



Discovering the Animals, Plants, and Habitats of Egypt's Red Sea Reefs

**DISCOVERING THE ANIMALS,
PLANTS, AND HABITATS OF
EGYPT'S RED SEA REEFS**

LIFE Red Sea Project

TABLE OF CONTENTS

List of Figures	v
Introduction	1
Chapter 1 – Coral Reefs in Egypt	2
Chapter 2 – The Reef Builders	4
Hard Coral.....	4
Fire Coral	5
Coralline Red Algae	5
Chapter 3 – Habitats on the Coral Reefs	7
Sandy Beach	7
Rocky Shore	9
Mangrove Stand	9
Inner Reef Flat.....	10
Outer Reef Flat.....	10
Seagrass Meadow	10
Reef Crest.....	11
Reef Slope	11
Open Sea	12
Chapter 4 – Common Animals and Plants Associated with Coral Reefs ...	13
Seaweeds.....	13
Soft Corals	14
Sponges.....	14
Anemones	15
Mollusks.....	15
Crustaceans	16
Echinoderms.....	16
Fishes.....	17
Chapter 5 – Harmful Animals	18
Venomous Animals	18
Poisonous Animals	19
Biting Animals.....	19
Treatment for People Injured by a Venomous Animal	20
Chapter 6 – Threats and Endangered Species	21
Dugong.....	21

Green Turtle	22
Hawksbill Turtle	24
White-eyed Gull	24
Osprey	24
Osprey	25
Chapter 7 – Traditional Uses of the Reef Animals and Plants by Indigenous Peoples	26
Chapter 8 – Protecting Coral Reefs for the Future	27
Snorkelers	27
SCUBA Divers	27
Beach Walkers	28
Wildlife Observer.....	28
Further Reading.....	29
Authors	30
Acknowledgements.....	30

LIST OF FIGURES

Figure 1	Fringing reefs are the most common type of reef found in Egypt.....	3
Figure 2	Delicate Coral Branches Fix to the Reef and Grow into New Coral Colonies ..	4
Figure 3	Forms of Fire Corals	5
Figure 4	Coralline Red Algae	6
Figure 5	Sandy Beach	7
Figure 6	Cross Section of an Egyptian Fringing Reef and the Location of Common Habitats (except rocky shore and sandy beach).....	8
Figure 7	Rocky Shore	9
Figure 8	Marina Mangrove	9
Figure 9	The Inner and Outer Reef Flats	10
Figure 10	Seagrasses.....	11
Figure 11	The Reef Crest and the Reef Slope.....	12
Figure 12	The Open Sea.....	12
Figure 13	Algae	13
Figure 14	Soft Coral	14
Figure 15	Sponges.....	14
Figure 16	Anemones	15
Figure 17	Mollusks	15
Figure 18	Crustaceans	16
Figure 19	Echinoderms	16
Figure 20	Butterflyfish	17
Figure 21	<i>Lyretail anthias</i>	17
Figure 22	Stonefish, Stingray, and Cone Shell	18
Figure 23	Pufferfish	19
Figure 24	Moray Eel	19
Figure 25	Dugong.....	22
Figure 26	Green Turtle Track	23
Figure 27	Hawksbill Turtle	24
Figure 28	White-eyed Gull	24
Figure 30	Osprey	25
Figure 31	Ababda Fisherman	26

Inside back cover: Map of Eastern Egypt

INTRODUCTION

This guide to *Discovering the Animals, Plants, and Habitats of Egypt's Red Sea Reefs* is intended to provide a simple, basic introduction to some of the physical features and species of plants and animals that are associated with Egypt's coral reefs. Visitors, residents, and students who are unfamiliar with this component of Egypt's coastal ecosystems will find the information in this booklet interesting and useful for understanding these unique and lovely environments, and will gain an appreciation of their value and the importance of protecting them. Readers who wish more detail on some topics discussed in this guide are directed to the references included under the section, Further Reading.

CORAL REEFS IN EGYPT

EGYPT BORDERS TWO LARGE BODIES OF WATER: the Mediterranean Sea to the north and the Red Sea to the east (see inside front cover). Both are semi-enclosed, having small entrances connecting them to the Atlantic and Indian Oceans, respectively. The Red Sea differs from the Mediterranean Sea by containing coral reefs. Coral reefs are masses of rock made of calcium carbonate that are capped with a thin veneer of living corals and algae. Indeed, living corals produced the calcium carbonate that formed and continues to form coral reefs today. The Red Sea has some of the most northerly coral reefs in the world. Another interesting facet about these reefs is that they are some of the youngest on earth. About 17,000 years ago the tropical waters of the Indian Ocean trickled back into the Red Sea, then a salt encrusted basin, after a period of reduced sea level. The Red Sea reached its current level only about 7,000 years ago.

Coral reefs can be classified into four broad types:

1. Fringing reefs
2. Barrier reefs
3. Atolls
4. Platform reefs (sometimes referred to as shelf reefs).

The separation of reefs into different types is based on shape, central structure (e.g. development of a lagoon) and their location on or from the continental shelf. Fringing reefs (Figure 1) lie immediately adjacent to land (continents or islands), whereas barrier reefs are separated from land by deep water lagoons, often kilometers wide. Barrier reefs are usually situated on the seaward margin of continental shelves. Atolls are circular shaped reefs located on old volcanoes, typically located in deep water and well offshore from continental shelves. Platform reefs are also round or oval shape and lie between land and the seaward margin of continental shelves. Unlike atolls, they are normally situated on submerged sections of the adjacent land. Within any of these four reef types may be found small patch reefs.

All of the above types of reefs are found in Egypt. The best known platform reef is Elphinstone Reef near Marsa Alam. Platform reefs can also be found off Hurghada and Lahmi Bay. Fringing reefs occur almost along the entire length of the Egyptian Red Sea and are the most common type of coral reef.

This guide describes the common animals, plants, and habitats found on Egyptian fringing reefs. It is not a technical guide, rather it is written for guests at Red Sea resorts. It is hoped that a better understanding of these animals and plants will foster a greater awareness of Egypt's coral reefs and a sense of shared responsibility to protect them.

Figure 1 Fringing reefs are the most common type of reef found in Egypt



Chapter 2

THE REEF BUILDERS

CORAL REEFS ARE SOME OF THE LARGEST LIVING STRUCTURES ON EARTH. They are so large they can be observed by astronauts from space. However, most people are surprised to learn that coral reefs are created by very small animals and plants. The reef builders include two types of animals (hard corals and fire corals) and plants known as coralline red algae.

Hard Coral

Hard corals are related to jellyfish and sea anemones. All these animals have a sac-like body cavity with one opening surrounded by stinging tentacles. The body of a coral is called a polyp. The single opening in a polyp doubles as the mouth and anus. Unlike jellyfish and sea anemones, corals produce a hard skeleton made out of a type of calcium carbonate.

A group of coral polyps joined together is called a coral colony. Hard coral colonies come in a variety of shapes including tree like forms, whorls or plates, domes or combinations of each. Hard corals also come in a range of colors including green, brown, yellow, and pink. The main source of this color is single-celled algae living in the coral tissue. These algae, called *zooxanthellae*, are very important to the survival of hard corals because they provide much of their food requirements. In turn, the algae receive essential nutrients from the waste products of corals and are protected from animals that eat small algae. Coral can also obtain food by capturing plankton from the water using their tentacles.

Figure 2 Delicate Coral Branches Fix to the Reef and Grow into New Coral Colonies



Most corals on a reef are colonies made up of many individual animals called coral polyps



Some hard corals are rounded in shape, which allows them to withstand strong water movement



Many corals develop delicate branches

Fire Coral

Fire coral look like hard corals but are more closely related to the freshwater hydra and the Portuguese man-of-war. Like hard corals, fire coral polyps produce calcium carbonate skeletons and their tissue contains single-celled algae. They are called fire corals because the polyps have stinging cells that can deliver an unpleasant sting to bare skin. Fire coral colonies may grow in a variety of shapes, including columns, branches, domes, and plates. They are usually yellow-brown, with pale edges or branch tips.

Figure 3 Forms of Fire Corals



(Above) Fire corals have one kind of polyp for capturing prey and defense and another type for feeding.



(Right) Fire corals may have delicate branches.

Coralline Red Algae

A close look at the surface of a coral reef will reveal pink to pinkish-grey patches. These patches of pink are living plants called coralline red algae. Coralline algae are mostly pink or some shade of red, but may be purple, yellow, blue, or grey-green. They form veneers over dead coral ranging from a few millimeters to several centimeters thick. Many coralline crusts produce knobby lumps ranging from a millimeter to several centimeters high. Coralline red algae are slow growing, but play a major role in building coral reefs. They act as a binding agent for loose rock and sediment on the reef. Also, some coralline algae produce chemicals that encourage the settlement of young hard corals.

Figure 4 Coralline Red Algae



Pink and red patches behind the fish are coralline red algae



The bleached and broken remains of coralline red algae are common on the shoreline

Chapter 3

Habitats on the Coral Reefs

EGYPTIAN CORAL REEFS SUPPORT MANY HABITATS. A habitat is an area that provides an animal or plant with its food, shelter, and living space. For many marine animals and plants, their habitats may change according to their age or stage in their life. For example, the habitat of adult hard corals is the reef crest or reef slope. However, for young corals, called coral larvae, their habitat is the open sea because they spend a short period of their life drifting in the open sea before settling and attaching permanently to a reef. The most common habitats on or near Egyptian fringing reefs are: sandy beach, rocky shore, mangrove stands, inner reef flat, outer reef flat, seagrass meadow, reef crest, reef slope, and open sea. The drawing on the next page shows where each habitat (except rocky shore and sandy beach) is found on typical fringing reefs. Scientists also refer to the reef flat, crest, and slope as zones that are characterized by very different environmental conditions, such as light levels, water turbulence, and water depth. In turn, abundances of corals and algae may vary considerably among zones. Some habitats, such as the reef flat, reef crest and reef slope are common to all reefs. However, mangrove stands are found only near a few coastal areas in Egypt.

Sandy Beach

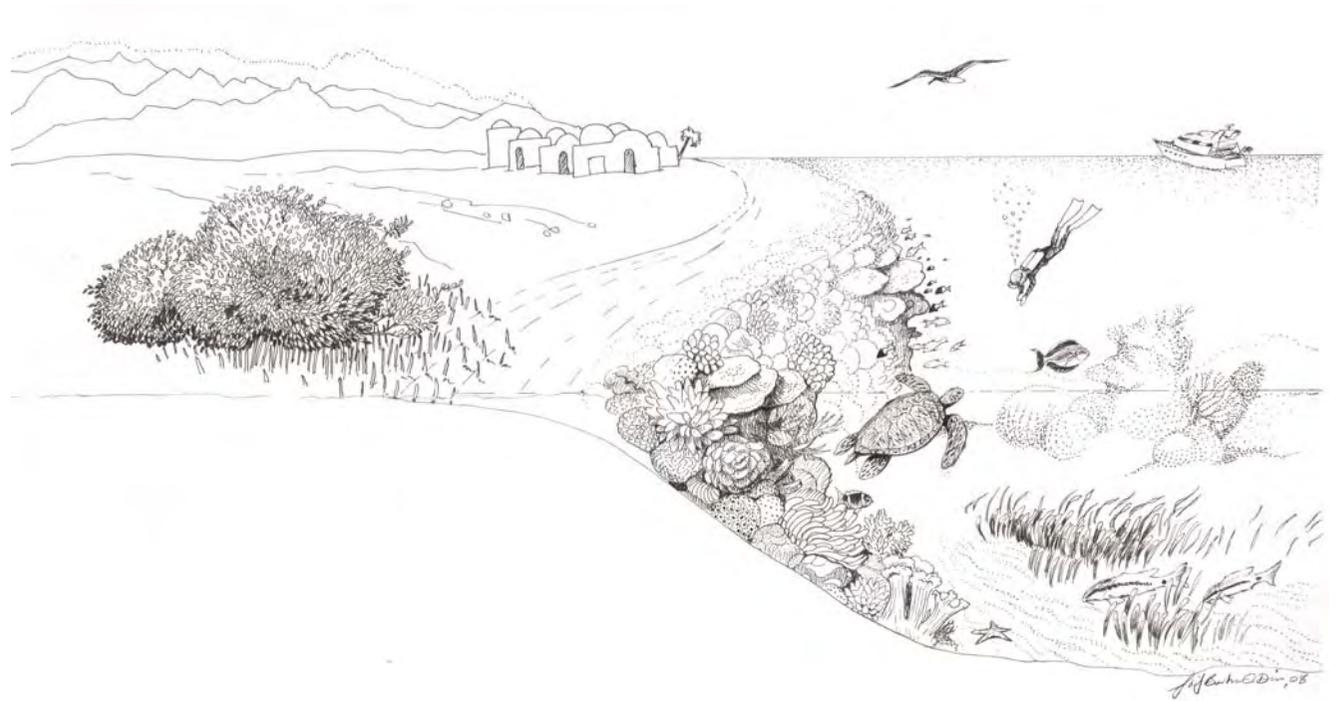
Sandy beaches (Figure 5) are composed of sediment originating from land and sea. Sediment originating from the sea includes tiny dead animals and plants they have calcareous skeletons or hard parts. Sandy beaches are uncommon along the Egyptian Red Sea. They are normally restricted to sheltered bays, called *marsas* in Egypt, or on the side of a headland protected from the wind. A sandy beach is not a stable habitat because sediments are constantly being added or removed by wind and waves.

Figure 5 Sandy Beach



Sandy beaches are normally restricted to bays along the Egyptian Red Sea

Figure 6 Cross Section of an Egyptian Fringing Reef and the Location of Common Habitats (except rocky shore and sandy beach)



Rocky Shore

Rocky shores are more common than sandy beaches along the Red Sea (Figure 7). Rocky shores are typically the eroded face of an ancient coral reef that formed many thousands of years ago, and now provide the foundation for living modern reefs. Close inspection of the eroded surface will reveal fossil corals. To survive in this habitat, animals need shells to protect themselves from the sun and dry wind (e.g., crabs), or they must be able to move rapidly between dry areas and permanent pools of water in the reef flat (e.g., fish, brittle starfish).

Figure 7 Rocky Shore



In Egypt, a rocky shore is usually the eroded face of a fossil coral reef. In Figure 7, the circular fossils are about 8 mm wide.

Figure 8 Marina Mangrove

Mangrove Stand

A mangrove stand is a small forest of plants known as mangroves. Mangroves are hardy plants that live between the sea and the land in areas that are periodically flooded by seawater as a result of tidal movement. They can live in this environment because they can tolerate salt water. One species has aerial roots that allow it to obtain oxygen directly from the air. In Egypt, there are two species of mangroves, but only the marina mangrove (*Avicennia marina*) (Figure 8) is widespread. Along the Egyptian Red Sea, mangroves range in height from small trees to shrubs. The canopy of the mangrove provides shelter for birds and insects, while the root system provides shelter for marine animals such as crabs.



he marina mangrove has aerial roots called pneumatophores that allow it to take oxygen directly from the air

Inner Reef Flat

The reef flat is the horizontal section of the reef between the shoreline and the deep water of the open sea. It includes two sections—the inner and outer reef flats. The inner reef flat is sometime dominated by rock or sand, or consists of a mosaic of the two (Figure 9). The inner reef flat is periodically exposed to air during low tide, but pools in the reef provide areas of permanent water. Where the inner reef flat has been heavily eroded, lagoons provide larger and deeper areas of permanent water. Contrary to popular belief, the reef flat is teeming with animal and plant life. Many of these are small or remain hidden during the day so are not easily seen.

Outer Reef Flat

The outer reef flat is the section of reef flat closest to the open sea, so may experience considerable water turbulence during storms. However, the frequency at which this habitat is exposed to air is less than the inner reef flat. For these reasons, the outer reef flat may support very different animals and plants to those found on the inner reef flat.

Figure 9 The Inner and Outer Reef Flats



The inner reef flat may look barren but it provides habitat to many small species of animals and plants



The outer reef flat may experience strong wave action, which is a major influence on the types of animals and plants that can live in this habitat

Seagrass Meadow

Seagrasses (Figure 10) are can be found on the reef flat or in lagoons, which offer a large permanent source of water during low tide. Most seagrasses prefer to remain submerged, but some types can survive periodic exposure to air during low tide. Most grow in sediment, but at least one species will attached to rock. Despite their name, seagrasses are more closely

related to pondweeds than they are to grasses found on land. Seagrass are flowering plants and usually consist of separate male and female plants. They form meadows on the seafloor, providing food and shelter for a variety of animals.

Figure 10 Seagrasses



Seagrasses provide food and nursery areas for a variety of marine animals

Reef Crest

The reef crest (Figure 11) is the area of the reef that waves break on during periods of strong wind and therefore this habitat provides many challenges for the animals and plants that live here. Corals in this habitat are normally flattened or round in shape, which reduces the risk of them being dislodged by strong wave action. In bays where wave action is not great, corals on the reef crest may take more delicate forms. Some plants, including flattened coralline algae or erect algae with very strong hold-fasts, can live on exposed reef crests.

Reef Slope

Beyond the reef crest is the reef slope, which is sometimes called the reef face because it 'faces' the open sea. Unlike the reef flat, the reef slope is permanently submerged. For this reason, the reef slope supports very different animals and plants to the reef flat. Another difference is that the reef slope is not horizontal, but is steeply sloping or even vertical in some places.

Figure 11 The Reef Crest and the Reef Slope



Hard corals and fire corals may be abundant on the reef crest (above) and on the reef slope (right)

Open Sea

The open sea is a very different type of habitat to the others. Animals and plants found in this habitat are either drifting by at the mercy of the currents or, in the case of sharks or dolphins, swimming to fish (Figure 12).

Figure 12 The Open Sea

The open sea is habitat for dolphins (below left), jellyfish (below center), butterfly fish (right), and other free-swimming animals that sometimes come close to the reef



Chapter 4

Common Animals and Plants Associated with Coral Reefs

CORAL REEFS SUPPORT MANY HABITATS, which accounts for the enormous array of animals and plants found on a coral reef. Some of these, such as the hard corals and fire corals, were described in Chapter 2: The Reef Builders. Others include seaweeds, soft corals, sponges, anemones, mollusks, crustaceans, echinoderms, and fishes. These are described below. Marine mammals, reptiles, and some shore birds may also be seen on reefs. However, because many of these animals are uncommon or threatened by human activity, they are dealt with separately in Chapter 6, Threats and Endangered Species.

Seaweeds

Seaweeds (or algae) are marine plants different from typical land plants because they lack roots, stems, and true leaves. Seaweeds come in a variety of sizes and shapes ranging from small turfs to large plants that can reach lengths of several meters. Seaweeds are grouped into three broad types based on their colors: green, brown, and red. All have chlorophyll, a green colored substance used by plants to convert sunlight into energy. However, the brown and red algae also contain pigments that mask the green color of the chlorophyll, which is why they do not appear green like the green algae or the leaves of land plants. A fourth type, known as blue-green algae, is not included here because it more closely related to bacteria. Figure 13 shows three kinds of algae.

Figure 13 Algae



Brown algae such as this *Turbinaria* grow quickly in winter and die off during summer



Green algae such as this *Halimeda* have hard inner parts that drop off, contributing to the sediment on the seafloor



Not all red algae are flat like the coralline red algae

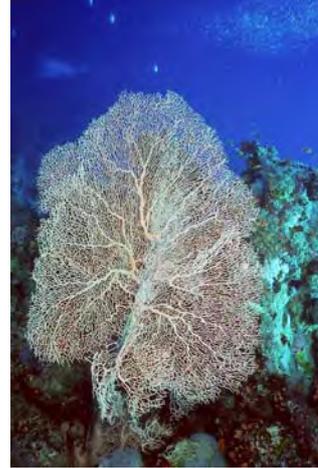
Soft Corals

Although soft corals may look like brightly colored plants, they are animals. They are called soft corals because they are made up of a large number of individual animals (called polyps) connected by fleshy tissue. Soft corals lack the limestone skeleton found in their close relatives, the hard coral. The term 'soft' is a bit misleading because soft corals have numerous tiny, needle-like spicules (skeletal structures) in their tissues. Apart from their swaying bodies and jelly like feel, soft corals (Figure 14) are distinguished by the eight tentacles on each polyp and have a feathery appearance, whereas hard corals have smooth tentacles.

Figure 14 Soft Coral



(Above) Soft corals may look like plants but are actually colonies of many individual animals living together
(Right) Sea fans provide habitat for mollusks and brittle stars that live on the surface of the sea fan



Sponges

The sponges or *poriferans* (from Latin *porus* "pore" and *ferre* "to bear") are primitive animals that are fixed to the reef. Sponges are filter feeders that pump water through their bodies to filter out particles of food. Sponges represent the simplest of animals. They come in a variety of shapes ranging from flattened forms to those that resemble large bowls. Some sponges can overgrow and kill coral, as well as burrow into the reef.

Sponges pump water through their bodies to filter out particles of food

Figure 15 Sponges



Anemones

Sea anemones (Figure 16) are named after the anemone flower found on land, and are closely related to corals and jellyfish. A sea anemone is a small sac, attached to a reef by an adhesive foot, with a column shaped body ending in an oral disc. The mouth is in the middle of the oral disc, surrounded by tentacles armed with many stinging cells.

Figure 16 Anemones



Anemones are closely related to the jellyfish, but are fixed to the reef

Mollusks

The mollusks (Figure 17) are a large and diverse group of animals that include snails, clams, squids, and octopuses. Mollusks with shells can be broadly categorized into those with a single shell called a gastropod (e.g. spider conch and cone shell) or those with two shells called a bivalve (giant clam and oyster).

Figure 17 Mollusks



The giant clam is the largest mollusk in the Red Sea



Octopuses have extremely large eyes that they use to hunt animals on the reef

Crustaceans

The crustaceans (Figure 18) include lobsters, crabs, shrimps, and barnacles. The majority live in either freshwater or marine environments, but a few groups have adapted to live on land. Their characteristics include a head with a pair of antennae and five pairs of walking legs. The first pair of legs is modified to form claws (also called pincers) used for defense or feeding.

Figure 18 Crustaceans



During the day lobsters remain hidden in crevices deep inside the reef



During summer, the saratan ghost crab builds a mound of sediment on the beach near the water to attract a female

Echinoderms

Echinoderms (Figure 19) animals found at all depths, but especially abundantly on coral reefs. This group of animals includes sea stars, brittle stars, and sea urchins. The word *echinus* comes from the Greek word for spiny skin. Sea stars and brittle stars normally have five arms, with the mouth located beneath the body. A new sea star can form from a detached arm of another sea star. Some sea urchins are equipped with venomous spines.

Figure 19 Echinoderms



This sea star, called a crown-of-thorns sea star, eats hard corals



The main defense of a sea urchin is its sharp spines

Fishes

Coral reef fishes, including sharks and rays, are some of the most conspicuous animals found on a coral reef. Coral reefs contain more species of fish than any other marine environment. About 1,000 species of fishes are known from the Red Sea. Coral reef fishes range from the colorful butterflyfishes (Figure 20) to the drab stonefish. Many eat plants, such as the parrotfishes, while others, such as sharks and moray eels, eat meat. Surgeonfishes and parrotfishes are active during daylight hours, while other fishes, including soldierfishes, emerge from their caves only at night.

Figure 20 Butterflyfish



Butterflyfishes (left) feed on coral polyps, small crustaceans, and algae

Figure 21 Lyretail anthias



(Left) If the dominant male lyretail anthias (colored pink, center, above) dies, a female will change sex and color to take its place

Chapter 5

Harmful Animals

NOT ALL ANIMALS FOUND ON EGYPTIAN CORAL REEFS ARE HARMLESS. Harmful animals can be grouped into three types: venomous, poisonous, and biting animals.

Venomous Animals

The stonefish, stingray (Figure 22), and sea urchin have venomous spines that can cause serious injury to a person who steps on these animals. If the spine punctures human skin, the venom can enter the blood stream, leading to considerable pain. The pretty looking cone shell is equipped with a venomous 'harpoon' used for hunting other shells or small fish. This harpoon is capable of penetrating human skin, so cone shells should never be handled. Jellyfish are common in the Red Sea and can deliver an unpleasant sting to sensitive parts of the human body such as lips or eyelids. Their stinging cells are located on their tentacles.

Figure 22 Stonefish, Stingray, and Cone Shell



Stonefishes have venomous spines on their back



A stingray has one or two spines on its tail



(Left) Cone shells have venomous harpoons that are dangerous to humans

Poisonous Animals

A poisonous animal is one that will harm you if you eat it because it contains poisons, called toxins, in its flesh or organs. Toxins are substances produced by living cells or organisms. Stonefish and stingrays are not poisonous fish because humans and other animals can safely eat their flesh. However, eating pufferfish (Figure 23), boxfish, or porcupinefish can result in death because they have harmful toxins in certain parts of their bodies.

Figure 23 Pufferfish



Pufferfish have poisons in their flesh and organs

Biting Animals

Biting animals have sharp teeth that can puncture or tear human skin. Biting animals found on or near coral reefs include moray eels and reef sharks. There are very few cases in which people have been bitten by these animals on Egyptian coral reefs. Moray eels (Figure 24) have been known to accidentally bite divers after mistaking a hand for food. Sharks are generally only a threat when people are spearfishing—an illegal activity in the Egyptian Red Sea. Injured fish on the end of a spear will attract and excite sharks.

Figure 24 Moray Eel



Outside Egypt where fish feeding is legal, moray eels have bitten the hands of people after mistaking them for food

Treatment for People Injured by a Venomous Animal

If you suspect someone has been injured by one of these animals you must get a doctor to them as quickly as possible. A simple treatment for injuries caused by stonefish is to soak the wound in non-scalding hot water for 30 to 90 minutes. (Victims in pain may not be able to tell if water is too hot. Therefore, someone else should test the water temperature on his or her own hand first.) The hot water should relieve the pain until the doctor can provide the appropriate treatment. If the injury was caused by a jellyfish, apply vinegar to the injury. Do not scrub or wash with fresh water, as this will trigger the remaining stinging cells.

Threats and Endangered Species

CORAL REEFS AND THEIR ASSOCIATED ANIMALS are under threat from natural and human sources of damage. Weather-related damage to reefs occurs frequently. Large and powerful waves from storms can break apart or flatten large corals and exceptionally low tides expose corals to air. Increased sea surface temperatures and decreased salinity following freshwater discharge into the sea can all result from weather patterns, and together these conditions can have devastating effects on coral reefs. In addition to weather, corals are vulnerable to animals that feed on coral polyps. Some fish, marine worms, barnacles, crabs, snails, and sea stars eat coral polyps. In extreme cases, entire reefs can be devastated by plague numbers of the crown-of-thorns sea star. Coral reefs tend to recover quickly from weather or other natural occurrences. However, if corals are subjected to repeated human related impacts, they may not recover. Human-caused impacts include pollution, over fishing, destructive fishing practices using dynamite or cyanide, collecting live corals for the aquarium market, and infilling of reef flats. Many of these have largely been controlled in Egypt. On coral reefs, activities such as snorkeling and SCUBA diving can also damage corals.

Some animals found on Egyptian coral reefs are at risk of disappearing from the face of the Earth. These include dugongs, marine turtles, and some bird species. Endangered species that may be observed at an Egyptian coral reef include the dugong, the hawksbill and green turtles, the white-eyed gull, and the osprey.

Dugong

Local names for dugongs (*Dugong dugon*) are *Arouset el Bahr* (Bride of the Sea) or *Gild el Bahr* (Leather of the Sea). The dugong is a 3-m long grey-brown mammal, with a flattened, fluked tail, like that of a whale. It has small eyes and a flattened muzzled face covered in bristles. Dugongs can be found from the Red Sea to the western Pacific Ocean. In Egypt, they have been recorded from the Sinai to the Sudan border, but are commonly sighted only south of El Quesir. Dugongs are mainly found in shallow coastal areas and feed on seagrass. Dugongs are occasionally encountered by divers in Egypt's Red Sea

Figure 25 Dugong



Dugongs feed on seagrasses



Dugong “feeding trails” may create paths of bare sand in seagrass meadows after eating the below-ground parts of the seagrass

Green Turtle

The local name for this species is *sulhifa bahariya khadra*, *Tersa*, or green sea turtle. The green turtle (*Chelonia mydas*) has an olive-green, heart-shaped shell up to 1-m in length, usually

variegated with brown, reddish-brown, and black, and is whitish or cream underneath. Recently hatched turtles are shiny black above, and white below. Green turtles are mainly found in tropical and subtropical waters throughout the world, but individuals sometime stray into cooler waters. They have been reported from most areas of the Egyptian Red Sea, but nesting occurs only at a few sites. Important nesting beaches in Egypt's Red Sea region are the Wadi Gemal Hamata Protected Area, Ras Banas, and the islands of Sarenka, Zabargad, Syial, and Rawabiel. Interestingly, the temperature of the sand surrounding the buried eggs dictates the sex of the forthcoming baby turtles. Cooler temperatures results in males and higher temperatures in females. In Egypt, nesting occurs during summer.

Figure 26 Green Turtle Track



The only evidence of the nighttime nesting activity of green turtles is their wide tracks on sandy beaches

Hawksbill Turtle

The local name for this species is *sulhifa bahariya saqriya*, *Sagr*, or sharp rock (nosed) sea turtle. The hawksbill (*Eretmochelys imbricata*) is a small to medium-sized marine turtle (maximum shell length about 80 cm) with an elongated oval shell and overlapping scutes (shell plates) on the shell surface, a relatively small head with a distinctive hawk-like beak, and flippers with two claws. General coloration is brown with numerous splashes of yellow, orange, or reddish-brown on the carapace. Hawksbill turtles are found in all tropical and subtropical oceans of the world. They are found throughout the Red Sea. Nesting beaches are found along the entire length of the Egyptian Red Sea coast and islands. Important nesting locations include the Siyal Islands off Hamata (inside Wadi Gemal–Hamata National Park) and Ras Banas. In Egypt, this species nests in summer.

Figure 27 Hawksbill Turtle

The hawksbill turtle uses its long beak to extract sponges and other animals from crevices in the reef



White-eyed Gull

The local names of this species are *Noras* and *Agama*. The head and upper breast of the white-eyed gull is black. The back is dark and the wings dark grey. The brown eyes are surrounded by a red ring and have a white crescent both above and beneath them. The bill is red and droops slightly to the black tip. The legs are bright yellow. White-eyed gulls (*Larus leucoptalmus*) are largely restricted to the Red Sea. Their distribution is patchy, although common in some areas. In Egypt, they are commonly observed near the city of Hurghada and other towns. Seasonally they can also be observed at resorts along the Egyptian Red Sea.

Figure 28 White-eyed Gull

The white-eyed gull nests on desert islands off the Egyptian coast



Photo courtesy Dr. Sherif Baha El Din

Osprey

The local names for this species are *Uqab Nassarya* and *Abu Gadaf* (the one that dives). The osprey (*Pandion haliaetus haliaetus*) is a medium-sized bird-of-prey. It has mainly white under parts and head, apart from a dark mask through the eye, and fairly uniformly brown upper parts. Adult males can be distinguished from females by their slimmer bodies and narrower wings. The osprey has a worldwide distribution (except Antarctica). It occurs along coastal areas, but may extend inland along major river systems. In Egypt, it is mainly restricted to the Red Sea coast and islands.

Figure 30 Osprey



Ospreys are specialized fish catchers that build large nests on the ground on islands

Traditional Uses of the House Reef Animals and Plants by Indigenous Peoples

THE ANIMALS OF THE CORAL REEF HAVE PROVIDED FOOD and material for the Red Sea indigenous people for a millennium. The indigenous people of the Eastern Desert, the region between the Nile River and the Red Sea, include the Ababda and Bisharia. Until recently, they were predominantly nomadic pastoralists moving through the desert with their flocks of camels and goats. More recently, they have established permanent settlements near the coast. In addition to catching fish, they sometimes collect shells, such as giant clams (*Tridacna*) and spider conches (*Lambis*), for food. Evidence of their harvesting is shell middens found in various localities along the coast. Shell middens are mounds of broken shell, left behind after the meat was extracted from the shell.

In the Red Sea, the large stromb shell (*Strombus*) is harvested for the horny plate called the operculum, which is attached to the muscular foot of the animal and used to close the entrance of the shell. The operculum was used in the process to make perfume. Although no longer exploited by local people, the meat of the dugong was eaten and the thick skin used to make war shields and sandals.

Figure 31 Ababda Fisherman



Many Ababda earn their livelihoods by fishing along the Red Sea coast

Chapter 8

Protecting Coral Reefs for the Future

THE ANIMALS AND PLANTS ON CORAL REEF ARE FRAGILE and can be damaged by careless visitors. By following some simple rules, visitors can experience the beauty of a coral reef without damaging it or disturbing the animals and plants living on it.

Snorkelers

- Practice at first over sand patches and away from coral.
- Get comfortable with floating horizontally and fining techniques.
- Remain at least 2-m from the reef. This will reduce the risk of making accidental contact with corals.
- Move slowly and deliberately in the water, relax and take your time, and refrain from standing up.
- Avoid entering semi-confined areas.
- Avoid leaning on, holding onto, or touching any part of the reef or moving animals when taking underwater photographs.
- Avoid touching or relocating any animals or plants—even consider not wearing gloves as an incentive not to touch.

SCUBA Divers

- Move slowly and deliberately in the water, relax and take your time—relax and avoid rapid changes in direction.
- Remain at least 2-m from the reef. This will reduce the risk of making accidental contact with corals.
- Avoid leaning on, holding onto, or touching any part of the reef.
- Avoid entering semi-confined areas (for example, caves or overhangs). Never squeeze through a small area.
- Consider not wearing gloves (unless they're required for safety reasons) as bare hands make it less likely that you will touch the coral.
- Avoid collecting any shells, coral, or other 'souvenirs.'
- Avoid relocating any marine life—particularly when taking photos or filming.
- Avoid walking on seagrass meadows when entering the sea from a sandy beach.

Beach Walkers

- Don't walk on the reef flat.
- If you must cross the reef flat, use the raised walkway or designated path.
- Don't drop litter on the beach.
- Make sure your litter is placed in a secured rubbish bin.
- Don't feed wild animals such as birds and fishes.
- Avoid collecting any shells, coral, or other 'souvenirs.'

Wildlife Observer

- Don't touch, grab, or chase dugongs and turtles.
- If you are lucky enough to spot a dugong or turtle underwater, do not approach it – instead, stop and remain at least 10 m away.
- If it moves towards you, swim slowly away.
- Avoid snorkeling over the top of a dugong or turtle – allow it direct access to the sea surface.
- Don't feed wild animals, including birds and fishes.

Further Reading

- Abu Salama Society. Non profit organization aimed at studying and protecting marine mammals in the Egyptian Red Sea (office at the Fantasia Hotel # 102, Sheraton Road, Hurghada).
- Baha El Din, S. 1999. *Directory of Important Bird Areas in Egypt*. Bird Life International.
- Baha El Din, Sherif, *Where to Watch Birds in Wadi el-Gemal National Park and Neighboring Areas*. LIFE Red Sea Project, Cairo, 2008.
- Bemert, G. & Ormond, R. 1981. *Red Sea Coral Reefs*. Kegan Paul International.
- Debelius, H. 1998. *Red Sea Reef Guide*. IKAN.
- Edwards, A.J. & Head, S.M. 1987. *Key Environment - The Red Sea*. Pergamon Press.
- Egyptian Environmental Affairs Agency. Contains English translations of Egyptian legislation (Law 4 1994 & Law 102 1983) relating to environmental protection in the Red Sea. www.eeaa.gov.eg
- Egyptian Environmental Policy Program. *Management Plan for Wadi El Gemal National Park*, 2004. See appendices 6–10 for lists of the scientific names of stony coral, soft coral, gastropods, echinoderms, and fish reported in the park.
- Farid, A. 2001. *Red Sea Panorama*. Farid Atiya Press.
- H₂O Magazine. Quarterly publication of the Red Sea Diving Association. www.h2o-mag.com
- Habib, M. 2004. *Corals of Egypt*. EEAA & USAID.
- Heiss, G. Kochzius, M. Alter, C. & Roder, C. 2005. "Assessment of the status of coral reefs in the El Quadim Bay, El Quseir, Egypt." SUBEX Red Sea Diving. www.subex.org/en/about_us/environment/elqbay.htm
- Hurghada Environmental Protection and Conservation Association (HEPCA) www.hepca.com
- Lieske, E & Meyers, R. 2006. *Coral Reef Guide: Red Sea*. Harper Collins.
- McClanahan, T., Sheppard, C. & Obura, D. 2000. *Coral Reefs of the Indian Ocean – Their Ecology and Conservation*. Oxford University Press.
- Sheppard, C., Price, A. & Roberts, C. 1992. *Marine Ecology of the Arabian Region: Patterns and Processes in Extreme Tropical Environments*. Academic Press.
- TDA 1998. Best Practices for Tourism Center *Development along the Red Sea Coast*. Tourism Development Authority. TDA & USAID. <http://www.coralseas.com/doc/BP-TDA.pdf>

Authors

Tony Roupael is a marine scientist from Australia, who has great passion for the Red Sea and for the communities and countries bordering it. His research interests relate to the impacts of tourism-related activities on marine environments and management of marine protected areas. One of his favorite locations in the Red Sea is the beautiful Wadi el-Gemal National Park, located south of Marsa Alam in Egypt.

Mahmoud H. Hanafy is a marine biologist and Associate Professor, Marine Sciences, Suez Canal University, Ismailia, Egypt. Since the 1980s his attention and effort have been oriented to conservation of the Red Sea region's natural resources, and he played a key role in the declaration process for three new protected areas along the Egyptian Red Sea coast during the past 4 years. His research interests relate to the human impact on marine living resources and the management of protected areas. All his efforts are now directed toward having the entire Egyptian coast of the Red Sea declared to be a multiple use protected area.

Acknowledgements

The authors especially thank the following people for information and comments on earlier drafts:

Hossam Helmay (Red Sea Diving Safari)
Salah Sohimam Oda (LIFE Red Sea)
Mohamed Habib (Red Sea Diving Association)
Constanze Conrad (Blue Heaven Holidays)
Sherif Baha El Din (LIFE Red Sea Project).

Photographs by Mohamed Habib, John McEachern, and Tony Roupael.



Livelihood and Income from the Environment (LIFE)
Sustainable Economic Development in the Red Sea Project
in partnership with

The Egyptian Environmental Affairs Agency (EEAA),
Ministry of State for the Environment
The Tourism Development Authority (TDA),
Ministry of Tourism
and

The Red Sea Governorate (RSG)