainability of the fisheries
3. Estimates of the number of full and part-time artisan fishermen (i.e. those who pursue fishing as a vocation) and subsistence fishermen
4. Basic trends in the fishery
5. Basic economic and financial indicators, including recurrent costs (fuel, ice, repairs, and maintenance), fixed costs (fees, duties, and depreciation), and earnings from sale of catch, to allow analysis of the economic viability and socio-economic importance of the fishery
6. Biological information for the main species targeted to allow an assessment of stocks and to set a baseline for future monitoring of the state of the stocks.

Databases

The data collection system would require the creation of a number of databases:

- Fishing vessel register database (FVRD),
- Fishing vessel license database (FVLD),
- Fishermen license database (FLD),
- Various databases containing information from interview/sample forms (catch, effort, economic data, length–frequency, and biological data).

Data Forms

Many data forms would be needed. These include:

- Fishing vessel registration application.
- Fishing trip log sheet
- Fishing day log sheet
- Sales receipt (to be filled by the buyer)
- Trip interview (for catch and effort)
- Commercial species composition
- Length–frequency data
- Cost and earning data
- Fixed costs.

Data Analysis and Reporting

In recent years there has been considerable progress made in the development of software packages such as ARTFISH developed by FAO that assist in the analysis of basic data from artisan fisheries, such as catch, fishing effort, and length and weight data.[10]

It is recommended that a formal report on the fisheries be produced each year. The report would present an overall description of the fisheries sector, possibly supplemented by other publications on specialized topics (e.g. the development of the vessel register, management systems and their value for conservation, including documentation on the sampling program and databases, vessel registration summary, and fish stock assessment report). An overall description of the sector is a basic requirement if the management plan for the fishery is to be successful.

The data collected and processed will have three main uses: assessment, monitoring, and management. The annual report should provide information in each of these three areas, as indicated below:

- **Assessment of the fisheries:** results of scientific analysis of the length frequency data, coupled with the catch and effort data, would provide an indication of the status (or health) of the fish stocks and the likely effect fishing mortality is having. Analysis of the economic data will provide an appraisal of the financial viability of fishing activities, fishing-related employment, nutritional levels, and calculation of revenues and fees associated with fishing.
- **Monitoring:** this would focus on changes in fleet structure, gear used, response of the fishery and resources to management measures, changes in economic values, and revenues generated by the sector.
- **Management:** management would be supported through identifying the effects of management regimes, development of new fisheries/techniques, and establishment of license fee schedules and other regulatory mechanisms.

Main users of the data and the analyses performed would include fisheries policy makers, fisheries managers, fisheries biologists, economists, private sector investors, as well as the FMC to decide whether or not management strategies developed are working, and whether new measures are required.

Training

Basic and refresher training would be needed in the following specific areas:

1. Enumerators need to be trained in interview techniques, use of forms, species identification, random sampling, length measurements, and registration and licensing procedures.

[10] Approaches, Rules and Techniques for the statistical monitoring of Fisheries. Developed by FAO's Fisheries Information Data and Statistics Unit, ARTFISH contains 3 sub-components: ARTPLAN for training and survey planning; ARTBASIC for handling sample data and producing monthly estimates on catch and fishing effort, and ARTSER for reporting time series (catch, effort, Values) resulting from ARTBASIC. It is planned that FAO will provide training in the software to Egypt.

2. Marine researchers need to be trained in form design, database design, data entry, data manipulation and processing, interpretation of results, report preparation, and use of results in formulating management advice.
3. Fishermen need to be trained in the use of charts to plot fishing positions, and in how to fill in catch/effort log sheets and sales slips.

Technical assistance will be required in detailed planning and implementation of the program.

Public Awareness

The close support and cooperation of the societies will be instrumental in successful data collection. It is essential that the aims of the systems for vessel registration, fishermen's licenses, log sheets, sales sheets, and sample interview data be clearly explained to the fishermen. Their active support, participation, and direct assistance are crucial to the success of the monitoring plan.

Awareness will be facilitated in the same way as awareness for the Management Plan, i.e., through publication of FMC meeting minutes, and by advice passed through the society system and community leaders.

Although many fisherman interviewed during the course of the mission stated their understanding of the need for better data collection, scientific investigation of the fisheries, and increased management, it will be important to clearly explain the idea of restricted entry to the fishery. Restricted access to fisheries resources, through vessel registration and fishermen licensing, is a new and unfamiliar concept to the fishermen in the study area. Objections will undoubtedly be raised in many quarters, especially if the system is not adequately explained.

Evaluation and Review

The data collection system should be reviewed and modified as needs resources (labor, funding, and equipment) change. This review should take place at the same time as the review of the management plan.

Required Administrative Actions

Appropriate legal instruments (e.g. gubernatorial and/or GAFRD resolutions) are needed to:

1. Require that fish buyers purchase fish only from licensed fishermen; that the fish have not been caught in violation of any management measures that may have been prescribed
2. Establish the fishing vessel registration system
3. Delegate authority to the fishermen's societies in assisting GAFRD to complete registration and licensing requirements
4. Require that artisan and vocational fishermen fill in sales receipt forms for every transaction.

All stages should proceed more or less at the same time, once the initial pilot testing phase is over. Planning of all steps and activities for the new pilot scheme should commence once the FMC has been established.

Monitoring. Control, and Surveillance

The purpose of an MCS system is to ensure that fishery policy in general and the conservation and management arrangements for any specific fishery are implemented fully and expeditiously.

Monitoring involves the continuous collection, measurement, and analysis of data and information on fishing activities and resource yields. In addition to collecting the data necessary for implementation of a management plan, those responsible for fisheries management must ensure data that are collected on a regular and continuous basis. Effective monitoring requires data on the fishery in terms of the number of fishermen, gear used, catch, and effort, as well as economic, financial, and biological data.

Control refers to specifying the regulatory terms and conditions under which resources can be harvested. This includes laws, decrees, regulations, license conditions, and customary management measures.

The current regulatory framework requires improvement and strengthening so as to better provide for management and conservation of resources.

Surveillance involves checking and supervising fishing activities to ensure that the participants in the fishery are complying with all applicable regulatory controls imposed on fishing activities. Surveillance in the study area requires a suitable approach, appropriate to the size and value of the fishery, as well as the staff capabilities and institutional capacity.

Management of the Plan

Fisheries Management Committee

The plan will be managed through consensus. All stakeholders (interested parties) must study and discuss the issues and jointly make decisions. Establishment of a Fisheries Management Committee (FMC) is recommended.

The FMC would be responsible for providing advice, and for directing and administering the management of the fisheries in the study area. It would become the main body providing guidance on management objectives, strategies, and regulatory measures. Many countries have successfully established such committees to promote broader and more comprehensive policy and planning for fisheries management in the framework of coastal management plans.

Role of the FMC

The FMC would be responsible for implementation, regular revision, and amendment of the Fisheries Management Plan. Specific executive responsibilities would include the establishment and administration of a vessel registration system, a fishing vessel and fishermen's licensing system, as well as enforcement of all measures particular to specific fisheries.

The Committee would specifically confer on the issue of concessions requested by commercial operators, and determine the acceptability of requests for licenses under the various categories laid down in the existing legislation.

The FMC would be empowered under the fisheries laws of Egypt to set license terms and conditions and to manage all aspects of the fisheries. The Red Sea would be the first place in Egypt where such power is delegated to a local body, with wide membership representing the interests of the fishing communities and other interested parties.

Some management measures would build on the existing traditional management system, on matters such as gear restrictions and fishing season.

A major problem is the need to improve surveillance. The FMC would strive to improve the surveillance and enforcement capacity in the area, as part of the overall national efforts to improve MCS in Egypt.

Establishment of the FMC

The existing fisheries law provides for the establishment of such a body by the Minister of Agriculture. The FMC could be established through an appropriate Ministerial Decree.

The FMC would be the principal decision-making body in regard to fisheries management in the area. Terms of reference for the FMC would be to implement the fisheries management plan. It would have executive powers conferred by the Minister of Agriculture to execute the vessel register and licensing system.

Membership in the FMC

In order to achieve a balanced, wider perspective on the issue confronting the Fisheries Department, it is suggested that the committee would include all interested parties. Membership in the FMC could include presidents of fishermen's cooperative societies, fisheries scientists and experts, and representatives from:

- GAFRD
- Ministry of Environment
- Red Sea Governorate
- Ministry of Tourism
- Ministry of Petrol and Mineral Resources
- Local Tourism Associations
- Coast Guard Forces

- Ministry of Justice
- Fish marketing bodies
- Other individuals as required.

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MOBIS Task Order No. 263-M-00-03-00002-00

U.S. Agency for International Development

Program Support Unit

Egyptian Environmental Policy Program

Fisheries Management Plan for the Red Sea

BY

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Photo of Grouper by Mike Colby

International Resources Group with Winrock International

Washington, DC

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Acronyms and Abbreviations

ARTFISH	Acronym for software developed by the FAO
E	east
EEAA	Egyptian Environmental Affairs Agency
EEPP	Egyptian Environmental Policy Program.
FAO	Food And Agriculture Organization (of the UN)
FLD	Fishermen License Database
FMC	Fisheries Management Committee
FVLD	Fishing Vessel License Database
FVRD	Fishing Vessel Registration Database
GAFRD	General Authority for Fish Resources Development
GEF	Global Environmental Facility (of the UN)
hp	horsepower
kg	kilogram
km	kilometer
LE	Egyptian Pound(s) (currency)
m	meter(s)
MCS	Monitoring, Control, and Surveillance
mm	millimeter(s)
MSEA	Ministry of State for Environmental Affairs
N	north
PSU	Program Support Unit
UN	United Nations
UNCLOS	UN Convention of the Law of the Sea

Summary

This report is an overview of the current status of fisheries in the area between Hurghada and Ras Banas on the Red Sea. It provides information to assist in predicting the environmental consequences of fishing in the study area and to develop a proposed management plan to alleviate the detrimental effects of this activity on the marine environment.

Field visits to 21 landing sites in the study area were made where fishermen and Coast Guard personnel were interviewed. Published scientific studies and local and national experts provided part of the presented data.

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

- Official fisheries statistical data
- Landing sites
- Fishing fleet and fishing gears
- Catch and target species
- Nursery grounds
- Fishermen
- Wadi el-Gemal–Hamata protected area
- Fish handling and marketing
- Fisheries legislation.

The spatial distribution of fishing activities per fishery as well as important nursery and spawning areas are illustrated on maps that follow the text.

The local administration faces difficulty in trying to collect accurate data on fisheries due to the mobility of the fleet, with a relatively large number of boats moving through different areas at different times. The government lacks both trained enumerators and the transportation facilities to provide complete data. In addition, there are a considerable numbers of amateur fishermen scattered along the coast, so available data does not include the actual landed quantities of fish. Tourist boats are known to fish as well, creating conflicts between tourist boats operators and professional artisan fishermen as they compete on the same fishing grounds.

Hurghada's fishing port, Sakala, is considered to be distinct landing site, with Safaga's port lying further south. The fishing fleet operating in the study area is composed of 9 purse-seiners and 420 deck boats with inboard or outboard engines. The principal artisan fishing methods are hand lining, long-lining, gill nets, and trammel nets. In the south protected area, gray mullet are fished using veranda nets.

Fishermen coming from Fayoum Governorate have introduced illegal gill nets called *sabeeb*, which have a smaller mesh size than the stipulated minimum size. They also use ring nets on the coral reefs that cause serious damage.

The main fishing grounds are concentrated in the northern protected area of the study area along the coast and around the Hurghada Islands. Small fishing grounds scattered southward are mainly fished using hand and long lines.

All habitats are being fished, including coral reefs, hard substrate, soft bottoms, mangroves, and deep water. The study area fisheries are dominated by reef fishing. Purse-seiners and artisan vessels operate in the vicinity of the Hurghada Islands and along the coast, landing pelagic species. There is a marked difference in the catch down the coast, due primarily to different habitats, but also due to the different gear used.

Twenty-three nursery grounds were identified within the study area. Seventeen of them are threatened by the fishing and tourism activities. Two mangrove nursery grounds are located in the marine park, but are being used for animals grazing. The remaining four nursery grounds are not being used for any activities. Serious action should be taken to protect and conserve the nursery grounds.

Fisheries resources in the study area are targeted by three groups: local fishermen, migratory fishermen from other governorates, and visitor fishermen from the Nile Delta who operate purse-seiners in fishing season, then return to their home villages. Traditional local fishermen are increasingly leaving for more lucrative opportunities in tourism, working in the diving industry or in hotels. Newcomers who replace them have less knowledge about the local ecology and use unsustainable fishing practices. This has led to an increase in habitat destruction from net damage. Traditional local fishing knowledge is being irreversibly lost.

The Wadi el-Gemal–Hamata protected area includes three landing sites:

5. Sharm el-Loly's 55 fishermen operate 11 boats with 40 horsepower (hp) outboard engines and use trammel nets. Annual landings are estimated at about 28 tons.
6. Culan village has 20 local fishermen operating four fishing boats with 20–40 hp outboard engines. They mainly use trammel nets.

7. At Hamata, 50 local and migratory fishermen operate 10 boats with 40 hp outboard engines and use mainly hand lines and trammel nets. The annual average landing is estimated at about 25 tons.

Fisheries are governed by laws that dictate the terms and conditions under which fishing activities may take place and provide for the protection and conservation of living marine resources. Regulations (or bylaws) set out details concerning fishing activities and restrictions that apply. Unfortunately, most laws do not have the strength and clarity needed for effective management or for monitoring, control, and surveillance (MCS). Penalties for infringements are frequently far too low, undermining respect for management and control, since there is minimal deterrence. Licensing systems are often inadequate and poor coordination between governmental bodies results in overlapping responsibilities and jurisdictions for the implementation of legislation for the marine environment and coastal zone.

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

- Registering fishing vessels
- Licensing fishermen
- Licensing fishing vessels
- Recommending regulatory measures for targeted species and Sea Cucumbers
- Improving data collection systems for monitoring and assessment.

Finally, the report identifies steps to be taken to put the Management Plan into action.

1. Introduction

Within the Egyptian Environmental Policy Program (EEPP), the Program Support Unit (PSU) provides technical assistance to the Egyptian Environmental Affairs Agency (EEAA) in the Ministry of State for Environmental Affairs (MSEA). The PSU also has certain cross-cutting functions related to helping the EEPP as a programmatic whole. To help it fulfill its role, the PSU sought the services of two specialists in order to describe the present status of the inshore and offshore fisheries from Hurghada to Ras Banas with particular focus on the proposed Wadi el-Gemal protected area.

Dr. Ahmed Barrania and Dr. Ashraf Ibrahim were nominated to perform the following tasks over a period of 3 months:

- **Task 1—Field surveys and data gathering** (undertaken by Dr. Ashraf Ibrahim). The task consists of fieldwork and desktop study to:
  - List the most recent fishing landing information for the study area.
  - Summarize current Egyptian fisheries legislation and regulations pertaining to the Red Sea, with emphasis on reef-based fisheries.
  - List and describe the types of fisheries (defined according to gear type, habitat fished, and whether fishermen were local or visitors).
  - List primary target species.
  - Illustrate the spatial distribution of fishing activity, per fishery in the study area.
  - Illustrate important nursery and spawning areas as indicated by the fishermen.
  - Estimate the temporal distribution of fishing activity per fishery.
  - Estimate the approximate number of fishermen and boats per fishery.
  - Describe the incidence of Dugong and turtle by-catch.
  - Describe the incidence of destructive fishing techniques.
- **Task2—Report preparation and management recommendations** (undertaken by Dr. Ahmed Barrania). This included analysis and description of the fieldwork results and preparation of a fisheries management plan.

Objectives

The objective of this report is to present an overview of the current status of fisheries in the study area and to provide information to assist the PSU–EEAA and their EEAA partners to predict the environmental consequences of fishing in the study area. Further, management actions to alleviate the detrimental effects of this activity on the marine environment are proposed.

Study Area

The study area focused on the coastal and near shore marine areas on the Egyptian side of the Red Sea and the area's seasonal fishing grounds, as shown in map 1, appendix 1. It spanned a distance of about 520 kilometers (km) between 60 km north of Hurghada (Gemsha) and north of latitude 23°. This includes the Wadi el-Gemal protected area. For the purposes of this report the study area has been divided into four sectors as shown in map 2, appendix 1. These are:

8. Sector I extends from north of Hurghada to south of Om el-Hoitata, including six landing sites: El-Ahiaa, El-Dahar, Hurghada fishing port, Safaga, Safaga Port, and Om el-Hoitata, as shown in map 3, appendix 1.
9. Sector II extends from El-Gweeh, north of latitude 26.20 to Sharm el-Kebly, north of latitude 25.50, and includes four landing sites: El-Gweeh, Quseir, Sharm el-Bahary, and Sharm el-Kebly, as shown in map 4, appendix 1.
10. Sector III extends from Marsa Umm Gheg to Marsa Alam, and includes four landing sites: El-Shekh Malak, Marsa Umm Gheg, Marsa Alam (old jetty), and Marsa Alam Port, as shown in map 5, appendix 1.
11. Sector IV extend from 24 km south of Marsa Alam to Ras Banas, including seven landing sites: Kilo 24, South Marsa Alam, Sharm el-Loly, Cul'an Village and Hamata Port, Sataieh, Ras Banas 1, and Ras Banas 2, as shown in map 6, appendix 1.

Three landing sites (Sharm el-Loly, Cul'an Village, and Hamata Port) are located within the Wadi el-Gemal Protected Area.

Gathering Local Data

Dr. Ashraf Ibrahim and Mr. Salah Soliman PSU Community Consultant spent 18 days visiting 21 landing sites within the study area. They interviewed fishermen, community leaders, and Coast Guard personnel, asking about the fisheries and fishing operations. Specific questions elicited information about fishing gear, fishing boats, the number of

fishermen in each area and their origins, fish species targeted, estimates of the catch, fishing grounds, nurseries, and spawning areas.

National data was obtained from relevant authorities and experts and from previously published scientific reports.

2. Background

The Red Sea coast is about 780 km in length and extends from the southern protected area of the Gulf of Suez to the Egyptian–Sudanese border. It has an average width of approximately 240 km. Because of the presence of coral reefs, fishing takes place in grounds ranging from a low of 3–5 square miles in area to a high of 10–15 square miles. Such large areas are transit regions for many species during specific seasons.

Most of Egypt's Red Sea coast is bordered by more or less flat lands, 3–20 km wide, some of which can look like depressions (El-Mallaha). Behind these lands are the chain of Red Sea Mountains. They have some extensions along the coast.

Flat lands along the sea are normally a positive factor for good communications, which are essential for marketing fish over long distances. They are also interesting areas for the development of aquaculture in earth ponds. Protected bays resulting from coastal chains of mountains are interesting areas for aquaculture in floating cages.

There are seven islands adjacent to Hurghada: Giftun Keber, Giftun Saghier, Abu Mingar, Abu Ramada, Magawish Keber, and Magwish Saghier. This group lies 5-15 km from shore. The other, Safaga Island, lies approximately 5 km from Safaga.

This group of islands receives various types of pollutants from both sea and land based sources. A considerable amount of garbage, plastics, and tar balls can be found in shallow water all around the islands. There is a persistent threat of heavy oil from tanker traffic.

Fishermen in the Hurghada area catch both coral reef and pelagic fishes above the reefs around the islands.

The most important economic centers in the study area are:

12. Hurghada, the capital of the Red Sea Governorate. Its main activity is tourism and fishing. Hurghada was associated with the initial tourism boom that took place during the early 1980s, and is the main center associated with ongoing tourism developments.
13. Safaga is an important center for the extraction and export of phosphate from its commercial port. Tourism in Safaga lies mostly to the north of the

urban settlement while the reef areas south of Safaga have good potential for dive tourism.

14. Quseir is an important mining center. Lately, there have been attempts to expand tourism and many tourism projects are being established.

The study area displays a wide range of habitats due to the coral reef systems with their complex and diverse associated fauna. Most are situated along the coast and surrounding offshore islands. Coral reefs play an important role in the coastal ecosystem, providing habitats for a wide variety of marine species. They also protect coastal lands from erosion and storm damage. Corals also create a protected environment for the development of coastal vegetation such as sea grasses and salt marshes. Mangrove systems contributing their high primary productivity to the ecosystems of the area and provide important nursery grounds for a wide range of marine and terrestrial fauna. Sandy beaches provide nesting grounds for sea turtles. Sea grasses constitute highly productive ecosystems where many species of living marine resources a abound. They provide important feeding ground for the marine turtle and many species of Sea Cucumbers that have begun to form the basis of a new and important artisan fishery in the area recently.

The socio-economic importance of fisheries to the rural communities in the area is significant. Fishing is dominated by small-scale, artisan activities. Such fisheries are, by their nature, notoriously difficult to monitor due to the large number of small craft, and the wide range of landing sites used. Reliable data in many cases are often difficult to obtain.

The area around Hurghada is intensively fished. It has the largest fishermen's cooperative society in the study area, with 691 members and more than 100 nonmember fishermen, but there are many other low intensity fishing communities spread through the area. The accelerated growth and expansion in urban coastal centers during the 1980s, coupled with a wide range of human activities—especially tourism and over fishing—have increased the risk of environmental degradation and depletion of fisheries resources.

Fish production activities in the Red Sea are regulated by the Fisheries Department in Hurghada, Red Sea Branch, affiliated to the Central Fisheries Department, Red Sea Region, located in Suez. Both departments are under the supervision of the General Authority for Fish Resources Development (GAFRD) in Cairo. The Hurghada Fisheries Department has four divisions: Statistics, Fishermen's Cooperatives, Fisheries, Marine Aquaculture, and Financial & Administrative Affairs.

3. Official Fishery Statistical Data for the Red Sea

GAFRD publishes fisheries statistics (monthly and annual yield, fishing vessels and gear, and number of involved fishermen) based on a database of information collected from official landing centers in Hurghada, Safaga, Quseir, Baranis, Shalatin, and Abou Ramad.

Fisheries Department in Hurghada

Under the supervision of GAFRD, the Hurghada office is responsible for collecting fishery statistics for the Red Sea. Twenty-two enumerators are involved in collecting data on species composition at main landing sites. These enumerators include five for Hurghada, two for Safaga, one for Quseir, six for Baranis, and four each for Shalatin and Abou Ramad in the south.

Effort data are taken from license allocations. The Fisheries Department maintains vessel registers on vessel specifications, gear, and license conditions. However, it was reported that many vessels in the southern protected area of the Red Sea coast are unlicensed.

Coast Guard authorities maintain data from fishing vessel logbooks completed by each boat's skipper with regard to ground fished and trip dates.

Official figures for landings in main sites are composed of recorded and unrecorded fish landings. The estimates of unrecorded fish catch include the catch taken by both artisan fishing boats and tourism boats. Unrecorded landings represent about 60 percent of the total landings of Hurghada, 95 percent of Safaga, 92 percent in Quseir, and 15 percent of the Baranis landings.

According to 2002's official estimates, the fish catch taken by tourism boats were about 5,400 tons in Hurghada, 300 tons in Safaga, 450 tons in Quseir, and 1,440 tons in Baranis.

Reports indicate that around 900 tourist boats fish in Hurghada, 50 in Safaga, 75 in Quseir, and 240 in Baranis. This situation creates a conflict between tourist boat operators and professional artisan fishermen as they compete on the same fishing grounds.

One of the problems facing the local administration in trying to collect accurate data on artisan fisheries is the mobility of the fleet, with a relatively large number of boats moving to different areas at different times depending on weather and availability of fish. Furthermore, due to the shortage of enumerators and transportation facilities, available data does not include the actual landed quantities. Another difficulty arises from the numbers of amateur, part-time fishermen scattered a long the coast.

Fish Production

Based on official statistics from the Fisheries Department in Hurghada, the estimated fish production taken from the study area was about 5,700 tons in 2002. This estimate excludes fish taken by tourist boats. The distribution of the landings by main fishing areas was as shown in table 1.

Table 11 2002 Fish Production by Landing

Fishing Area	Ton	%
Hurghada	3,000	52
Safaga	400	7
Quseir	1,800	32
Marsa Alam–Ras Banas	500	9
Total	5,700	100

Catch Composition

Composition of the landings in the Hurghada area was Parrotfish (*Scaridea*) 27 percent, Emperor (*Lethrnidae*) 20 percent, Grouper (*Serranidoe*) 18 percent, and Sea Cucumber (*Holothuriodea*) 17 percent. Other species represent less than 5percent each of the total landings. These include Red Mullet (Goat Fish), Sardinellas, and Tiger Fish.

Composition of landings in the Safaga area was Jacks (*Carangidae*) 34 percent, Emperor (*Lethrnidea*) 27 percent, Parrotfish (*Scarida*) 15 percent, Grouper (*Serranidae*) 13 percent, and Mullet (*Mugilidea*) 8 percent.

In the Quseir area, the landings consisted of Mullet (*Mugilidae*) 24 percent, Parrotfish (*Scaridae*) 19 percent, Grouper (*Serranidae*) 15 percent, Jacks (*Carangidae*) 11 percent, and Snapper (*Lutjandae*) 8 percent. Other species included Emperor (*Lethrnidae*) and Mojarras (*Gerridae*).

In the Ras Bans area, Mullet (*Mugilidae*), Mojarras (*Gerridae*), and Parrotfish (*Scaridae*) are the dominate species.

Many of the species are pictured in appendix 2.

4. Fieldwork Findings

Landing Sites

The locations of fishing landing sites are shown in the maps for each sector in appendix 1. The landing sites are listed in table 2 in decreasing order of size based on the number of fishing boats.

Table 12 Fishing Landing Sites

Major Landing Sites		Minor Landing Sites
(50–100 boats)	**(20–40 boats)**	**(Fewer than 20 boats)**
Hurghada Fishing Port (150)	Quseir (40)	Ras Banas 2 (17)
Safaga Port (100)	El-Ahiaa (20)	Om el-Hoitata (15)
El-Dahar (50)	El-Gweeh (20)	Sharm el-Loly (11)
Safaga (50)	Marsa Alam Old Jetty (20)	Marsa Umm Gheg (10)
	Marsa Alam Port (20)	Hamata Port (10)
		El-Sheikh Malak (6)
		Sharm el-Bahary (5)
		Cul'an Village (4)
		Sataieh (4)
		Ras Banas 1 (4)
		Sharm el-Kebly (2)
		Kils 24 South Marsa Alam (2)

Hurghada Fishing Port (Sakkala Port) is considered to be a distinct landing site. The Port of Sakkala is well located in a bay, has a100-meter quay, and serves the navy as well as fishing vessels. This site is the base for an important fishing fleet composed not only of small motorized units, but also of purse-seiners and trawlers, especially from Suez, that fish in the south in Foul Bay. A fuel store is located at the site, and ice and cold storage facilities are located 1 km distant. The existing slipway, of the sliding type, is a primitive structure.

Safaga Port is the largest Egyptian commercial Red Sea port as well as serving fishing vessels. Quseir landing site has a quay for fishing boats that fish the nearby islands and, seasonally, southward. The other landing sites are simply beaching sites with no onshore facilities. Ice facilities are centered in Safaga and Quseir.

Table 3 shows the location of the landing sites.

Table 13 Location of Landings and Number of Boats in the Study Area

Landing Site	Position	Number of Boats
El-Ahiaa	17.06 N 33.46.22 E	20
Hurghada Fishing Port	13.51 N 33.50.41E	150
El-Dahar	15.42 N 33.49.08 E	50
Safaga Ferry	45.56 N 33.56.42 E	50
Safaga Landing Site	43.33 N 33.56.17 E	100
Om el-Hwitat	38.42 N 33.58.08 E	15
El-Gweeh	22.30N 34.07.58 E	20
Quseir Landing Site	06.12 N 34.17.07 E	40
Om Geish	43.01 N 34.33.12 E	10
Sharm el-Bahari	52.07 N 34.24.50E	5
Sharm el-Kably	50.48 N 34.25.43 E	2
El-Shekh Malek	43.51 N 34.32.36 E	6
Marsa Alam Old Jetty	05.05 N 34.53.04 E	20
Marsa Alam Landing Site	25.04.03 N 34.53.58 E	20
Kilo 24 South Marsa Alam	57.48 N 34.56.08 E	2

Landing Site	Position	Number of Boats
Sharm el-Looly	36.35 N 22.06 E	11
Wadi el-Kalaan	24.21.27 N 35.18.21 E	4
Hamata	17.52 N 35.22.06 E	10
Sataih	00.07 N 35.38.51 E	4
Ras Banas 1	23.55.20 N 35.45.55 E	17
Ras Banas 2	56.00 N 35.43.56 E	4

Fishing Fleet

The fishing fleet operating in the study area is composed of:

- **Purse-seiners**—These boats have a typical Mediterranean design, are 26–30 m in length, and are powered with inboard motors ranging from 300–450 horsepower (hp). They operate in the fishing grounds near the Hurghada islands by night during the dark of the moon. The vessels use butagaz lamps placed in two, 6-meter dinghies to attract the fish (10 lamps on each dinghy). Lamps are also placed on the seiner. When enough fish are concentrated under the light, the lamps are put on board a third dinghy and a ring net is cast to surround each dinghy. The ring net has its bag in the middle with the purse rope in two parts. The net is hauled on board by hand, starting with the two wings. Mesh size is 50-mm (stretch) on the wing and 18-mm in the bag. The mixed polyamide/steel ropes have a diameter of 30-mm and are hauled by trawl winch and are coiled in two parts on the deck. There are nine of these boats.

  During the fishing period of approximately 20 days each month, purse-seiners make a number of trips, each lasting from 3-4 days. It was reported that the catch per trip is about 6 tons. From 8 to 10 fishing trips are made per year.

  The crew numbers between 25–30 and are generally hired for one season or even just one trip in Alexandria or Suez.

- **Trawlers**—These boats operate in the same fishing grounds as purse-seiners. Since their use is not permitted in this area, their catch is not significant. Foul Bay is the main fishing ground for trawlers in the Egyptian Red Sea.

- **Artisan Boats**–This fishing fleet is composed of about 100 deck boats ranging from 10–15 m in length, with diesel inboard engines of 25–45 hp. In addition there are about 320 smaller deck boats ranging from 6–7 m in length, equipped with outboard engines of 20–40 hp. There are about 140 craft ranging from 6–7 m in length that are powered by sails and oars, and 3 large sailing boats between 15-18 m. long.

  The principal artisan fishing methods are hand-lining, long-lining, gill netting, and trammel netting. To a lesser extent, ring nets and *lambara* are used. In southern part of the study area, mullet are fished with veranda nets—vertical and horizontally floating nets. One original fishing method is developing along the Red Sea coast. Foot fishing involves a group of 7–10 men wading out onto the coral reef table and catching fish with nets. The group travels by vehicle, which carries men, nets, and fish. Motorcycles are also widely used as a mean of transportation to the fishing grounds, especially among non-professional and part-time fishermen, especially in the Quseir region. A motorcycle is usually used to carry two fishermen to the fishing site along the shore, where they fish mainly for lobster and other species. They use torches to attract the lobster and a spear and prong with four to five points, to catch it.

Fishing Gear

The most important gear used is shown in appendix 3. Classifying fishing boats by fishing methods is not particularly accurate because the boats can use several times of gear. A purse-seiner can fish with a trammel net during the day, or with hand lines at anchor. It is presently impossible to know the exact proportion of the by-catch produced by these switches.

Fishermen coming from Fayoum Governorate have introduced illegal gill nets called *sabeeb*. These have a smaller mesh size than the stipulated minimum. They also use ring nets on the corals, which cause serious damage.

Artisan vessels fish all along the coast and a fishing trip may last from 1–15 days depending on the location of the grounds fished as well as type of boat and gear used.

Fishing Grounds and Habitats

Main fishing grounds are concentrated in the northern part of the study area, between 27.50 N and 27.20 N latitude along the coast and around the Hurghada Islands. Hand and long lines are the dominate fishing gear used, followed by entangle nets. Lesser fishing grounds are used by purse-seiners. Small fishing grounds are scattered southward and are mainly fished using hand and long lines and to lesser extent entangle nets and purse-seining. Maps 3–6 in appendix 1 show these grounds while map 1 illustrates the distribution of the main fish species by fishing grounds.

Fishing habitats include the coral reefs, hard substrates, soft bottoms, mangrove forests, and deep water. Table 4 breaks out fishing habitat by landing sites.

Table 14 Fishing Habitat by Landing Sites

Coral	Mangrove	Hard Substrate	Soft Bottom	Deep Water
El-Ahiaa	Sharm el-Bahary	El-Dahar	Hurghada Port	Hamats Port
Safaga	Sharm el-Kebly	Safaga Port	Ras Banas 2	
Quseir	Cul'an Village	Om el-Hoitata		
Marsa Umm Gheg		El-Gweeh		
Marsa Alam Old Jetty		El-Shekh Malak		
Marsa Alam Port				
Kilo 24 South Marsa Alam				
Sharm el-Loly				
Cul'an Village				
Sataieh				
Ras Banas 1				

Catch and Target Species

A breakdown of annual catch estimates based on fieldwork is presented. Catch estimates for the study area indicate that the annual landings have been about 2,400 tons. Except in the vicinity of Hurghada, fishing activity is less significant, more scattered and limited. Hurghada's three landing sites (Fishing Port, El-Ahiaa and El-Dahar) alone account for 80 percent (1,940 tons) of the study area's total catch.

Study area fisheries are dominated by reef fish landings. Purse-seiners operating in the vicinity of the Hurghada Islands as well as artisan vessels fish along the coast of the area for pelagic species. There is a marked difference in catches down the coast, due primarily to different habitats, but also to the use of different gear.

Tables 5, 6, and 7 illustrate the target species according to fishing gear used in the study area.

Table 15 Target Species Fished using Entangle Nets (Trammel, Gill, and Veranda Nets)

Family/ Species	English name	Local name
Belonidae (Needlefish)		
Tylosurus choram	Red Sea Houndfish	*Khirman*
Hemiramphidae (Halfbeaks)		
Hemiramphus far	Spotted Halfbeak	*Gambrour*
Holocentridae (Squirrelfish)		
Adioryx caudimaculatus	Crown Squirrelfish	*Bosili Ahmer*
Flammeo Sammara	Spotfin Squirrelfish	*Bosili Abid*
Serranidae (Grouper)		
Plectropomus maculates	Roving Grouper	*Trad*
Plectropomus turuncatus	Squaretail Grouper	*Nagel*
Priacanthidae (Bigeyes)		
Priacanthus hamrur	Goggle-eye	*Abo Sharara*
Haemulidae (Grunts)		
Plectorhynchus gaterinus	Blackspotted Grunt	*Tahmal*
Plectorhynchus schotaf	Minstrel	*Tahmal*
Sparidae (Progies)		
Rhabdosargus sarba	Yellowfin Bream	*Botit*
Acanthopagrus bifsciatus	Doublebar Bream	*Rhabag*
Diplodus noct	Arabian Pinfish	*Abo nocta*
Mullidae		
Parupeneus macronema	Longbarbel Goatfish	*Embera*
Parupneus forsskali	Forsskal's Goatfish	*Embera*
Parupeneus cyclostomus	Yellowsaddle Goatfish	*Embera*
Parupeneus rubescens	Rosy Goatfish	*Embera*
Mulloides flavlineatus	Yellowstrip Goatfish	*Embera*
Mulloides vanicolensis	Yellowfin Goatfish	*Embera*
Gerriedae (Mojarras)		
Gerres oyena	Slenderspine Mojarras	*Gasa*
Mugilidae (Mullet)		
Crenimugil crenilabis	Fringelip Mullet	*Arabi*
Scaridae (Parrotfish)		
Hipposcarus harid	Longnose Parrotfish	*Wareig*
Cetoscarus bicolor	Bicolor Parrotfish	*Abohomar*
Scarus sordidus	Bullethead Parrotfish	*Haridaswed*
Scarus genazonatus	Purplestreak Parrotfish	*Hafar*
Scarus ghobban	Bluebarred Parrotfish	*Farhodi*
Scarus psiltacus	Palenose Parrotfish	*Baid*

Family/ Species	English name	Local name
Acanthuridae		
Acanthurus sohal	Sohal	*Sohal*
Zebersoma veliform	Sailfin Surgeonfish	*Flafel*
Naso unicornis	Bluespine Unicornfish	*Raho (Abo karn)*
Siganidae		
Siganus rivulatus	Rivulated Rabbitfish	*Sigan*
Siganus argentus	Forktail Rabbitfish	*Shbigy*
Siganus luridus	Squaretail Rabbitfish	*Hrofy*

Table 16 Target Species Fished using Hand and Long Lines

Family/ species	English name	Local name
Belonidae (Needlefish)		
Tylosursus choram	Red Sea Houndfish	*Khirman*
Hemiramphidae (Halfbeaks)		
Hemiramphus far	Spotted Halfbeak	*Gambarour*
Holocentridae (Squirrelfishes)		
Adiryx caudimaculatus	Silverspot Squirrelfish	*Kahaia*
Serranidae (Grouper)		
Cephalopholis argus	Peacock Grouper	*Nagel*
Cephalopholis miniata	Halfspotted Grouper	*Homrany*
Cephalopholis hemstikotos	Coral Grouper	*Kosher helf*
Cephalopholis oligostica	Vermilion Grouper	*Kosher helf*
Epinephelus faciatus	Blacktip Grouper	*Abololo*
Epinephelus microdon	Smalltooth Grouper	*Karna*
Epinephelus fascoguttatus	Brownmarbeled Grouper	*Fark karna*
Epinephelus summana	Summana Grouper	*Bagog*
Epinephelus malabaricus	Malabar Grouper	*Tween*
Epinephelus areolatus	Areolate Grouper	*Kosher tina*
Epinephelus chlorostigma	Brownspotted Grouper	*Fanoos*
Variola louti	Lunertail Grouper	*Sherifa*
Plectropomus maculates	Roving Grouper	*Nagel Ahmer*
Plectropomus truncatus	Squaretail Grouper	*Tarad Shaib*
Carangidae (Jacks)		
Carangoid bajad	Orangespotted Jack	*Biad*
Carangods fulvoguttatus	Yellowspotted Jack	*Salikh*
Caranx melampygus	Bluefin Trevally	*Girm baiad*
Caranx sexfaciatus	Bigeye Trevelly	*Baiad*

Family/ species	English name	Local name
Lutjandae (Snapper)		
Lutjanus flaviflamma	Dory Snapper	*Herby*
Lutjanus bohar	Twinspot Snapper	*Bohar*
Haemulidae (Grunt)		
Plectorhynchus gaterinus	Blackspotted Grunt	*Katreen*
Plectorhyncus pictus	Painted Grunt	*Shataf*
Lethrnidae(Emperor)		
Lethrinus elongates	Longnose Emperors	*Khirmy*
Lethrinus variegates	Variegated Emperor	*Dreeny*
Lethrinus lentjan	Redspot Emperor	*Khomkhom*
Lethrinus ramak	Yellowstripe Emperor	*Bongoz*
Lethrinus mahsena	Mahsena	*Mehsena*
Lethrinus nebulosus	Spangled Emperor	*Shoor*
Monotaxis grandoculis	Bigeye Emperor	*Aboeen*
Sparidae (Progies)		
Acanthopagrus bifasciatus	Doublebar Bream	*Rabag*
Spyraenidae (Burracudas)		
Sphyraenae barracuda	Great Barracuda	*Kenaya*
Sphyranae putnamiae	Chevron Barrcuda	*Ogaam*
Balistidae (Triggerfish)		
Pseudobalistes fuscus	Blue Triggerfish	*Shaaram*
Odnus niger	Redtooth Triggerfish	*Aboariba*

Table 17 Target Species of Fish for Purse-seiners

Family/Species	English name	Local name
Culpeidae		
Sardinella melanura	Spotted Sardinella	*Sardin mofater*
Clupea sirm	Golden striped Sardinella	*Sardin mofater asfer*
Clupea leigoaster	Red-eye Round Herring	*Moza*
Scombridae		
Scomber japonicus	Houtuyn	*Shak el-Zore*
Rasterelleger kanagurta	Indian Mackerel	*Bagah*
Atherinidae		
Atherina forskali		*Kashkosha*

Table 8 illustrates catch composition and fishing gear used in aggregation/season in different fishing grounds. Note that fishing operations are undertaken in spawning and feeding aggregation. Deep and detailed studies may be required to identify the proper

fishing times to maximize both biological and economic yields and to ensure sustainability of the resources.

Table 18 Catch Composition, Fishing Gear, and Aggregation/Season by Fishing Grounds

Family/Species	Fishing Gear	Aggregation/Season	Sites
Serranidae *Epinephalus twina* *Twina*	Hook and line	Spawning aggregation (June and July)	Ras el-Gimsha, Abo Malh, and Twila
Carangidae *Caranx fullvoguttatus* *Slikakaady* *Decaperus helenae* *Shakora*	Hook and line Purse-seine	Feeding aggregation Winter months Spawning aggregation (May, June, and July)	Gobal, Shidwan Island, Ras Banas, and Abo Monkar
Mullidae *Mulloidicthys auriflamma* *Embera baldi*	Trammel and gill nets	Near shore feeding and spawning aggregation 15 days in May, June, and July	Sharm el-Arab, Dishatt Abo Monkar, Shatt el-Mina, Gaffateen, and Shidwan
Gerreidae *Gerres oyena* *Gasa*	Trammel and gill nets	Spawning aggregation February, March, April, and May	Sharm el-Arab, Dishatt, Abo Monkar, Shatt el-Mina, Gaffateen, Shidwan, and Ras Banas
Lutjanidae *Lutjanus bohar* *Bohar*	Hook and line Trammel net	Spawning aggregation July, August, and September	Gobal and Shidwan
Sparidae *Argyrops spinifer* *Morgan*	Trawling Gill and trammel nets	Spawning aggregation Winter months	In the soft bottom near coral reefs in the study area

Family/Species	Fishing Gear	Aggregation/Season	Sites
Letherindae *Letherinus nebulosus* *Shoor*	Hook and line Trammel net	Spawning aggregation 21 April–15 June	North Abo Nahas, Shidwanand, and Elhilook
Letherinus mahsena *Mahsena*	Hook and line Trammel net	Spawning aggregation 21 June–July	Between Giftun Island and El-Ereg el-Sogaier, Abo Monkar, and El-Ereg el-Keebeir
Scaridae *Scarus bicolor* *Biaady*	Gill and trammel nets	Spawning season July, August, and 15th September	Abo Monkar
Scombridae *Scomber japonicus* *Shak el-Zor*	Purse-seine	Spawning aggregation	Abo Monkar
Mugilidae	Veranda net	Spawning agreggation	El-Ahiaa to El-Esh

Nursery Grounds

General

The Importance of the sheltered marine coastal habitat as nursery grounds for the juvenile fishes is well-established in the literature and it has been shown that a large number of fish species are dependant on these area during the juvenile phase of their life cycle.[11]

Typically, juvenile fish enter the nursery areas after metamorphosis, having been spawned elsewhere in the sea. They remain in the nursery area for some time, often no more than a year before vacating it for their adult habitat. This pattern of habitat utilization is considered to occur because sheltered habitat offer advantages over marine environment in the terms of protection from predators and an abundant food supply.[12] [13]

[11] Bennett, B.A., "The Fish Community of the Moderately Exposed Beach on the South Western Cape Coast of South Africa and an Assessment of their Habitat as a Nursery Ground for Juvenile Fishes," *Estur. Coast. Shelf. Sci.,* 28:239-305, city, 1989.

[12] Lenanton, R.C.J., "Alternative Non-estuarine Nursery Habitats for Some Commercially and Recreationally Important Fish Species of Southwestern Australia," *Australian Journal of Marine Freshwater Resources,* 33:881-900, city, 1982.

[13] Ahmed (other names), "Ecological and Biological Studies on the Juvenile Fishes in South Sinai," M.Sc. thesis, Suez Canal University, Suez, 1992.

Nursery grounds for juvenile fish must have certain characteristic features. They must be rich in food and particularly high in temperature. They are usually found near the shore, i.e., in sheltered, shallow water. Gibson stated that juveniles are adapted to shallow water life that allow them to remain in the favorable position of the littoral zone, but the adults of their species are found in deeper water. Gibson summarized factors affecting the abundance of juveniles as salinity, temperature, turbulence and wave action, and food availability.[14] Blaber and Blaber summarized the factors affecting juvenile fish in the nursery grounds as physical and biological parameters, adding that predators are an important factor.[15]

The nursery grounds include estuaries and sheltered coastal marine habitat such as sandy shores, bays, and mangroves. These habitats serve as nursery areas for many juveniles of marine fish species.[16] Many authors have shown that a large number of species—perhaps 100—are dependent on these habitat during the juvenile phase of their life cycles.[17]

Ahmed studied the nursery grounds in the Gulf of Aqaba in the Egyptian Red Sea and found that that Sharm el-Mayia Bay and NABAQ mangroves are excellent nursery grounds for 13 commercial fish species.[18]

Nursery Grounds in the Study Area

Twenty-three nursery grounds have been identified in the study area. Maps 7–10 in appendix 1 and table 9 below illustrate their distribution by habitat. Seventeen nursery grounds are threatened by fishing and tourism activities, two mangrove grounds are located in marine parks, but are used for animal grazing, the rest are still unused for any activity. Serious actions should be taken to protect and conserve the nursery grounds.

Table 19 Nursery Grounds in the Study Area

Nursery	Position	Habitat	Activities
Gimsha	39.28 N 33.33.51 E	Seragrass and seaweed	Fishing
Gobit Melaha	31.26 N 33.33.24 E	Seagrass	Fishing
Gobit el-Disha	02.47 N 33.53.22 E	Soft bottom	Tourism and fishing

[14] Gibson, R. N., "Recent Studies on the Biology of Inertial Fishes," Oceanographic Marine Biology Annual Review, 20:363-414, city, 1982.
[15] Blaber, S.J.M. and Blaber, I.G., "Factors Affecting the Distribution of Juvenile Estuaries and Inshore Fish," *Journal of Fish Biology*, 17:134-162, city, 1980.
[16] Bennett, 1989.
[17] Need to provide a reference for this one—the listed Blaber is 1980.
[18] Ahmed, 1992.

Nursery	Position	Habitat	Activities
Abo Makadig	59.40 N 33.53.56 E	Seagrass	Tourism and fishing
Sharm el-Arab	57.56 N 33.55.13 E	Seagrass and coral patches	Fishing
Soma Bay	50.09 N 33.57.00 E	Seaweed and Seagrass	Tourism
Mangrove Rehabilitation	36.56 N 34.00.41 E	Mangroves	Marine park
Abo Kalawi	30.32 N 34.03.59 E	Seagrass seaweed	Fishing
Mangrove	24.07 N 34.06.54 E	Mangroves	Marine park
Asil	56.31 N 34.23.15 E	Coral	Tourism
Marsa Wzer	47.09 N 34.29.11 E	Seaweed	None
South Om Geish	42.18 N 34.3.22 E	Soft bottom	None
Om el-Grifaat Lagoon	36.00 N 34.36.12 E		Tourism
South Abo Dabab	17.59 N 34.45.06 E	Soft bottom	None
Morein Lagoon	23.41 N 34.42.06 E		Tourism
Gabal el-Rosas	12.17 N 34.48.23 E	Soft bottom	None
South Gabal el-Rosas	09.11 N 34.51.00 E	Soft bottom	None
Kilo 7 South Marsa Alam	00.47 N 34.55.30 E	Seagrass	None
Sharm el-Loly	36.35 N 35.06.36 E	Soft bottom	Fishing
Wadi el-Kalaan Mangrove	21.27 N 35.18.21 E	Mangrove	Marine park, animal grazing, and fishing
Hamata	17.52 N 35.22.06 E	Mangrove	Marine park, over-grazing, and fishing
Wadi Lahmy	12.57 N 35.25.32 E	Mangrove	Tourism

Nursery	Position	Habitat	Activities
Kara el-Hartway	07.53 N 35.29.12 E	Mangrove	None

Fishermen

Based on fieldwork data, there are an estimated 2,800 fishermen operating in the study area. This figure represents regular fishermen operating from fishing vessels as well as those who use trucks to transport nets and fish to and from fishing grounds, i.e., foot fishermen. It does not include part-time fishermen or those who operate tourist boats who also fish.

A breakdown of fishermen by landing site is given. Approximately 46 percent or a total of 1,280 fishermen are based at the Hurghada region's landing sites, Al-Ahiaa, El-Dahar, and Hurghada Port. Approximately 90 percent of all fishermen are predominately artisan fishermen using hand and long lines, gill nets, trammel nets, and veranda nets.

Fisheries resources in the study area targeted by three groups:

15. Local fishermen who originally came from Upper Egypt and are based mainly in Hurghada, Safaga, and Quseir and settled Bedouin fishermen, belonging to the Bshari and Abada tribes who are living in Ras Banas in small groups. The latter group use mainly sail boats with veranda nets, cast nets, hand lines and longs lines. Production is consumed locally, with some fish salted or sun dried.
16. Migratory fishermen who came many years ago from Fayoum Governorate and settled mainly in Hurghada and Safaga. It was reported that about 195 fishermen are fishing from Hurghada and 15 from Safaga. They usually establish seasonal fishing camps and use fishing boats equipped with inboard engines. They introduced the use of gill nets that consist of 30 segments of 30 m. long in an illegal mesh size, which are highly destructive. They also use stand nets on corals, which cause serious damage to this important habitat. As to date the Red Sea fisheries are open to all, there is a trend toward gradually increasing their numbers That may present serious threats to fisheries in the area.
17. Visiting fishermen who operate purse-seiners during the fishing season and go back to their home villages in the Delta.

Most fishermen in the artisan fleets are related to or belong to one family. For the local fishermen, there is a noticeable trend toward leaving fishing to work in tourism and other

sectors such as mining and petrol. Reasons cited include limiting fishing grounds and poor coastal zone management. There are already conflicts between tourism development and traditional fishing interests. The main coastal stakeholders affected by tourism and reef recreational activities in particular are the artisan fishing communities. A recent Global Environmental Fund project survey, together with other project-related stakeholder analyses (MEP Report 540-R-12, 1998) showed the main issues to be:

- **Reduction in access to reef flat fisheries due to the construction of beach front hotels and water sports facilities.** Actual access to the beach is denied and most hotels actively prevent fishing in front of the hotel. In both Hurghada and Safaga, approximately 20 km of beach front are now effectively barred to local fishermen.
- **Displacement of fishing communities through hotel and water sport development.** New tourism activity sites are often designated and implemented without local consultation. In some cases (i.e., Barakah), fishing villages are displaced involuntarily. Favorable hotel development sites (i.e., adjacent to reef flats, in bays, or on headlands) are often productive fishing grounds that increase the chance of conflict unless appropriate investigation and compromise is made.
- **Favored dive sites become effectively barred**. Often located in traditional fishing grounds, these can be closed to artisan fishermen. Local fishermen also report that fish catches are markedly lower in sites that are frequently dived.
- **Traditional fishermen are leaving.** More lucrative opportunities exist in the dive and hotel sector for the traditional fishermen. Newcomers with less knowledge about the local ecology and with unsustainable fishing practices frequently replace them. This has led to an increase in habitat destruction from nets damage. There is also an irreversible loss of knowledge of traditional local fishing methods.[19]

It is necessary that some level of compromise be integrated into proposed shoreline management plans.

Based on information from interviewed fishermen at visited landing sites, the average monthly income from fishing activities was: Hurghada, LE 300–500; Safaga, LE 50–200; and other landing sites, LE 200–700.

The fishermen live in their own communities. In Hurghada they concentrate in the El-Sakkala region near the fishing port. Other main fishing communities are El-Gweeh Village, Quseir, Marsa Alam, Kilo 24 South Marsa Alam, Cul'an Village, Sataieh, and Ras Banas.

There are three fishermen's cooperative societies in the study area: Hurghada Cooperative with about 600 member fishermen, Safaga Cooperative with 129 members,

[19] Breika, 1997

and Quseir cooperative with 269 members. Fishing cooperatives are governed by Fishing Cooperative Law No. 123/1982, which stipulates the role of the cooperative in improving the economic, social, and professional status of members. Cooperatives provide a number of benefits and services, including supply of fishing gear and equipment, credit finance, and some basic social services. Migratory fishermen do not belong to the cooperatives as they are not accepted by local member fishermen. It is important to group the migratory fishermen in some kind of association to facilitate contact between them and other concerned bodies.

Wadi el-Gemal–Hamata Protected Area

The Wadi el-Gemal–Hamata Protected Area includes three landing sites:

18. Sharm el-Loly, with 55 local fishermen operating 11 boats equipped with 40 hp outboard engines and using trammel nets. The average annual landings are estimated at about 28 tons composed mainly of Slenderspine Mojarras (*Gasa*), Mullet (*Arabi*), Rabbit Fish (*Sigan*), Goat Fish (*Ember*), and Emperor (*Shoor*). The main fishing grounds are Hamraween, Abou Saan, and Wadi el-Gemal Island, which are also nursery grounds.
19. Cul'an Village, with 20 local fishermen operating four fishing boats equipped with 20–40 hp outboard engines and mainly using trammel nets. The average annual landings were estimated at 5 tons composed mainly of Mullet, Mojarras, Houndfish (*Kherman*), Parrotfish (*Harid*), and Grouper (*Koshar*). The main fishing grounds are mangrove habitats and Cul'an Island.
20. Hamata, with 50 local and migratory fishermen operating 10 fishing boats with 40 hp outboard engines and mainly using hand lines and trammel nets. The annual average landings were estimated at about 25 tons composed mainly of Snapper (*Fares*) and Jack (*Biad*). The main fishing grounds are the deep waters of Koraa el-Hartawi and Hamata. The latter is considered nursery ground.

Fish Handling and Marketing

Most of the fish is marketed fresh (iced), and a small part—mainly mullet—is salted while bigger fish may be dried. Fish are sorted and graded on the boats. The fishermen's cooperative society in Hurghada manages the marketing of fish caught by its members against a commission. A certain quantity of the catch has to be delivered to the Red Sea Governorate to be sold at a fixed price to local consumers.

At the other landing sites, the fishermen market their own catch directly to consumers comprised of mine workers, company officials, and tourism villages.

Salted fish are packed in metal tins (15–17 kg in each tin) and sent by truck to be sold to wholesale merchants mainly in Cairo. The wholesale merchants have their representatives in the main fishing centers (Hurghada, Quseir, and Baranis) that provide fishermen with tins and loans and manage salted fish collection and transportation.

Fisheries Legislation

Fisheries are governed by national laws that dictate the terms and conditions under which fishing activities may take place and provide for protection and conservation of living marine resources. Regulations (or by-laws) set out the details concerning fishing activities and restrictions that apply.

Law enforcement is the responsibility of GAFRD in cooperation with the Ministry of Defense Frontiers Guard. The Guard is based at the fishing ports and main landing sites. They issue permits to fishing vessels and record trip duration, area fished, and names of fishermen on each boat.

The GAFRD was created by Presidential Decree 190/1983. The chairman of the authority was given the status of first secretary, directly responsible to the Minister of Agriculture. Presidential Decree 465/83 gave the GAFRD the right and obligation to supervise, administer, and monitor the waters of Egypt. Presidential Decree 362/1984 declared that all license fees due from fishermen and fishing vessels are the property of the authority.

In 1983, two laws were created that dealt with the fisheries sector. The first was Law 123, dealing with fisheries cooperative societies. The second was 124, dealing with fishing, living aquatic resources, and fish farms.

Law 123 regulates the fishermen's cooperative societies, to which the majority of fishermen in Egypt now belong The law deals with the administration, meetings, elections of the board of directors, distribution of profits, and credit arrangements. It also established the Fishermen's Cooperative Union, to which all the cooperative societies belong.

Law 124 (Fisheries and Fish Farming Organizing Law) deals with all living aquatic resources, fishing grounds, vessels and methods, pollution, licensing, fees, penalties, and other matters.

These articles are relevant to the Red Sea:

- Article 2: All fishing boats must show clearly, both on their hull and their sail, their class, license number, and designated fishing area. The class of a boat (sailing and

rowing) is designated according to the size and class of its crew—1st class will not exceed 27 fishermen crew, 2nd class will not exceed 13 fishermen crew, 3rd class will not exceed 4 fishermen crew.

- Article 7: All fishing is prohibited in areas and seasons as decreed by the Minister of Agriculture. Use of some fishing gear may be prohibited by such decree as well.
- Article 9: All unlawfull fishing gear is prohibited either on board of fishing boats or in the possession of persons in the fishing areas or nearby.
- Article 10: It is prohibited to catch, sell, or have undersized fish or other living aquatic species, whether fresh or dried and salted.
- Article 11: It is prohibited to catch ornamental fish without permission from GAFRD.
- Article 13: Using harmful materials, poisons, narcotics and explosives…is prohibited in fishing.
- Article 23: All fishing boats must be licensed. Fishermen, whether or not on a boat, are required to be licensed and to carry a fisherman's card. The number of vessels using each type of fishing gear is determined according to the by-law.

Sanctions

- A boat not showing the information identified in Article 2 shall be fined LE 20.
- A boat fishing without a license shall be fined LE 50 and the responsible shall be imprisoned for up to 3 months, or one of these two sanctions. In addition, the boat and fishing tools shall be confiscated.
- Use of unlawful fishing gear or fishing in closed areas or seasons shall be liable to a fine of LE 100–500, and imprisonment of 3–6 months, or one of these two sanctions.
- Use of poisons or explosives shall be liable to a fine of LE 500–1,000 and imprisonment of 6–24 months, or one of these two sanctions.

In addition to these specific regulations, the Minister of Agriculture has wide discretionary powers to regulate the issuance of licenses and to identify fishing areas and seasons.

In 1987, the Minister of Agriculture's Decree 303 was issued to implement Law124. The decree deals with detailed fishing methods, fishing grounds, fees, and penalties.

Other authorities have also issued regulations to control fishing activities in the Red Sea as well as to identify Wadi el-Gemal as a protected area. These as summarized in table 10:

Table 20 Principal Decisions Issued by the Red Sea Governor, the Chairman of GAFRD, and the Prime Minister Affecting Egypt's Fisheries

Decisions	Subject
Red Sea Governor	
No. 14/1998	Prohibition of any action or activity that will lead to the destruction or deterioration of the natural environment of islands and areas surrounding them as well as mangrove regions.
No. 46/1998	Prohibition against collecting, exposing, and marketing shells, coral, ornamental fish, and other protected marine species is the governorate.
No. 95/1998	Prohibiting harpoons for fishing in Egyptian waters.
No. 22/2003	Prohibition of Sea Cucumber fishing for 1 year starting in March 2003.
Chairman of GAFRD	
No. 410/2001	Hurghada and its islands belong to the Red Sea (not to the Gulf of Suez) and it is permitted to use lines and net as follows: Ghabriat nets of 20 mesh size, Mowaghat nets with 2 layers of 6 mesh size for the outside layer and 17 mesh size for the other layer The number of segments of each net shall not exceed 12 units. It is forbidden to use this gear in coral reef regions.
No. 424/2001	Implementing Law 124/1983 in Hurghada Islands as in the case of Gulf of Suez, except that it is permitted to use lines and nets in the Hurghada region and its islands as follow: Nets for Borbon of 20 mesh size, Marabee nets of 14 mesh size, Mowagehat nets with 2 layers of 6 mesh size for the outside layer and 17 mesh size for the inside layer, provided that the number of segments do not exceed 12 units to ensure smooth operation of small boats.
No. 1741/2001	Closed season for the Gulf of Suez and the Hurghada region and its islands are as follow: From 1/6/2001 to 30/9/2001 for trawlers. From 5/6/2001 to 5/11/2001 for purse-seiners. From 1/8/2001 to 30/9/2001 for launches using lines (hooks). From 1/9/2001 to 30/9/2001 for small boats (faloukas) using lines (hooks). As for the Red Sea, closed to trawlers from 1/8/2001 to 4/10/2001.
No. 236/2001	Hurghada region and its islands are considered part of the Gulf of Suez. Lines are only permitted for fishing in this area. Nets of all kinds are not permitted.

Decisions	Subject
No. 282/2002	Sea Cucumber fishing is permitted year around with the exception of April, May, and June (spawning period). 52 boats and 155 foot fishermen are licensed for fishing. The licenses are identified by region according to the attached list and through the fishermen's cooperatives and companies. They are responsible for the safety of divers during the operations. The fee to be paid by fishing boats with a maximum of 5 persons is LE 5,000/year and LE 500 for on-foot fisherman. The fee per individual Cucumber taken from Egyptian water is to be PT 15, distributed as follows: PT 2 for the cooperative, PT 2 for the Cooperative Union, and the rest for GAFRD. As for fishing boats taking Cucumbers from outside Egyptian waters and landing them in fishing ports along the Red Sea coast, the fee is to be LE 5 per fish box. Use of trawlers to catch Sea Cucumbers within Egyptian waters is prohibited.
Minister of Agriculture	
No. 410/2002	Prohibiting catching Sea Cucumbers in the protected areas and around the islands as well as in the coral reef regions of the Red Sea.
Prime Minister	
No. 143/2003	Identifying the Wadi el-Gemal–Hamata Protected Area in compliance with Law 102/1983. The Governor of the Red Sea is to supervise the implementation of the decision in coordination with concerned authorities.

Other legislation and regulations that directly or indirectly regulate and protect marine resources in the Red Sea include:

- Minister of Defense Decree No. 56/1962 on the Cleanliness of Ports and Territorial Waters, in compliance with Public Law 280/1960 regulating ports and territorial waters
- Public Law 72/1968 on the Protection of Sea Water against Oil Pollution
- Presidential Decree 261/1981 concerning the establishment of a Shore Protection Authority (SPA)
- Ministry of Industry Decree 380/1982 concerning the Protection of the Environment against the Introduction of New Technologies
- Presidential Decree 1948/1985 establishing a Standing Committee for the Prevention of Marine Pollution by Oil, amending Decree 691/1972

- Conservation Law 102/1983 setting up the legislative framework for the creation of protectorates
- The legislative framework governing all new developments is the Law for the Environment (Law 4/1994) brought into effect by Executive Regulations issued by Prime Minister Decree 338/1995.

  The main provisions of this law can be summarized as:

  – Founding an agency with a clear mandate to protect the environment—the Egyptian Environmental Affairs Agency (EEAA).
  – Establishing and running environmental information and monitoring networks to guarantee an efficient implementation of the agency's mandate.
  – Centralizing pollution control and giving powers to EEAA in terms of pollution control and management.
  – Setting up an Environmental Protection Fund with sufficient resources and well defined expenditure items. The fund resources are devoted to research, technical analyses of the environment, environmental assessment studies, the establishment of environmental monitoring networks, the removal of pollutants, and other activities aiming at environmental protection.
  – Setting up the principles and procedures to be followed in the preparation of environmental impact assessments of new projects and extensions to existing projects that have the potential of adversely affecting the environment.
  – Establishing an Environmental Affairs Department in each governorate to help coordinate and implement EEAA's mandate at the local level.

  Under the Executive Regulations virtually all new construction or extensions to previous construction require the consent of a competent administrative authority, which is one of various ministries or governorates depending on the nature and location of the construction. Each proposal must be accompanied by some form of environmental impact assessment. The competent administrative authority provides preliminary screening of the proposal and passes the environmental impact assessment to the EEAA for evaluation and comment. In the light of these comments, the competent administrative authority may approve, refuse, or request modifications to the project. There is an appeals procedure to which EEAA has input but is not otherwise involved in the final judgment.

Articles 59 and 60 of Law 4 have far-reaching implications for the design of new coastal resorts. Article 59 prohibits construction of any establishment within 200 m of the

shoreline except with the approval of the General Shore Protection Authority in coordination with EEAA, following submission by the developer of a detailed environmental impact assessment of potential impacts to the coastal area and shoreline. Particular attention must be given to the precautions that are to be taken by the developer to avoid erosion, sedimentation, and alteration of coastal currents and pollution that could potentially result from the project. Article 60 prohibits all activities that cause alteration of the natural shoreline.

Appendix VIII of the Guidelines for Egyptian Environmental Impact Assessment (EEAA, 1997) gives specific guidelines for environmental impact assessments for offshore oil and gas establishments. Of particular relevance to the GEF Red Sea project is Section 4.2 (Coastal and Marine Ecosystems and Resources). The developer should consider the following issues:

- Fauna and flora, and rare or endangered species within or in areas adjacent to the project
- Sensitive habitats, coral reefs, wetlands, bays, lagoons, marshes, and mangrove swamps
- Species of commercial importance affected by the project
- In addition to the biological data, the EIA should consider water quality, currents, ability to assimilate discharges and maintain desired water quality, and other significant sources of pollution in the area.

Protected Areas Legislation

Initiatives include the Egyptian Conservation Law, Law 102/1983, which established the framework for the creation of protected areas. Implementation of some of the provision of this law is provided by a 1983 Prime Ministerial Decree.

The regulations defined in Article 11 of Law 102, deal with any action or activity that will lead to the destruction or deterioration of the natural environment or harm the biota, or detract from the aesthetic appeal of the protected areas. The rangers in charge of the day-to-day management of protected areas patrol to guard against the following actions, which are strictly prohibited:

- Hunting, transporting, killing, or disturbing living terrestrial and marine organisms, or carrying out activities that would lead to their destruction (i.e. spear fishing).
- Damaging, removing, or transporting any living organism or organic material such as shells, corals, rocks, or soil for any purpose.
- Damaging or transporting plants found in a protected area.
- Damaging or destroying geographic or geological formations of areas considered as habitats for animals and plants, or for their reproduction.

- Introducing foreign species into protected areas.
- Polluting the soil, water, or air of a protected areas.
- Construction of any building or establishment in a protected area without the permission of the relevant administrative body.

It is concluded that a common feature in the study area is that most laws do not have the strength and clarity needed for effective management and monitoring, control, and surveillance (MCS). Common concerns include inadequate definition of term such as ‘fishing vessel,’ ‘tourism vessel,’ or ‘fishing activities’ for sound administration and enforcement of the legal process. Penalties for infringements are frequently far too low, undermining respect for management and control, since there is minimal deterrence. Licensing systems are often inadequate. For example, it was reported that many fishing vessels operating in the study area—especially in the southern part—have no license.

Fisheries observers and enforcement officers’ powers, duties, and responsibilities are in some cases not described; procedures following seizure and arrest are not specified; and often there is no option of imposing an ‘administrative penalty’ by the minister responsible for fisheries rather than initiating a lengthy court process.

Poor coordination between different governmental bodies has often resulted in overlapping responsibilities and jurisdictions for the implementation of legislation for the marine environment and coastal zone.

National legislation should also be brought into line with current international initiatives to promote cooperation in management of shared stocks as required under the United Nations Convention of the Law of the Sea (UNCLOS) and facilitate implementation of the Food and Agriculture Organization’s (FAO) Code of Conduct for Responsible Fisheries and the Conservation and Management of Straddling Stocks Agreement.

5. Proposed Fisheries Management Plan for the Study Area

Introduction

The management plan defines how the marine resources of the study area, including the Wadi el-Gemal–Hamata Protected Area, will be managed. It tries to answer the following questions:

- What fisheries resources are available?
- How valuable are these resources?
- What is the best way to use these resources?
- Are the resources being overexploited and the environment being damaged?
- Are there resources that are being under-used? Should these be fished more?

The plan is based on information gained from a number of sources including existing documentation and interviews with officials, fishermen, managers of fishermen's cooperatives, and fish traders.

The plan indicates the key issues and constraints for sustainable fisheries development and conservation. It identifies objectives for the fisheries and the strategy to be employed in order to achieve those objectives. To be successful, the plan must have the active input, support, and acceptance from all stakeholders, especially the fishermen. A carefully planned public awareness program will be essential.

Key Issues and Constraints for Sustainable Fish Resources

There are a number of problems facing the fisheries in the Red Sea. These include inadequate information, ineffective management, uncontrolled use of resources, poor control of the resources, lack of planning, and inadequate training and public outreach activities.

Inadequate Information Base

Fisheries management must be based on an accurate understanding of the resource base and of the relationship between resources use and natural regeneration, that is the

sustainability of fish levels and methods of exploitation. There is currently very little reliable data on which to base fishery specific management strategies and measures. Current data collection systems lack planning and transparency. Data formats are often not amenable to effective stock assessment or monitoring of fisheries management. A lack of comprehensive biological and economic statistics is a major constraint to effective fisheries management. This is compounded by a lack of awareness or application of the precautionary approach principle.

A fundamental requirement for statistical information on artisan fisheries, for purposes of resources assessment, planning, and future management, is the establishment and implementation of an appropriate sampling program. This must be based on a new census of the size, location, and characteristics of the fishing fleet. The implementation of the program will require enumerators stationed at, or near the sites selected for sampling.

It is suggested therefore that the present arrangements for fisheries data collection and analysis be revised. Data should be collected that will allow routine catch, effort, and CPUE analysis at the species level.

Inadequate Effective Management

Fisheries management policies are not currently well defined, nor are they based on reliable scientific information. Modern guidelines such as the Code of Conduct for Responsible Fisheries are not part of legal framework. The adoption of the precautionary approach has considerable implications for fisheries management authorities. Scientific advice to fisheries managers should allow for uncertainty in both the understanding of the state of the stocks and the effect of future management actions. When less is known, fisheries management authorities should be more cautious. This requires a management approach less focused on and influenced by short-term considerations, and more concerned with long-term sustainability of fisheries resources and the environment. Over-fishing due to over-capacity and ineffective application of controls is the major problem facing Red Sea fisheries. Many factors attract new entrants from other governorates to the Red Sea fisheries, leading to uncontrolled effort expended on the resources.

Uncontrolled Expansion of Fishing Operations

Uncontrolled expansion of operations eventually leads to over-exploitation of the resources. The most appropriate way of regulating fishing is to limit the fishing fleet to a certain size. It is also appropriate to charge the tourist boats owners who fish for the right to exploit the common resources and recover some of the cost of managing the fisheries. This of course may also apply to the artisan fisheries in certain places.

There is anecdotal information concerning fishing and marketing of Sea Cucumber, but there are conflicting estimates of magnitude. Intensive surveillance could assist in

quantifying the problem, but very little can be done about it without empowered enforcement officers.

Poor Monitoring, Control, and Surveillance

National authorities are currently unable to undertake effective MCS of artisan fisheries due to lack of equipment, recurrent financial problems, and a lack of suitably trained personnel. The allocation of resources for enforcement as well as training of enforcement officers, particularly in areas of high fishing pressures, should be given priority. Implementing boat registration and licensing systems can assist surveillance of artisan fisheries.

Lack of Integrated Coastal Planning

Integrated coastal management is lacking: both the tourism and oil industries are afforded high priority, but the negative impacts of such activities on coral reefs, nursery grounds, spawning areas, and fishing grounds are not considered when policy is being made for these lucrative sectors.

There is a lack of effective communication between those formulating fisheries policy and the fishing industries and communities which are ultimately affected by the management measures imposed. This results in poor understanding of the need for and agreement with management measures. Considerable opportunity exists for increasing the involvement of fishing communities in the development and implementation of appropriate management measures for fisheries resources.

Lack of Extension, Training, and Public Awareness

Public awareness of the need for a balance between fisheries and environmental protection and conservation requires urgent attention. Many of the undesirable activities currently practiced (such as using gill nets with an illegal mesh size or dumping used gear at sea) could be reduced considerably if more attention were given to improving extension and training and public awareness campaigns.

Overall Objectives for Fisheries Management

Global objectives for management of fisheries resources should be designed to:

- Ensure that the fisheries are managed in accordance with the principles laid down in the FAO Code of Conduct for Responsible Fisheries, so that stakeholders enjoy maximum sustainable benefits.
- Promote cooperation between sectors so that fishery and marine resource management policies are integrated within the decision-making framework of the Coastal Zone Management Plan of the Red Sea.

- Integrate the many uses of marine resources so that they are managed for the equitable benefit of all stakeholders.

Management Strategy

The strategy to be employed in order to achieve the objectives must be:

- Simple, clear, and understandable to all interested parties
- Low in cost to implement and administer
- Based on elements of the existing national management system (e.g. licensing)
- Acceptable to the local fisheries societies.

The following strategy is recommended:

- Development of a sound information base on which to build a management system
- Adoption of a precautionary approach to decision making to ensure that harvesting of marine resources in the area is sustainable
- Adoption of a participatory approach to decision making so that wherever possible, management decisions are based on consensus among fishermen, authorities, and other interested parties
- Elevation of living standard for artisan fishermen by providing the means to improve processing, marketing, and distribution of marine products
- Encouraging exploitation of under-utilized marine resources
- Basing management primarily on controlling the fishing effort through the establishment of a vessel registration, implementation of licensing requirements already laid down in national law, and restriction of the number of licenses issued
- Development of a sound institutional foundation such as a Fisheries Management Committee.

Management Tasks and Options

Registration of Fishing Vessels

All fishing boats must be registered. The vessel's unique registration number must be fixed on both sides of the bow in accordance with existing legislation. No boat without a registration number should be permitted to obtain a license to fish commercially. The fishing vessel registration system would be based on the system already implemented. The registration system would form the main element of the proposed data collection system and be the main tool for regulating the fisheries.

Licensing Fishermen

Fishing licenses would be issued preferentially to applicants who are long-term study area residents. Fishermen from other places would be granted rights only if a license is available under the license allocation, and the management body—the Fisheries Management Committee—decides that the activities of the applicant will have no detrimental impact on the area license holders.

Licensing Fishing Vessels

All fishing boats used for commercial gain must be licensed in accordance with existing legislation. However, the terms and conditions of the license would specify the target species, allowable gear, and area/seasonal restrictions.

Regulatory Measures for Targeted Species and Sea Cucumbers

Based on information obtained during field visits as well as from fishery officials, the following regulatory measures are urgently needed:

- Prohibiting use of illegal gill nets called *sabeeb*
- Protecting inshore areas where spawning occurs
- Reducing possible growth of over-fishing by protecting juvenile fish
- Establishing areas known to be breeding grounds as 'no take zones' or closed areas.

It was reported that Sea Cucumbers fisheries are characterized by heavy exploitation. They were not subject to any form of management at all for a long period. Recently the Governor of the Red Sea issued a decision prohibiting Sea Cucumber fishing for the year starting March 2003.

Management measures imposed in Pacific Island fisheries include a minimum allowable size for dried products (Fiji), export quota restrictions (Solomon Islands), a system of 'crop rotation,' in which areas are harvested for a few months then left for the rest of year (New Caledonia and Fiji). There is little management experience around on which to base recommendations. However, the following management options should be investigated:

- Establish closed areas/seasons (crop rotation)
- Maintain a ban on SCUBA and snorkelling diving apparatus
- Introduce alternate year total bans for some areas, establishing marine reserves.

Improve Data Collection Systems for Monitoring and Assessment

The many dispersed landing sites, the multitude of species, variations in fish prices, and unrecorded subsistence catches combine to make data collection systems for artisan fisheries inaccurate and inordinately expensive in terms of the resources and manpower

needed to maintain them. In addition, the multi-gear nature of many artisan fisheries makes estimating fishing effort difficult in most cases.

Establishing a system for the collection of reliable data is the single biggest issue to be addressed in planning for management and future development of the fisheries in the Red Sea.

A proposed system is built on the sample-based approach, introducing new sample data collection forms, as well as compulsory data reporting requirements for the fishermen and other related persons.

Objectives

The proposed data collection system would have as an overall objective the establishment of a system for the regular collection of catch, effort, economic, financial, and biological data that would allow monitoring of changes in the fishery and contribute to the assessment of the status and population dynamics of the resources being exploited.

At the end of 1 full year's collection and analysis of data, the system should be able to provide:

21. An inventory of fishing gear, fishing vessels, fishermen, and their distribution
22. An estimate of total weight of fish caught and fishing effort, broken down by principal species, fishing gear, and areas fished (to allow spatial mapping of catch-per-unit of effort) that would enable assessment of the impact of fishing effort for each of the targeted species groups relative to available stock, and assess sustainability of the fisheries
23. Estimates of the number of full and part-time artisan fishermen (i.e. those who pursue fishing as a vocation) and subsistence fishermen
24. Basic trends in the fishery
25. Basic economic and financial indicators, including recurrent costs (fuel, ice, repairs, and maintenance), fixed costs (fees, duties, and depreciation), and earnings from sale of catch, to allow analysis of the economic viability and socio-economic importance of the fishery
26. Biological information for the main species targeted to allow an assessment of stocks and to set a baseline for future monitoring of the state of the stocks.

Databases

The data collection system would require the creation of a number of databases:

- Fishing vessel register database (FVRD),

- Fishing vessel license database (FVLD),
- Fishermen license database (FLD),
- Various databases containing information from interview/sample forms (catch, effort, economic data, length–frequency, and biological data).

Data Forms

Many data forms would be needed. These include:

- Fishing vessel registration application.
- Fishing trip log sheet
- Fishing day log sheet
- Sales receipt (to be filled by the buyer)
- Trip interview (for catch and effort)
- Commercial species composition
- Length–frequency data
- Cost and earning data
- Fixed costs.

Data Analysis and Reporting

In recent years there has been considerable progress made in the development of software packages such as ARTFISH developed by FAO that assist in the analysis of basic data from artisan fisheries, such as catch, fishing effort, and length and weight data.[20]

It is recommended that a formal report on the fisheries be produced each year. The report would present an overall description of the fisheries sector, possibly supplemented by other publications on specialized topics (e.g. the development of the vessel register, management systems and their value for conservation, including documentation on the sampling program and databases, vessel registration summary, and fish stock assessment report). An overall description of the sector is a basic requirement if the management plan for the fishery is to be successful.

The data collected and processed will have three main uses: assessment, monitoring, and management. The annual report should provide information in each of these three areas, as indicated below:

[20] Approaches, Rules and Techniques for the statistical monitoring of Fisheries. Developed by FAO's Fisheries Information Data and Statistics Unit, ARTFISH contains 3 sub-components: ARTPLAN for training and survey planning; ARTBASIC for handling sample data and producing monthly estimates on catch and fishing effort, and ARTSER for reporting time series (catch, effort, Values) resulting from ARTBASIC. It is planned that FAO will provide training in the software to Egypt.

- **Assessment of the fisheries:** results of scientific analysis of the length frequency data, coupled with the catch and effort data, would provide an indication of the status (or health) of the fish stocks and the likely effect fishing mortality is having. Analysis of the economic data will provide an appraisal of the financial viability of fishing activities, fishing-related employment, nutritional levels, and calculation of revenues and fees associated with fishing.
- **Monitoring:** this would focus on changes in fleet structure, gear used, response of the fishery and resources to management measures, changes in economic values, and revenues generated by the sector.
- **Management:** management would be supported through identifying the effects of management regimes, development of new fisheries/techniques, and establishment of license fee schedules and other regulatory mechanisms.

Main users of the data and the analyses performed would include fisheries policy makers, fisheries managers, fisheries biologists, economists, private sector investors, as well as the FMC to decide whether or not management strategies developed are working, and whether new measures are required.

Training

Basic and refresher training would be needed in the following specific areas:

27. Enumerators need to be trained in interview techniques, use of forms, species identification, random sampling, length measurements, and registration and licensing procedures.
28. Marine researchers need to be trained in form design, database design, data entry, data manipulation and processing, interpretation of results, report preparation, and use of results in formulating management advice.
29. Fishermen need to be trained in the use of charts to plot fishing positions, and in how to fill in catch/effort log sheets and sales slips.

Technical assistance will be required in detailed planning and implementation of the program.

Public Awareness

The close support and cooperation of the societies will be instrumental in successful data collection. It is essential that the aims of the systems for vessel registration, fishermen's licenses, log sheets, sales sheets, and sample interview data be clearly explained to the fishermen. Their active support, participation, and direct assistance are crucial to the success of the monitoring plan.

Awareness will be facilitated in the same way as awareness for the Management Plan, i.e., through publication of FMC meeting minutes, and by advice passed through the society system and community leaders.

Although many fisherman interviewed during the course of the mission stated their understanding of the need for better data collection, scientific investigation of the fisheries, and increased management, it will be important to clearly explain the idea of restricted entry to the fishery. Restricted access to fisheries resources, through vessel registration and fishermen licensing, is a new and unfamiliar concept to the fishermen in the study area. Objections will undoubtedly be raised in many quarters, especially if the system is not adequately explained.

Evaluation and Review

The data collection system should be reviewed and modified as needs resources (labor, funding, and equipment) change. This review should take place at the same time as the review of the management plan.

Required Administrative Actions

Appropriate legal instruments (e.g. gubernatorial and/or GAFRD resolutions) are needed to:

30. Require that fish buyers purchase fish only from licensed fishermen; that the fish have not been caught in violation of any management measures that may have been prescribed
31. Establish the fishing vessel registration system
32. Delegate authority to the fishermen's societies in assisting GAFRD to complete registration and licensing requirements
33. Require that artisan and vocational fishermen fill in sales receipt forms for every transaction.

All stages should proceed more or less at the same time, once the initial pilot testing phase is over. Planning of all steps and activities for the new pilot scheme should commence once the FMC has been established.

Monitoring. Control, and Surveillance

The purpose of an MCS system is to ensure that fishery policy in general and the conservation and management arrangements for any specific fishery are implemented fully and expeditiously.

Monitoring involves the continuous collection, measurement, and analysis of data and information on fishing activities and resource yields. In addition to collecting the data

necessary for implementation of a management plan, those responsible for fisheries management must ensure data that are collected on a regular and continuous basis. Effective monitoring requires data on the fishery in terms of the number of fishermen, gear used, catch, and effort, as well as economic, financial, and biological data.

Control refers to specifying the regulatory terms and conditions under which resources can be harvested. This includes laws, decrees, regulations, license conditions, and customary management measures.

The current regulatory framework requires improvement and strengthening so as to better provide for management and conservation of resources.

Surveillance involves checking and supervising fishing activities to ensure that the participants in the fishery are complying with all applicable regulatory controls imposed on fishing activities. Surveillance in the study area requires a suitable approach, appropriate to the size and value of the fishery, as well as the staff capabilities and institutional capacity.

Management of the Plan

Fisheries Management Committee

The plan will be managed through consensus. All stakeholders (interested parties) must study and discuss the issues and jointly make decisions. Establishment of a Fisheries Management Committee (FMC) is recommended.

The FMC would be responsible for providing advice, and for directing and administering the management of the fisheries in the study area. It would become the main body providing guidance on management objectives, strategies, and regulatory measures. Many countries have successfully established such committees to promote broader and more comprehensive policy and planning for fisheries management in the framework of coastal management plans.

Role of the FMC

The FMC would be responsible for implementation, regular revision, and amendment of the Fisheries Management Plan. Specific executive responsibilities would include the establishment and administration of a vessel registration system, a fishing vessel and fishermen’s licensing system, as well as enforcement of all measures particular to specific fisheries.

The Committee would specifically confer on the issue of concessions requested by commercial operators, and determine the acceptability of requests for licenses under the various categories laid down in the existing legislation.

The FMC would be empowered under the fisheries laws of Egypt to set license terms and conditions and to manage all aspects of the fisheries. The Red Sea would be the first place in Egypt where such power is delegated to a local body, with wide membership representing the interests of the fishing communities and other interested parties.

Some management measures would build on the existing traditional management system, on matters such as gear restrictions and fishing season.

A major problem is the need to improve surveillance. The FMC would strive to improve the surveillance and enforcement capacity in the area, as part of the overall national efforts to improve MCS in Egypt.

Establishment of the FMC

The existing fisheries law provides for the establishment of such a body by the Minister of Agriculture. The FMC could be established through an appropriate Ministerial Decree.

The FMC would be the principal decision-making body in regard to fisheries management in the area. Terms of reference for the FMC would be to implement the fisheries management plan. It would have executive powers conferred by the Minister of Agriculture to execute the vessel register and licensing system.

Membership in the FMC

In order to achieve a balanced, wider perspective on the issue confronting the Fisheries Department, it is suggested that the committee would include all interested parties. Membership in the FMC could include presidents of fishermen's cooperative societies, fisheries scientists and experts, and representatives from:

- GAFRD
- Ministry of Environment
- Red Sea Governorate
- Ministry of Tourism
- Ministry of Petrol and Mineral Resources
- Local Tourism Associations
- Coast Guard Forces
- Ministry of Justice
- Fish marketing bodies
- Other individuals as required.

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