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## 1.Introduction

The Gulf of Aqaba is the only marine outlet to Jordan and represents a semi-enclosed water body at the arm of the northern end of the Red Sea (Figure 1). The sills of the Strait of Tiran separate it from the Red Sea. The Jordanian Coastline at the Gulf extends for 27Km, with a minimum width of 5 km and maximum of 20 km between the Gulf shores of Jordan and Egypt. The greatest depth reaches about 1830 m, with an average depth of about 800 m. The Gulf has a global importance stemming from its geographical location, situated within the Jordan Valley, which is part of the Syrian African Rift Valley.



Figure 1: Aqaba; a semi-enclosed Gulf

The little matter in suspension, low biomass, strong isolation, absence of rivers and low plankton productivity at the Gulf of Aqaba have created clear water with high transparency (Figure 2). The evaporation rates of seawater range between 200-365 cm/year. The seawater temperature in the northern Gulf of Aqaba ranges between  $\sim 21^{\circ}\text{C}$  in winter and  $27^{\circ}\text{C}$  in summer. Salinity is high with little annual variation between 40.3 to 40.8 PSU. According to other studies, the coastal current below 12 m depth is weak and fluctuate from east-northeastward to west-southwestward (parallel to the shoreline). The prevailing northerly winds and stratification conditions during summer and variations in generation and propagation associated with changes in thermocline strength and structure throughout the year were the main causes of the southward current.



Figure 2: Clear and highly transparent water of the Gulf of Aqaba

Despite the Gulf of Aqaba being a relatively small body of water, it hosts an extraordinary amount of marine diversity (Figure 3) with the existence of corals, reef-building coral, and an unknown number of soft corals species. Some expert stated that coral reefs of Jordan are amongst the most diverse per m<sup>2</sup> in the world. The diversity of fish species is high with more than 510 species recorded, of which 5% are endemic. Three globally endangered species of the Marine Turtle were found at Aqaba including the Green Sea Turtle; *Chelonia mydas*, Loggerhead Sea Turtle; *Caretta caretta*, and the Hawksbill Sea Turtle; *Eretmochelys imbricate*. In addition, three species of seagrass survive beneath the seawater and form the bulk of the biomass upon which other organisms in the benthic community depend. Also, a total of 82 species of different mesozooplankton groups and larval stages of various other organisms have been identified at Aqaba, where copepods are, by far, the most abundant and ubiquitous mesozooplankton organisms.



Figure 3: Diversity of species at the Gulf of Aqaba

## 1.2 Socio-Economic Development in Aqaba Special Economic Zone (ASEZ)

According to the population census of 2004 the population of Aqaba was 80,059 inhabitants. By the end of 2010, the population of Aqaba was 103,000 compared to 98,750 in 2007. The estimated population of Aqaba by the end of 2012 was about 139,200. According to the General Census of 2015 the population of Aqaba was 188,160. This fast-growing coastal town is considered the heart of the ASEZ. The increase in the population growth puts a lot of pressure on the coastal environment resources and coastal city infrastructure.

The economy of Aqaba has increased after the establishment of the ASEZ. The main economic activities in Aqaba are associated with the port, some industries, and tourism and re-export activities. New resorts and tourism projects are being constructed. Along with tourism projects, Aqaba has also attracted global logistic companies to invest in logistics, which boosted the city's status as a transport and logistics.

### 1.2.1 The Port and Industrial Activities

Many industrial activities are located in the South Coast Industrial Zone adjacent to the Saudi Border. The main activities are: The Jordan Phosphate Mines Co. (Industrial Complex), the Thermal Power Plant, the Arab Potash Company (APC), the Arab Gas Pipeline, and the new port of Aqaba, which will include many terminals such as a Liquefied Petroleum Gas (LPG), Liquefied Natural Gas (LNG), the rehabilitation of the Oil, New Phosphate, Industrial Port, Miscellaneous Liquids, General Cargo and Ro-Ro, the Grain, and the New Ferry (Passenger) Terminal.

### 1.2.2 Land Use and Tourism

The land-use changes for ASEZ area of about 375km<sup>2</sup> between 1990 and 2004 showed that continuous urban fabric was expanding and about 46% of discontinuous urban fabric has changed to urbanized areas. Assuming that similar trend of land-use changes will take place in the future, the predicted land-use by 2018 shows that most change will be in the urbanization and the industrial and commercial areas.

Tourism is very important to the economy and social development of Jordan who experienced a steady increase in tourism during the first decade of the 21st century. Aqaba Special Economic Zone Authority (ASEZA) reported that the number of tourists who visited the ASEZ in 2006 rose to about 432,000 individuals, an increase of 5% over the previous year. Approximately 65% (293,000) were Jordanians. In 2010, the number of tourists was 503,551 including 294,592 (59%) incoming tourism. More than \$20 billion has been invested in developing Aqaba's massive mega projects in tourism infrastructure and logistics. ASEZA targeted occupancy of 67% in 2014 and 70% in 2015 compared to 45% in 2009.

### 1.2.3 Diving and Sea Sports

There are approximately 28 diving centers in the city of Aqaba, mainly located on the South beach. Diving is starting either from the shore or using boats, especially after the closure of some beaches managed by resorts and private properties. Other limited but

seasonal activities such as water skiing, surfing, and other new sea sports are reported from Aqaba.

#### 1.2.4 Fishing

The fishing activities divided into two types which are: a. Professional fishing with two registered associations using around 100 fishing boats. b. Recreational fishing which is a source of entertainment to many citizens and visitors. Professional fishermen move within a certain geographical range set by authorities, while the others choose to fish within the boundaries of Aqaba Marine Park (AMP).

#### 1.2.5 Glass Bottom and Commercial Boats

The Gulf of Aqaba accommodates 90 licensed glass bottom boats where boats are traveling from the fishermen harbor near the Great Revolution Plaza either to AMP in the southern coast, or to the northern parts near hotels areas. There are over 400 commercial and private boats for pleasure, entertainment and diving in Aqaba. Most of these are owned by non-Aqaba residents, so their movement is bounded.

#### 1.2.6 Research and Protected Areas

Aqaba Marine Park extends over the coastline for about 7 kilometers from the Marine Science Station (MSS) in the north to the Royal Diving Club in the south. It is a multi-use preserved area, managed by the Marine Park Staff to make sure that they have no negative impacts over the marine environment from the activities and users. Within the park boundaries there is the MSS which is a fenced area, dedicated to scientific research purposes held by academic and research groups and students.

#### 1.2.7 Special Purposes

A number of military and security facilities are located on the Jordanian coastline and south beach, such as the Royal Navy Base. They provide the security needed in these areas and contributing in the regulations enforcement. It should be integrated in the coastal management.

#### 1.2.8 Marine Resources

The southern coastal region is distinguished by its dense coral cover in comparison with the northeastern regions. The coral cover abundance coexists usually in deep habitats rather than in shallow ones, preserving it from human activities. 157 species of hard corals were recorded in the Jordanian waters. More than 500 species of fish were recorded in the Jordanian waters. The largest fish species are observed throughout the year in the Gulf of Aqaba, especially migratory ones such as the whale shark, barracuda fish, and dolphins. Other species include Sponges, Oysters, Anemones, and Algae. Several kinds of sea turtles were recorded locally in several diving zones.

### 1.3 Threats to Hard Corals at the Gulf of Aqaba

Hard corals and reef-building corals are among the most fragile and threatened ecosystems in the Gulf of Aqaba, due to a variety of natural and anthropogenic threats. The following provide a summarized description to the major threats on hard corals in Aqaba based on the available literature and knowledge.

#### 1.3.1 Natural Threats

##### 1.3.1.1 Natural Predators

Natural predators are surviving on the living tissues of scleractinian corals. Several species exist and include bony and cartilaginous fishes, crustaceans (cyclopoid copepods, cirripeds, and brachyuran crabs), polychaetas, and gastropods (prosobranchs and nudibranchs). According to Robertson, 1970, all previously mentioned predators are facultative except the crustaceans and gastropods that are obligatory associated (symbiotic) with and feed on their coral hosts.

Although natural predators are accepted as part of any healthy coral reef ecosystem, excessive densities of some corallivores could result in serious and widespread declines in coral cover. Our knowledge on natural predators in Aqaba is limited, but two major species are recorded which are the Crown of Thorns Starfish (COTS); *Acanthaster planci*, and coral-eating snails mainly *Drupella cornus*. The COTS is a predator of reef building corals, where a single starfish is capable of consuming 10 m<sup>2</sup> of coral reef over the course of a year. Therefore, any outbreaks in its numbers will seriously affect the Gulf of Aqaba reefs. The *D. cornus* is a corallivores, which have been known to feed on several species of corals such as *Porites*. No outbreaks have been recorded so far, for these natural predators at the Gulf of Aqaba of Jordan, despite the outbreak of *D. cornus* reported from Eilat and the Gulf of Aqaba in the mid-1990s.

##### 1.3.1.2 Diseases

An expert have studied the Skeleton Eroding Band (SEB) coral disease at the Jordanian coast in the Gulf of Aqaba. This disease is caused by the colonial, heterotrich ciliate *Halofolliculina corallasia*. Although the infection rate was relatively low, this disease was frequently encountered with *Acropora* spp. and *Stylophora* sp., corals species while relative infection-rates were highest among *Seriatopora* sp. (75%), as well as *Stylophora* sp., *Hydnophora* sp., and *Galaxea* sp. (50% each). *Pocillopora*, *Mycedium*, *Montipora*, *Echinopora*, *Acropora*, *Lobophyllia*, *Goniastrea*, *Millepora*, *Platygyra*, *Fungia*, *Favia*, *Porites*, *Goniopora*, *Favites*, and *Pavona* followed this in steadily decreasing order from 44% to 5%. In addition, authors stated that the SEB was found to a depth of 30 m but may occur even deeper.

##### 1.3.1.3 Extreme Low Tide

It is known also as the spring tide and could cause extensive and widespread damage to corals at the Gulf of Aqaba. Corals exposed during daylight hours are subjected to the most ultraviolet radiation, which can overheat and dry out the coral's tissues. In addition, some irresponsible activities might happen in the event of extreme low tides, where people might walk on reefs, to collect souvenirs and cause serious damage to this fragile animal.

### 1.3.2 Anthropogenic Threats

#### 1.3.2.1 Fishing Gear

Despite the small scale of fishing in Aqaba, it affects corals seriously since reefs are very limited in area, and are of fringing type, which entitles that they are located at shallow depths. Fishermen tend to use gear consisting of nets, ropes, cages and nylon lines, where almost all are made of non-biodegradable materials. This has affected hard corals, and caused damage, which will cause its death, or it will potentially introduce parasites and pathogens.

In addition, losing gear or abandoned it will contribute to the marine debris and litter It will cause a phenomenon known as 'ghost fishing' which is extremely affecting corals' health and abundance worldwide.

#### 1.3.2.2 Tourism Impact

The diving industry is growing in Aqaba with the presence of 28 diving centers and 27 diving sites. Despite the importance of this industry to tourism business, it could contribute to serious damage to coral reefs if no proper control and management approach is applied. The physical damage, which is caused by snorkelers or divers could be in the form of kicking or brushing corals with fins, trampling, use of hands and grabbing corals to stabilize and maneuver across reefs and also the disruption of sediments creating sediment clouds. In addition, the direct contact of part of the divers' body (hands, knees) or gear (tanks, fins, regulators) is very common, and could lead to damage corals or lead to their death. This type of damage is called mechanical and is generally caused by inexperience and/or poor buoyancy control. In addition, tourism could affect coral reefs indirectly through the expansion of tourism infrastructure and facilities, where high siltation and sedimentation rates through poorly planned and constructed hotels and resorts facilities are the primary cause of damage to coral reefs.

#### 1.3.2.3 Ports Establishment

Ports establishments contributes to the loss of hard corals through various means including the breaking of limestone and coral materials into extremely fine particles after dredging activities or the created sedimentation after landfilling activities over the construction phase. The sedimentation created, including the milky white "clouds" of suspended sediments created by corals damage, could stay in suspension for a long time and spread over a large area and result in significantly reduced light penetration, which will affect corals over a wide area, and might lead to their death. Moreover, ports affect corals even during the operational phase where pollution caused from cargo and ship



spills, ship grounding and anchor damages on corals, reduction in light impacts to corals resulting from ships regularly moored above them, and pollutant discharges from the outfall are primary causes of corals' death.

Commercial shipping is vital to Jordan's economy, addressing that Aqaba is the only marine outlet to Jordan. Heavy investments in ports creation was performed by the government of Jordan where Ports Cooperation was developed (Figure 4), and consists of: i) main port, ii) Aqaba Container Terminal (ACT) and the iii) industrial port. In 2012, the Aqaba Development Corporation (ADC); the main development corporation for the Aqaba Special Economic Zone Authority (ASEZA) initiated the relocation of the main port from its location northern of the Gulf of Aqaba to the Southern parts based on the master plan which was developed by Royal Haskoning (RH) in 2006. A study by Spurgeon, 2008 was conducted to assess the coral compensation due to the port relocation. The estimated areas of hard corals affected by direct impact based on this study is 32,509 m<sup>2</sup> based on the effects which will occur on Derreh Bay South (1,238 m<sup>2</sup>), Derreh Bay North (17,900 m<sup>2</sup>), Industrial Jetty (1,494 m<sup>2</sup>), Industrial Liquid Berth (481 m<sup>2</sup>), Phosphate Berth (3,152 m<sup>2</sup>), Grain berth (722 m<sup>2</sup>), and Grain berth and other miscellaneous liquids berth (7522 m<sup>2</sup>). Despite this information, a major recommendation was made on the importance of establishing a comprehensive monitoring to establish the actual extent of such damages over time.

Based on the survey results, ASEZA has initiated coral transplantation efforts in 2012 where corals from the southern region of the coast and the Al Derreh area were placed at damaged reefs and a created cave site from cement and metal structures at Aqaba Marine Park.



Figure 4: Ports at Aqaba

#### 1.3.2.4 Corals Harvesting and Trade

Corals are collected in the dried ornamental trade business for souvenirs and jewelry in Aqaba and even in the city of Amman. Smuggling of dead corals specimens occurs in

Jordan, where they are used as souvenirs. A detailed study on the magnitude and impact of coral trade is required to understand its effects on coral diversity and presence.

Our knowledge of coral trading at the international level was derived from expert, who has provided a comprehensive review of CITES convention in Jordan. Despite the very limited documentation made on coral species, some records obtained indicated the export of 4 kg of wild *Goniopora* spp. for commercial purposes in 1997 to the United State of America. In addition, Indonesia has exported raw corals of wild sourced *Scleractinia* spp. during 2006, 2007 and 2008 with a sum quantity of 80 kg and 850 specimens. Moreover, Malaysia has also exported 1,078 specimens of unidentified units of *Scleractinia* spp. during 2007 and 2008, however, both Indonesian and Malaysian specimens were exported for commercial purposes. More records were obtained from Canada, which exported raw corals of wild *Porites* spp. during 2002 with a sum quantity of 10 and used for personal purposes. In addition, six CITES Appendix II corals species were exported by Jordan to Germany as raw materials for scientific purposes.

During 2003, the Jordan Management Authority requested the Secretariat to inform all parties that it applies stricter domestic measures with regard to trade in corals, in accordance with Article XIV, paragraphs 1 (a) and (b), of the Convention. Moreover, it stated that the collection of corals and the breaking of coral reefs are strictly prohibited in Jordan and offences are liable to fines and/or imprisonment. No import into or export from Jordan of corals is allowed except for scientific purposes and under permits granted by the Management Authority. And lastly, it made a notification to the parties that Jordan requests all parties not to authorize any export of coral specimens to Jordan and not to authorize any import of such specimens from Jordan, except where the Management Authority has issued a permit to authorize the trade for scientific purposes.

A single aquarium is located at the Marine Science Station at Aqaba southern beach. Despite its importance for tourism attraction, substantial harvesting of live corals and fish specimens occurs directly from the sea for exhibition purposes. Therefore, it is highly recommended to establish husbandry facilities for fisheries, and create artificial structures resembling corals in the aquariums to conserve the natural species diversity at the Gulf of Aqaba.

Despite the very limited collection of corals for medical use by local communities, but some locals tend to collect mucus from corals for healing purposes. Several researches have confirmed the potential applications of corals in medicinal industry. Cooper et al. 2014 provided a review on the therapeutic benefits of hard and soft corals especially in anti-inflammatory, anticancer, bone repair, and neurological benefits. Therefore, the Gulf of Aqaba of Jordan could be a source of therapeutic industry, and several benefits could be revealed if proper research was conducted.

#### 1.3.2.5 Marine Debris

The most significant accumulated debris at Aqaba's sea is the plastic. Despite the lack in research on the effects of marine debris especially plastic on coral reefs, but other studies observed the ingestion of micro plastic by scleractinian (reef-building) corals in the laboratory settings. In addition, solid waste might create a barrier separating corals from

sunlight or decompose or break parts of these materials that may be toxic or harmful to coral, such as plastic. Large and heavy items can break down coral colonies, such as tires and metals pieces. Many experts stated that more than 50% of the litter at Aqaba is plastic and the remainder are of wood, glass, cardboard, Styrofoam, metal and other materials. In addition, they found that most litter appears to be from local land-based or near shore sources, although there are some regional influences as well. The main local sources are the passenger port, the cargo port and the beach goers.

#### 1.3.2.6 Ship Grounding and Anchoring

The grounding of large commercial ships and even small recreational boats can cause massive damage to coral reef organisms. The effects will escalate and more injury to the reef will occur during the process of removing the grounded vessel from the hard bottom habitat.

#### 1.3.2.7 Oil Spill

Oil floating on the water's surface can be deposited directly on corals in an intertidal zone when the water level drops at low tide. Rough seas can mix lighter oil products into the water column, where they can drift down to coral reefs. As heavy oil weathers or is mixed with sand or sediment, it can become dense enough to sink below the ocean surface and smother corals below. Despite the strict regulation at Aqaba and the Zero Discharge policy, a few incidents of oil spills have been recorded.

#### 1.3.2.8 Floods

Flash floods carry large quantities of silt, sediment and solid waste, which could lead to the death of corals by suffocation and burial under mud and reduced sunlight due to turbidity. The area surrounding the Gulf of Aqaba is a hyper-arid desert. In addition, climatic conditions represented by limited precipitation of less than 50 mm per year and the very localized and short-lived rain events (hours) can cause flash floods that carry eroded sediment from their drainage basins to terminal sedimentary basins.

A study by expert showed that much of the flood sediments coming from the north are initially deposited on the upper shelf. In addition, they stated that this deposition constrains coral reef growth and it is the reason behind its absence in the north shelf of Aqaba. However, flooding effects on southern beach have been observed where huge sedimentation have been discharged to coral reefs through different wadis.

#### 1.3.2.9 Climate Change

Raised seawater temperature and ocean acidification linked to rising carbon dioxide levels are by far the greatest threats to reefs worldwide. High water temperatures cause corals to lose the microscopic algae that produce the food corals need and create coral bleaching. Severe or prolonged bleaching can kill coral colonies or leave them vulnerable to other threats. Meanwhile, ocean acidification means more acidic seawater, which makes it more difficult for corals to build their calcium carbonate skeletons. If acidification

gets severe enough, it could even break apart the existing skeletons that already provide the structure for reefs. Local expert has developed the vulnerability assessment of coastal areas at the Gulf of Aqaba. He stated that impacts on coastal areas in Aqaba from Climate Change is expected to occur through 1) sea level rise, 2) extreme rainfall events or droughts in upstream terrestrial areas which are connected to run off and flooding, 3) sea surface temperature and 4) CO2 concentrations.

## 1.4 Management Efforts at Aqaba

### 1.4.1 The Aqaba Marine Park

The Aqaba Marine Park (AMP) was established in 1997 over an area of 7 km to conserve and manage the natural near-shore marine environment of the Aqaba south coast region with its rich biodiversity, while allowing touristic uses at sustainable levels, for the benefit and enjoyment of the present and future generations of Jordanians and the global community. The AMP is located south of Aqaba city stretching from the Passenger Terminal in the North to the Police Officers' Club in the South. The area's terrestrial boundaries lie 50 m east of the Mean High-Water Mark and the marine boundaries lies 350m west of the mean high-water mark.

### 1.4.2 Legal Framework to Protect Corals at Aqaba

#### 1.4.2.1 Legislations at the National Level

Jordan's government has issued three main legal frameworks, where coral protection has been addressed either directly or indirectly and these are:

1. Aqaba Special Economic Zone Law No. 32 for the year 2000 and its amendments: this law is implemented by the Aqaba Special Economic Zone Authority (ASEZA), and contains two major bylaws, and an additional two regulations that are linked to corals and reef corals protection, as follows:
  - Aqaba Marine Park Bylaw No. 22 for the year 2001
  - Environmental Protection Bylaw No. 21 for the year 2001
  - Scientific Research at the Aqaba Marine Park Regulations No 82 for the year 2005s

In addition, two main instructions developed by ASEZA in cooperation with the Jordan Maritime Authority (JMA) in relation to ship grounding among other causes of possible marine environmental damage and resulted in the establishment of committee. The instructions provided a compensation of four thousand (4,000.00 JOD) for every 1 m<sup>2</sup> damage of coral reef as a result of breaking, covering, killing or even transporting. The instructions are:

- Instructions No 37 for the year 2002 on "Evaluation Committee E- as adopted."
- Instructions No 55 for the year 2004 "Regulations of Environmental Damage 55"

2. The Environment Protection Law No. 6 for the year 2017: governed by the Ministry of Environment and contains articles related to corals protection and defines penalties of violation.
3. The Agricultural law No. 13 for the year 2015: This law is governed by the Ministry of Agriculture, and contains two regulations that are linked to coral protection, which are:
  - Trade in Endangered Plants and Animals Regulations No. Z\ 2 for the year 2010
  - Fishing at Aqaba Regulations No. Z\5 for the year 2006

In addition, ASEZA is implementing a “Zero Discharge” policy, aiming to preserve the marine environment through the complete elimination of marine. The Gulf of Aqaba is defined as a ‘special area’ according to the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78) signifying that discharges of oil are prohibited from vessels.

#### 1.4.2.2 Legislations at the International Level

The government of Jordan has signed and ratified several conventions and engaged in different initiatives which are linked to coral reefs protection. All ratified conventions are legally binding, which states that the government of Jordan shall fulfill its own national legislative requirements. The following describe the conventions, which were signed or ratified by the Government of Jordan.

##### 1.4.2.2.1 Convention on Biological Diversity (CBD)

Jordan has ratified the CBD, and become a party in 1994, where the Directorate of Nature Conservation at the Ministry of Environment acts as the focal point to this convention. This convention has urged parties to conserve coral reefs where the extensive coral bleaching was highlighted in the fourth Conference of the Parties (COP) meeting, which was conducted in 1998. Based on that, decision IV/5, requested the Subsidiary Body on Scientific, Technical and Technological Advice to analyze the coral bleaching phenomenon in relation to global warming and provide relevant information to the fifth meeting of the COP. A year after, COP has decided in its decision V/3 to integrate coral reefs, and bleaching into marine and coastal living resources program, and urged the necessity to develop and implement a specific work plan on coral bleaching, in cooperation with the United Nations Framework Convention on Climate Change and with relevant conventions and organizations. This was followed by decision VII/5, has adopted 1) appendix 1 related to a Specific Work Plan on Coral Bleaching and appendix II on the Elements of a Work Plan on Physical Degradation and Destruction of Coral Reefs, including Cold Water Corals. The following activities were developed for the Specific Work Plan on Coral Bleaching: i) management actions and strategies to support reef resilience, rehabilitation and recovery, ii) information gathering, iii) capacity-building, iv) policy development\ implementation, and v) financing (<https://www.cbd.int/soi/>).

#### 1.4.2.2.2 Convention on International Trade in Endangered Species of Plants and Animals (CITES)

The Government of Jordan has ratified CITES convention and came into force in Jordan in 1979. The management authority is shared between three national entities, which are: i) the Ministry of Agriculture, ii) the Royal Society for the Conservation of Nature and iii) Al Mawa for Wildlife and Nature. The Resolution Conference 11.10 (Rev. CoP15) regulates the trade in stony corals where it urges parties and other bodies from range and consumer States to: i) collaborate and provide support, coordinated by the Secretariat, to produce as a priority accessible and practical guides to recognizing corals and coral rock in trade and to make these widely available to Parties through appropriate media, and ii) seek synergy with other multilateral environmental agreements and initiatives to work for the conservation and sustainable use of coral reef ecosystems (<http://www.cites.org/eng>).

#### 1.4.2.2.3 United Nations Framework Convention on Climate Change (UNFCCC)

Jordan has ratified the UNFCCC in 2016 as a non-Annex I party. The framework of this convention aims to stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. The convention highlights the importance of coral reefs as carbon storage, as well as its contribution to climatic conditions. Therefore, it urges parties to establish measures in order to protect this ecosystem through various mitigation and adaptation measures.

#### 1.4.2.2.4 World Heritage Convention (WHC) - United Nations Educational, Scientific and Cultural Organization (UNESCO)

The Government of Jordan ratified the UNESCO World Heritage Convention in 1975. The convention aims to protect natural and cultural places of Outstanding Universal Value. It recognizes the importance of corals in world heritage conservation, thus it has established several measures to build its resilience, by reducing local human pressure. The first global scientific assessment of climate change impacts on World Heritage coral reefs, published by UNESCO's World Heritage Centre in 2016, revealed that 25 of 29 listed reefs experienced bleaching stress in the last three years. The analysis predicts that all 29 coral-containing World Heritage sites might cease to exist as functioning coral reef ecosystems by the end of this century if CO<sub>2</sub> emissions are not drastically reduced.

WHC contains World Heritage Marine Programme that aims to establish effective conservation of existing and potential marine areas of Outstanding Universal Value. It works with four focus areas, which are: i) safeguarding, ii) network, iii) training and iv) exploring (More information are available online at <http://whc.unesco.org/en/marine-programme>).

#### 1.4.2.2.5 Jeddah Convention

It was established in 1982, after a Regional Intergovernmental Conference held in Jeddah city at the Kingdom of Saudi Arabia. It was formally titled as the "Regional Convention for the Conservation of the Red Sea and Gulf of Aden Environment". The Jeddah Convention expresses in clear terms the commitment and the political will of the governments of the region to tackle the marine and coastal environments of the Red Sea and Gulf of Aden through joint coordinated activities (<http://www.persga.org/inner.php?mainid=32>).

#### 1.4.2.2.6 International Convention for the Prevention of Pollution from Ships (MARPOL)

This convention entered into force in 1983, where Jordan is part. MARPOL is short for marine pollution, and it is considered as one of the most important international marine environmental conventions. It was developed by the International Maritime Organization in an effort to minimize pollution of the oceans and seas, including dumping, oil and air pollution. The objective of this convention is to preserve the marine environment in an attempt to completely eliminate pollution by oil and other harmful substances and to minimize accidental spillage of such substances ([http://www.imo.org/en/about/conventions/listofconventions/pages/international-convention-for-the-prevention-of-pollution-from-ships-\(marpol\).aspx](http://www.imo.org/en/about/conventions/listofconventions/pages/international-convention-for-the-prevention-of-pollution-from-ships-(marpol).aspx)).

#### 1.4.2.2.7 The London Convention

The "Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972," the "London Convention " for short, entered into force on 24 March 2006. It is one of the first global conventions to protect the marine environment from human activities. The Convention has been in force since 1975. Its objective is to promote the effective control of all sources of marine pollution and to take all practicable steps to prevent pollution of the sea by dumping of wastes and other matter. In 1996, the "London Protocol" was agreed to further modernize the Convention and, eventually, replace it. Under the protocol, all dumping is prohibited, except for possibly acceptable wastes on the so-called "reverse list" (More information are available online at: <http://www.imo.org/en/OurWork/Environment/LCLP/Pages/default.aspx>).

#### 1.4.2.2.7 Basel Convention (1992)

Also called the Convention for the Control of Trans-boundary Movement of Hazardous Wastes and their Disposal, Jordan declared its territory as forbidden to the importation or transshipment of foreign hazardous wastes (<http://www.basel.int/>).

### 1.4.3 National Monitoring Program

ASEZA has been implementing a national monitoring program since the year 2002 to monitor the quality of seawater, coral reefs, benthic communities and fish. This ongoing program is implemented along the Jordanian Coastline through contracting with the Marine Science Station which belongs to the University of Jordan and Yarmouk University.

### 1.4.4 Reef Check

The Royal Marine Conservation Society of Jordan (JREDS) hosted a Reef Check EcoDiver Training in Aqaba with the aim to raise awareness and knowledge about coral reefs and to build up a team of qualified divers for further reef monitoring activities at the Jordanian Red Sea coast. JREDS is counting on the existing national team to collect information and details on the coral reef status on a frequent basis.

### 1.4.5 Clean Up Efforts and Initiatives

Some institutions, associations and initiatives contribute through some activities and in coordination with the concerned authorities to protect the marine environment resources. ASEZA, through the Aqaba Marine Park, supervises many of initiatives to the underwater cleanup which come with the contribution of the local community and its role in protection. The supervision, guidance and involvement of experienced divers in the field of underwater cleaning or through snorkeling.

A one-year contract was signed to clean up diving sites and other swimming areas, and a voluntary initiative was supported by equipment and training and those who were able to extract large amounts of waste.

### 1.4.6 Private Sector Engagement

#### 1.4.6.1 Ayla Oasis- Reef balls at Ayla

Amidst the natural beauty of the Red Sea port of Aqaba and located on its northern shores, Ayla development, a mixed-use development project for residential, touristic and commercial use, stands out by not only adding beauty to the Gulf, but also by seeking to protect and assist its natural wonders. By combining human ingenuity with Aqaba's resources, Ayla is a unique example of what can be achieved when humankind and nature work together. With its aim to restore the Gulf reef ecosystems and to protect natural reefs, Ayla has been using artificial reef technologies and "Reef Balls" to create its own reefs. Reef Balls are artificial reef modules placed in seawater to form reef habitats. This concept involves extracting segments of coral or larva of live corals, growing them in a nursery and then replanting them into these Reef balls.

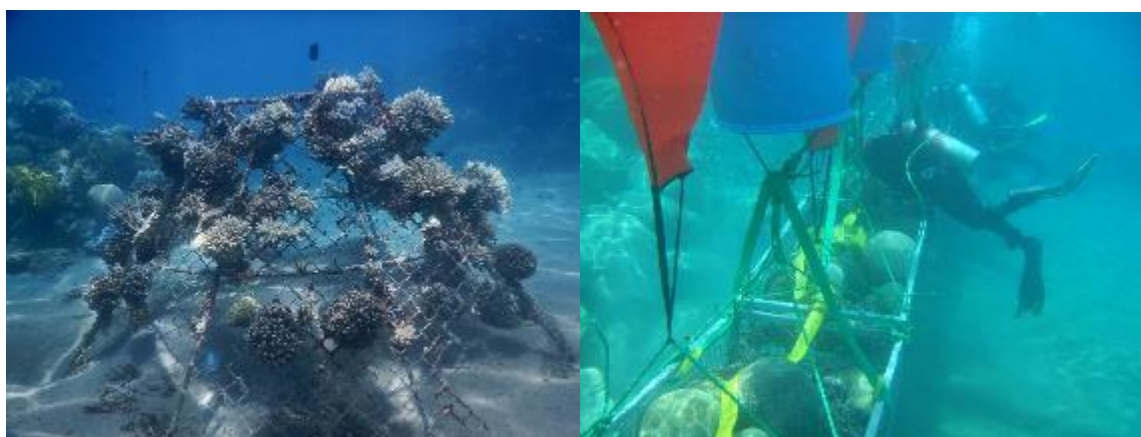
Ayla's lagoons have added 17 km of waterfront to the city of Aqaba. The lagoons are kept clean through an environmentally safe system for the circulation of water through a set of pumps, moving the water mass from the sea to the upper lagoons and then circulating



it back to the sea. More information about Ayla is available online at <http://www.ayla.com.jo/>.

#### 1.4.6.2 Aqaba Container Terminal (ACT)

Aqaba Container Terminal (ACT) is part of the ports cooperation at Aqaba, and is playing an important role through its commitments to achieve the high standards of environmental performance, preventing pollution and minimizing the impact of its business of container handling and storage. ACT has invested 1.3 million JOD to aid the transplantation of coral from the berth expansion area to alternative areas where it can thrive again (Figure 5). This transplantation, which was performed by ASEZA, includes detaching of the coral colonies from the donor site represented by the new main port at the south of Aqaba town, and re-attaching these colonies at the receptor sites within the Aqaba Marine Park. More information is available online at <https://www.act.com.jo/>.



**Figure 5: Transplantation efforts of corals at Aqaba**

#### 1.4.7 National and Regional Entities Involved in Corals Protection

##### 1.4.7.1 The Ministry of Environment

The Ministry of Environment is responsible for implementing the Environmental Law No 6 for the year 2017. In addition, it acts as the focal point to multilateral environmental conventions such as CBD and UNFCCC. A department for nature conservation was established, where a section for water and marine environmental protection was established. Recently, the Ministry of Environment has applied for the International Coral Reef Initiative (More information is available online at <http://moenv.gov.jo/En/Pages/mainpage.aspx>).

##### 1.4.7.2 Commission for the Environment at ASEZA

It includes two major departments within its structures that are directly dealing with marine environmental protection, and these are the environmental and beaches management departments (More information is available online at <http://aseza.io/Pages/viewpage.aspx?pageID=134>)

#### 1.4.7.3 Royal Department for the Protection of Nature

Established in 2006 according to his majesty king Abdullah II consists of instructions that aimed to protect and sustain the Jordanian environment. An active branch is established at Aqaba to monitor and enforce laws against violation to the marine environment including hard corals (More information are available online at <http://www.rangers.psd.gov.jo/?q=en>)

#### 1.4.7.4 Marine Science Station

Founded in the mid-1970s, to create a marine research facility for scientist and post graduate students from Jordan and the international community. The station provides several research efforts on the Gulf of Aqaba and increase our knowledge about its biological and physical characteristics (More information are available online at <http://mss.ju.edu.jo/Home.aspx>).

#### 1.4.7.5 Regional Organization for the Conservation of the Environment of the Red Sea and Gulf of Aden (PERSGA)

Intergovernmental body dedicated to the conservation of the coastal and marine environments found in the Red Sea, Gulf of Aqaba, Gulf of Suez, Suez Canal, and Gulf of Aden surrounding the Socotra Archipelago and nearby waters. PERSGA has developed a Regional Action Plan (RAP) that provides a set of priority actions for the conservation and sustainable use of coral reefs in the Red Sea and Gulf of Aden. The plan was developed in recognition of the great economic, ecological, and aesthetic importance that these ecosystems provide and in response to the serious threats posed by increasing human and natural impacts. (More information is available online at <http://www.persga.org/inner.php?id=91>).

## **Annex I: Hard Corals of Jordan: Species Checklist**

Kingdom: Animalia							
Phylum: Cnidaria							
Class: Anthozoa – Subclass Hexacorallia							
Order: Scleractinia							
Family	Genus	species	Taxonomic Authority	Zoox	Red Sea Endemic	IUCN – Red List Status	
Dendrophylliidae	<i>Rhizopsammia</i>	<i>wettsteini</i>	Scheer & Pillai, 1983			Not Evaluated	
	<i>Rhizopsammia</i>	<i>compacta</i>	Sheppard & Sheppard, 1991			Not Evaluated	
	<i>Tubastraea</i>	<i>micranthus</i>	(Ehrenberg, 1834)			Not Evaluated	
	<i>Turbinaria</i>	<i>mesenterina</i>	(Lamarck, 1816)	+		Vulnerable	
	<i>Turbinaria</i>	<i>reniformis</i>	Bernard, 1896	+		Vulnerable	
	<i>Balanophyllia</i>	sp.					
	<i>Goniopora</i>	<i>ciliatus</i>	Veron, 2000	+		Least Concern	
	<i>Goniopora</i>	<i>columna</i>	Dana, 1846	+		Near Threatened	
	<i>Goniopora</i>	<i>lobata</i>	Milne Edwards, 1860	+		Near Threatened	
	<i>Goniopora</i>	<i>minor</i>	Crossland, 1952	+		Near Threatened	
Poritidae	<i>Goniopora</i>	<i>savignyi</i>	(Dana, 1846)	+		Least Concern	
	<i>Goniopora</i>	<i>tantillus</i>	(Claereboudt & Al Amri, 2004)	+		Not Evaluated	
	<i>Goniopora</i>	<i>tenuidens</i>	(Quelch, 1886)	+		Not Evaluated	
	<i>Porites</i>	<i>columnaris</i>	Klunzinger, 1879	+		Least Concern	
	<i>Porites</i>	<i>fontanesii</i>	Benzoni & Stefani, 2012	+		Not Evaluated	
	<i>Porites</i>	<i>lutea</i>	Milne Edwards & Haime, 1851	+		Least Concern	
	<i>Porites</i>	<i>nodifera</i>	Klunzinger, 1879	+		Least Concern	
	<i>Porites</i>	<i>rus</i>	(Forskål, 1775)	+		Least Concern	
	<i>Porites</i>	<i>solida</i>	(Forskål, 1775)	+		Least Concern	
	Agariciidae	<i>Gardineroseris</i>	<i>planulata</i>	(Dana, 1846)	+		Least Concern
		<i>Leptoseris</i>	<i>explanata</i>	Yabe & Sugiyama, 1941	+		Least Concern
		<i>Leptoseris</i>	<i>incrustans</i>	(Quelch, 1886)	+		Vulnerable
		<i>Leptoseris</i>	<i>mycetoseroides</i>	Wells, 1954	+		Least Concern
		<i>Leptoseris</i>	<i>yabei</i>	(Pillai & Scheer, 1976)	+		Vulnerable

	<i>Pavona</i>	<i>danai</i>	Milne Edwards, 1860	+	Vulnerable
	<i>Pavona</i>	<i>decussata</i>	(Dana, 1846)	+	Vulnerable
	<i>Pavona</i>	<i>explanulata</i>	(Lamarck, 1816)	+	Least Concern
	<i>Pavona</i>	<i>maldivensis</i>	(Gardiner, 1905)	+	Least Concern
	<i>Pavona</i>	<i>varians</i>	Verrill, 1864	+	Least Concern
	<i>Pavona</i>	<i>venosa</i>	(Ehrenberg, 1834)	+	Vulnerable
Acroporidae	<i>Acropora</i>	<i>abrotanoides</i>	(Lamarck, 1816)	+	Least Concern
	<i>Acropora</i>	<i>arabensis</i>	Hodgson & Carpenter, 1995	+	Near Threatened
	<i>Acropora</i>	<i>austera</i>	(Dana, 1846)	+	Near Threatened
	<i>Acropora</i>	<i>cytherea</i>	(Dana, 1846)	+	Least Concern
	<i>Acropora</i>	<i>digitifera</i>	(Dana, 1846)	+	Near Threatened
	<i>Acropora</i>	<i>downingi</i>	Wallace 1999	+	Not Evaluated
	<i>Acropora</i>	<i>eurystoma</i>	(Klunzinger, 1879)	+	Not Evaluated
	<i>Acropora</i>	<i>gemmifera</i>	(Brook, 1892)	+	Least Concern
	<i>Acropora</i>	<i>hyacinthus</i>	(Dana, 1846)	+	Near Threatened
	<i>Acropora</i>	<i>pharaonis</i>	(Milne Edwards, 1860)	+	Vulnerable
	<i>Acropora</i>	<i>samoensis</i>	(Brook, 1891)	+	Least Concern
	<i>Acropora</i>	<i>secale</i>	(Studer, 1878)	+	Near Threatened
	<i>Acropora</i>	<i>squarrosa</i>	(Ehrenberg, 1834)	+	Least Concern
	<i>Acropora</i>	<i>variolosa</i>	(Klunzinger, 1879)	+	Least Concern
	<i>Acropora</i>	<i>cf aculeus</i>	(Dana, 1846)	+	Not Evaluated
	<i>Acropora</i>	sp. 1		+	
	<i>Alveopora</i>	<i>allingi</i>	Hoffmeister, 1925	+	Vulnerable
	<i>Alveopora</i>	<i>tizardi</i>	Bassett-Smith, 1890	+	Not Evaluated
	<i>Alveopora</i>	<i>viridis</i>	Quoy & Gaimard, 1833	+	Near Threatened
	<i>Astreopora</i>	<i>gracilis</i>	Bernard, 1896	+	Least Concern
	<i>Astreopora</i>	<i>myriophthalma</i>	(Lamarck, 1816)	+	Least Concern
	<i>Montipora</i>	<i>cryptus</i>	Veron, 2000	+	Near Threatened
	<i>Montipora</i>	<i>danae</i>	Milne Edwards & Haime, 1851	+	Least Concern
	<i>Montipora</i>	<i>efflorescens</i>	Bernard, 1897	+	Near Threatened

	<i>Montipora</i>	<i>hemispherica</i>	Veron, 2000	+			Data Deficient
	<i>Montipora</i>	<i>informis</i>	Bernard, 1897	+			Least Concern
	<i>Montipora</i>	<i>meandrina</i>	(Ehrenberg, 1834)	+			Vulnerable
	<i>Montipora</i>	<i>spumosa</i>	(Lamarck, 1816)	+			Least Concern
	<i>Montipora</i>	<i>stilosa</i>	(Ehrenberg, 1834)	+			Vulnerable
	<i>Montipora</i>	<i>tuberculosa</i>	(Lamarck, 1816)	+			Least Concern
	<i>Montipora</i>	sp. 1		+			
	<i>Montipora</i>	sp. 2		+			
Euphylliidae	<i>Galaxea</i>	<i>fascicularis</i>	(Linnaeus, 1767)	+			Near Threatened
	<i>Gyrosmitia</i>	<i>interrupta</i>	(Ehrenberg, 1834)	+			Least Concern
Siderastreidae	<i>Siderastrea</i>	<i>savignyana</i>	Milne Edwards & Haime, 1850	+			Least Concern
Caryophylliidae	<i>Polycyathus</i>	<i>fuscocomarginatus</i>	(Klunzinger, 1879)				Not Evaluated
Coscinaraeidae	<i>Coscinaraea</i>	<i>monile</i>	Forskål, 1775	+			Least Concern
	<i>Craterastrea</i>	<i>levis</i>	Head, 1983	+			Not Evaluated
Fungiidae	<i>Cantharellus</i>	<i>doederleini</i>	(von Marenzeller, 1907)	+	x		Least Concern
	<i>Ctenactis</i>	<i>echinata</i>	(Pallas, 1766)	+			Least Concern
	<i>Cycloseris</i>	<i>explanulata</i>	(van der Horst, 1922)	+			Not Evaluated
	<i>Cycloseris</i>	<i>wellsi</i>	(Veron & Pichon, 1980)	+			Not Evaluated
	<i>Danafungia</i>	<i>horrida</i>	(Dana, 1846)	+			Not Evaluated
	<i>Danafungia</i>	<i>scruposa</i>	(Klunzinger, 1879)	+			Not Evaluated
	<i>Fungia</i>	<i>fungites</i>	(Linnaeus, 1758)	+			Near Threatened
	<i>Herpolitha</i>	<i>limax</i>	(Esper, 1797)	+			Least Concern
	<i>Pleuractis</i>	<i>granulosa</i>	(Klunzinger, 1879)	+			Not Evaluated
	<i>Pleuractis</i>	<i>seychellensis</i>	(Hoeksema, 1993)	+			Not Evaluated
	<i>Podabacia</i>	<i>crustacea</i>	(Pallas, 1766)	+			Least Concern
	<i>Podabacia</i>	<i>sinai</i>	Veron, 2000	+			Data Deficient
Plesiastreidae	<i>Plesiastrea</i>	<i>versipora</i>	(Lamarck, 1816)	+			Least Concern
Lobophylliidae	<i>Cynarina</i>	<i>lacrymalis</i>	(Milne Edwards & Haime, 1848)	+			Near Threatened
	<i>Echinophyllia</i>	<i>aspera</i>	(Ellis & Solander, 1786)	+			Least Concern
	<i>Echinophyllia</i>	<i>bulbosa</i>	Arrigoni, Benzoni & Berumen, 2016	+	x		Not Evaluated

	<i>Lobophyllia</i>	<i>corymbosa</i>	(Forskål, 1775)	+		Least Concern
	<i>Lobophyllia</i>	<i>hataii</i>	Yabe & Sugiyama, 1936	+		Least Concern
	<i>Lobophyllia</i>	<i>hemprichii</i>	(Ehrenberg, 1834)	+		Least Concern
	<i>Lobophyllia</i>	<i>erythraea</i>	(Klunzinger, 1879)	+		Not Evaluated
	<i>Oxypora</i>	<i>convoluta</i>	Veron, 2000	+	x	Data Deficient
	<i>Sclerophyllia</i>	<i>margariticola</i>	Klunzinger, 1879	+	x	Not Evaluated
	<i>Acanthastrea</i>	<i>echinata</i>	(Dana, 1846)	+		Least Concern
	<i>Caulastraea</i>	<i>tumida</i>	Matthai, 1928	+		Not Evaluated
	<i>Cyphastrea</i>	<i>chalcidicum</i>	(Forskål, 1775)	+		Least Concern
	<i>Cyphastrea</i>	<i>hexasepta</i>	Veron, Turak & DeVantier, 2000	+	x	Vulnerable
	<i>Cyphastrea</i>	<i>microphthalma</i>	(Lamarck, 1816)	+		Least Concern
	<i>Cyphastrea</i>	<i>serailia</i>	(Forskål, 1775)	+		Least Concern
	<i>Cyphastrea</i>	<i>kausti</i>	Bouwmeester & Benzoni, 2015	+	x	Not Evaluated
	<i>Cyphastrea</i>	<i>magna</i>	Benzoni & Arrigoni, 2017	+	x	Not Evaluated
	<i>Dipsastraea</i>	<i>albida</i>	Veron, 2000	+		Not Evaluated
	<i>Dipsastraea</i>	<i>danae</i>	(Milne Edwards, 1857)	+		Not Evaluated
	<i>Dipsastraea</i>	<i>favus</i>	(Forskål, 1775)	+		Not Evaluated
	<i>Dipsastraea</i>	<i>lacuna</i>	(Veron, Turak & DeVantier, 2000)	+		Not Evaluated
	<i>Dipsastraea</i>	<i>laxa</i>	(Klunzinger, 1879)	+		Not Evaluated
	<i>Dipsastraea</i>	<i>matthai</i>	(Vaughan, 1918)	+		Not Evaluated
	<i>Dipsastraea</i>	<i>pallida</i>	(Dana, 1846)	+		Not Evaluated
	<i>Dipsastraea</i>	<i>speciosa</i>	(Dana, 1846)	+		Not Evaluated
	<i>Echinopora</i>	<i>forskaliana</i>	(Milne Edwards & Haime, 1849)	+		Near Threatened
	<i>Echinopora</i>	<i>fruticulosa</i>	Klunzinger, 1879	+		Near Threatened
	<i>Echinopora</i>	<i>tiranensis</i>	Veron, Turak & DeVantier, 2000	+	x	Data Deficient
	<i>Erythraeastera</i>	<i>flabellata</i>	Pichon, Scheer & Pillai, 1983	+	x	Near Threatened
	<i>Favites</i>	<i>halicora</i>	(Ehrenberg, 1834)	+		Near Threatened
	<i>Favites</i>	<i>micropentagonus</i>	Veron, 2000	+		Not Evaluated
	<i>Favites</i>	<i>pentagona</i>	(Esper, 1795)	+		Least Concern
	<i>Favites</i>	<i>rotundata</i>	Veron, Pichon & Wijsman-Best, 1977	+		Not Evaluated



<i>Leptastrea</i>	<i>bottae</i>	(Milne Edwards & Haime, 1849)	+		Near Threatened
<i>Leptastrea</i>	<i>inaequalis</i>	Klunzinger, 1879	+		Near Threatened
<i>Leptastrea</i>	<i>purpurea</i>	(Dana, 1846)	+		Least Concern
<i>Leptastrea</i>	<i>transversa</i>	Klunzinger, 1879	+		Least Concern
<i>Blastomussa</i>	<i>loyae</i>	Head, 1978	+		Not Evaluated
<i>Blastomussa</i>	<i>merleti</i>	(Wells, 1961)	+		Least Concern
<i>Plerogyra</i>	<i>sinuosa</i>	(Dana, 1846)	+		Near Threatened
Class: Anthozoa – Subclass Octocorallia					
Order: Alcyonacea					
Tubiporidae	<i>Tubipora</i>	<i>musica</i>	+		Near Threatened
Class: Hydrozoa					
Order: Anthoathecata					
Milleporidae	<i>Millepora</i>	<i>exesa</i>	+		Least Concern
	<i>Millepora</i>	<i>dichotoma</i>	+		Least Concern
	<i>Millepora</i>	<i>platyphylla</i>	+		Least Concern
		Hemprich & Ehrenberg, 1834			



## Sea Turtle in Aqaba

Family	Genus	Species	Ino اسم	Geographical distribution	Nesting	
					No	Yes
Cheloniidae	<i>Chelonia</i>	<i>mydas</i>	Green turtle	seagrass	No	
Cheloniidae	<i>Eretmochelys</i>	<i>imbricata</i>	hawksbill	corals	No	
Cheloniidae	<i>Caretta</i>	<i>caretta</i>	loggerhead	various habitat	No	

## Copepoda

Class قسم	Family	Order	Genus	Species
Copepoda	Paracalanidae	Calanoida	Paracalanus	<i>Paracalanus parvus</i>
Copepoda	Paracalanidae	Calanoida	Paracalanus	<i>Paracalanus indicus</i>
Copepoda	Paracalanidae	Calanoida	Paracalanus	<i>Paracalanus crassirostris</i>
Copepoda	Paracalanidae	Calanoida	Acrocalanus	<i>Acrocalanus gibber</i>
Copepoda	Calocalanidae	Calanoida	Calocalanus	<i>Calocalanus pavo</i>
Copepoda	Calocalanidae	Calanoida	Calocalanus	<i>Calocalanus pavoninus</i>
Copepoda	Calocalanidae	Calanoida	Mecynocera	<i>Mecynocera clausi</i>
Copepoda	Augaptilidae	Calanoida	Haloptilus	<i>Haloptilus ornatus</i>
Copepoda	Augaptilidae	Calanoida	Haloptilus	<i>Haloptilus longicornis</i>
Copepoda	Phaennidae	Calanoida	Phaenna	<i>Phaenna spinifera</i>
Copepoda	Metridinidae	Calanoida	Pleuromamma a	<i>Pleuromamma indica</i>
Copepoda	Centropagidae	Calanoida	Centropages	<i>Centropages furcatus</i>
Copepoda	Centropagidae	Calanoida	Centropages	<i>Centropages elongatus</i>
Copepoda	Euchaetidae	Calanoida	Euchaeta	<i>Euchaeta concinna</i>
Copepoda	Acartiidae	Calanoida	Acartia	<i>Acartia negligens</i>
Copepoda	Acartiidae	Calanoida	Acartia	<i>Acartia centrura</i>
Copepoda	Temoridae	Calanoida	Temora	<i>Temora stylifera</i>
Copepoda	Eucalanidae	Calanoida	Rhincalanus	<i>Rhincalanus nasutus</i>
Copepoda	Clausocalanida e	Calanoida	Clausocalanus	<i>Clausocalanus arcuicornis</i>

Copepoda	Clausocalanidae	Calanoida	Clausocalanus	<i>Clausocalanus furcatus</i>
Copepoda	Clausocalanidae	Calanoida	Clausocalanus	<i>Clausocalanus farrani</i>
Copepoda	Clausocalanidae	Calanoida	Ctenocalanus	<i>Ctenocalanus vanus</i>
Copepoda	Lucicutiidae	Calanoida	Lucicutia	<i>Lucicutia flavicornis</i>
Copepoda	Calanidae	Calanoida	Calanus	<i>Calanus minor</i>
Copepoda	Calanidae	Calanoida	Calanus	<i>Calanus vulgaris</i>
Copepoda	Calanidae	Calanoida	Calanus	<i>Calanus tenuicornis</i>
Copepoda	Calanidae	Calanoida	Calanus	<i>Calanus robustior</i>
Copepoda	Aetideidae	Calanoida	Euchirella	<i>Euchirella messinensis</i>
Copepoda	Pontellidae	Calanoida	Calanopia	<i>Calanopia elliptica</i>
Copepoda	Candaciidae	Calanoida	Candacia	<i>Candacia pectinata</i>
Copepoda	Candaciidae	Calanoida	Candacia	<i>Candacia simplex</i>
Copepoda	Candaciidae	Calanoida	Candacia	<i>Candacia tenuimana</i>
Copepoda	Candaciidae	Calanoida	Candacia	<i>Candacia truncata</i>
Copepoda	Candaciidae	Calanoida	Candacia	<i>Candacia curta</i>
Copepoda	Oithonidae	Cyclopoida	Oithona	<i>Oithona nana</i>
Copepoda	Oithonidae	Cyclopoida	Oithona	<i>Oithona plumifera</i>
Copepoda	Oithonidae	Cyclopoida	Oithona	<i>Oithona similis</i>
Copepoda	Oncaidae	Cyclopoida	Oncaea	<i>Oncaea media</i>
Copepoda	Oncaidae	Cyclopoida	Oncaea	<i>Oncaea conifera</i>
Copepoda	Oncaidae	Cyclopoida	Oncaea	<i>Oncaea venusta</i>
Copepoda	Oncaidae	Cyclopoida	Lubbockia	<i>Lubbockia squillimana</i>
Copepoda	Corycaidae	Cyclopoida	Corycaeus	<i>Corycaeus erythraeus</i>
Copepoda	Corycaidae	Cyclopoida	Corycaeus	<i>Corycaeus speciosus</i>
Copepoda	Corycaidae	Cyclopoida	Corycaeus	<i>Corycaeus ovalis</i>
Copepoda	Corycaidae	Cyclopoida	Corycaeus	<i>Corycaeus subulatus</i>
Copepoda	Corycaidae	Cyclopoida	Corycaeus	<i>Corycaeus limbatus</i>
Copepoda	Corycaidae	Cyclopoida	Farranula	<i>Farranula gibbula</i>
Copepoda	Corycaidae	Cyclopoida	Farranula	<i>Farranula carinata</i>
Copepoda	Corycaidae	Cyclopoida	Farranula	<i>Farranula rostrata</i>
Copepoda	sapphirinidae	Cyclopoida	Sapphirina	<i>Sapphirina opalina</i>
Copepoda	sapphirinidae	Cyclopoida	Copilia	<i>Copilia mirabilis</i>

Copepoda	Ectinosomatidae	Harpacticoida	Microsetella	<i>Microsetella norvegica</i>
Copepoda	Ectinosomatidae	Harpacticoida	Microsetella	<i>Microsetella rosea</i>
Copepoda	Clytemnestridae	Harpacticoida	Clytemnestra	<i>Clytemnestra scutellata</i>
Copepoda	Miraciidae	Harpacticoida	Macrosetella	<i>Macrosetella gracilis</i>

## Crustacea

Class	Family	Genus	Species	Geographical distribution	Comments
Crustacea	Ocypodidae	Ocypoda	<i>Ocypoda saratan</i>	red sea (burrows and nearby sediments in Gulf of Aqaba)	
Crustacea	Ocypodidae	Dotilla	<i>Dotilla sulcata</i>	red sea (Gulf of Aqaba)	
Crustacea	Ocypodidae	Uca	<i>Uca tetragonon</i>	red sea (Gulf of Aqaba)	
Crustacea	Ocypodidae	Uca	<i>Uca lactea annulipes</i>	red sea (Gulf of Aqaba)	
Crustacea	Grapsidae	Grapsus	<i>Grapsus albolineatus</i>	red sea (Gulf of Aqaba)	
Crustacea	Grapsidae	Metopograpsus	<i>Metopograpsus messor</i>	red sea (Gulf of Aqaba)	
Crustacea	Grapsidae	Metopograpsus	<i>Metopograpsus thukuhar</i>	red sea (Gulf of Aqaba)	
Crustacea	Grapsidae	Cardisoma	<i>Cardisoma carnifex</i>	red sea (Gulf of Aqaba)	
Crustacea	Diogenidae	Calcinus	<i>Calcinus latens</i>	red sea (Gulf of Aqaba)	Common in the Rocky littoral
Crustacea	Diogenidae	Calcinus	<i>Calcinus roseus</i>	red sea (Gulf of Aqaba)	Common in the coral reef
Crustacea	Diogenidae	Calcinus	<i>Calcinus sp</i>	red sea (Gulf of Aqaba)	Unknown hermit crabs
Crustacea	Diogenidae	Clibanarius	<i>Clibanarius sp.</i>	red sea (Gulf of Aqaba)	Black hermit crab
Crustacea	Diogenidae		<i>unknown</i>	red sea (Gulf of Aqaba)	hermit crab
Crustacea	Diogenidae	Dardanus	<i>Dardanus sp.</i>	red sea (Gulf of Aqaba)	
Crustacea	Diogenidae	Dardanus	<i>Dardanus tinctor</i>	red sea (Gulf of Aqaba)	
Crustacea	Diogenidae	Dardanus	<i>Dardanus lagopodes</i>	red sea (Gulf of Aqaba)	

Crustacea	Diogenidae	Ciliopagurus	<i>Ciliopagurus strigatus</i>	red sea (Gulf of Aqaba)	
Crustacea	Paguridae	Pagurus	<i>Pagurus cf hirtimanus</i>	red sea (Gulf of Aqaba)	
Crustacea	Coenobitidae	Coenobita	<i>Coenobita scaveola</i>	red sea (Gulf of Aqaba)	Large land active hermit crab
Crustacea	Galatheididae	Allogalatea	<i>Allogalatea elegans</i>	red sea (Gulf of Aqaba)	Lives upon Feather star
Crustacea	Galatheididae	Galathea	<i>Galathea sp.</i>	red sea (Gulf of Aqaba)	Habitat: Fire corals
Crustacea	Galatheididae	Galathea	<i>Galathea sp.</i>	red sea (Gulf of Aqaba)	Habitat: Coral reef
Crustacea	Galatheididae	Galathea	<i>Galathea sp.</i>	red sea (Gulf of Aqaba)	Habitat: Coral rubble
Crustacea	Galatheididae	Galathea	<i>Galathea sp.</i>	red sea (Gulf of Aqaba)	Habitat: soft coral
Crustacea	Galatheididae	Galathea	<i>Galathea cf. longimana</i>	red sea (Gulf of Aqaba)	Habitat: Subtidal algae
Crustacea	Porcellanidae	Petrolisthes	<i>Petrolisthes sp.</i>	red sea (Gulf of Aqaba)	Habitat: Symbiotic on sea anemones
Crustacea	Porcellanidae	Neopetrolisthes	<i>Neopetrolisthes maculatus</i>	red sea (Gulf of Aqaba)	
Crustacea	porcellanidae	Porcellanella	<i>Porcellanella triloba</i>	red sea (Gulf of Aqaba)	
Crustacea	Hippida	Hippa	<i>Hippa cf. picta</i>	red sea (Gulf of Aqaba)	
Crustacea	Dromiidae	Cryptodromia	<i>Cryptodromia sp.</i>	red sea (Gulf of Aqaba)	Sponge crab
Crustacea	Dromiidae	Dromiid	<i>Dromiid sp.</i>	red sea (Gulf of Aqaba)	Ascidia carrying crab
Crustacea	Calappidae		<i>Ashtoret (=Matuta) lunaris</i>	red sea (Gulf of Aqaba)	Flat footed crab, with large spine in both sides of its carapax, (moon crab)
Crustacea	Calappidae	Calappa	<i>Calappa hepatica</i>	red sea (Gulf of Aqaba)	box crab
Crustacea	Leucosiidae	Leucosia	<i>Leucosia signata</i>	red sea (Gulf of Aqaba)	Narrow fronted crab, round cephalothorax. Lives in pebble shores
Crustacea	Leucosiidae	Myra	<i>Myra subgranulata</i>	red sea (Gulf of Aqaba)	Nut crab
Crustacea	Leucosiidae	Leucosia	<i>Leucosia aff. sagamiensis</i>	red sea (Gulf of Aqaba)	Nut crab
Crustacea	Leucosiidae	Arcania	<i>Arcania sp.</i>	red sea (Gulf of Aqaba)	
Crustacea	Majidae		<i>unknown</i>	red sea (Gulf of Aqaba)	spider crab
Crustacea	Majidae	Schizophrys	<i>cf Schizophrys aspera</i>	red sea (Gulf of Aqaba)	spider crab

Crustacea	Majidae	Schizophrys	<i>Schizophrys aspera</i>	red sea (Gulf of Aqaba)	Eyelash spider crab
Crustacea	Majidae	Schizophrys	<i>cf Schizophrys aspera with a Mycale spong ,with the jellyfish Nausithoe punctata polyyps</i>	red sea (Gulf of Aqaba)	Inset: individual polyyps
Crustacea	Majidae		<i>Unknown</i>	red sea (Gulf of Aqaba)	
Crustacea	Majidae	Camposcia	<i>Camposcia retusa</i>	red sea (Gulf of Aqaba)	
Crustacea	Majidae	Achaeus	<i>Achaeus spinosus</i>	red sea (Gulf of Aqaba)	
Crustacea	Majidae		<i>unknown</i>	red sea (Gulf of Aqaba)	
Crustacea	Majidae	Husenienia	<i>Husenienia proteus</i>	red sea (Gulf of Aqaba)	Green spider crab
Crustacea	Majidae	Menaethius	<i>Menaethius nodulosa</i>	red sea (Gulf of Aqaba)	Noduled spider crab
Crustacea	Majidae	Menaethius	<i>Menaethius monocerus</i>	red sea (Gulf of Aqaba)	
Crustacea	Majidae	Micippa	<i>Micippa platipes</i>	red sea (Gulf of Aqaba)	Flat-foot decorator crab
Crustacea	Majidae	Naxioides	<i>Naxioides robillardi</i>	red sea (Gulf of Aqaba)	
Crustacea	Majidae	Naxioides	<i>Naxioides sp.</i>	red sea (Gulf of Aqaba)	Algae, black corals or hydroid carrying spined crab
Crustacea	Majidae	Stilbognathus	<i>Stilbognathus soikai</i>	red sea (Gulf of Aqaba)	
Crustacea	Portunidae	Scylla	<i>Scylla serrata</i>	red sea (Gulf of Aqaba)	Serrated mud crab
Crustacea	Portunidae	Thalamitoides	<i>Thalamitoides quadridens</i>	red sea (Gulf of Aqaba)	Four-tooth mud crab
Crustacea	Portunidae	Thalamita	<i>Thalamita poissonii</i>	red sea (Gulf of Aqaba)	Poisson's swimming crab
Crustacea	Portunidae	Charybdis	<i>Charybdis erythroactyla</i>	red sea (Gulf of Aqaba)	Red swimming crab
Crustacea	Portunidae	Lissocarcinus	<i>Lissocarcinus orbicularis</i>	red sea (Gulf of Aqaba)	Harlequin crab
Crustacea	Portunidae	Carupa	<i>Carupa tenuipes</i>	red sea (Gulf of Aqaba)	
Crustacea	Portunidae	Portunus	<i>Portunus sp.</i>	red sea (Gulf of Aqaba)	
Crustacea	Portunidae	Portunus	<i>Portunus sanguinolentus</i>	red sea (Gulf of Aqaba)	Three-spot Swimming crab
Crustacea	Portunidae	Portunus	<i>Portunus longispinosus</i>	red sea (Gulf of Aqaba)	Long-spine swimming crab
Crustacea	Portunidae	Portunus	<i>Portunus cf. longispinosus</i>	red sea (Gulf of Aqaba)	Long-spine swimming crab
Crustacea	Portunidae	Portunus	<i>Portunus tenuipes</i>	red sea (Gulf of Aqaba)	

Crustacea	Portunidae	Caphyra	<i>Caphyra bedoti</i>	red sea (Gulf of Aqaba)	
Crustacea	Parthenopidae	Furtipodia	<i>Furtipodia petrosa</i>	red sea (Gulf of Aqaba)	Elbow crab
Crustacea	Parthenopidae	Ceratocarcinus	<i>Ceratocarcinus spinosus</i>	red sea (Gulf of Aqaba)	
Crustacea	Parthenopidae	Echinoecus	<i>Echinoecus pentagonus</i>	red sea (Gulf of Aqaba)	
Crustacea	Xanthidae	Carpilius	<i>Carpilius convexus</i>	red sea (Gulf of Aqaba)	
Crustacea	Xanthidae	Atergatis	<i>Atergatis roseus</i>	red sea (Gulf of Aqaba)	
Crustacea	Xanthidae		<i>cf Xanthias sp.</i>	red sea (Gulf of Aqaba)	
Crustacea	Xanthidae	Lybia	<i>Lybia leptochelis</i>	red sea (Gulf of Aqaba)	
Crustacea	Xanthidae	Pseudoliomera	<i>Pseudoliomera cf. speciosa</i>	red sea (Gulf of Aqaba)	
Crustacea	Xanthidae	Pseudoliomera	<i>Pseudoliomera sp.</i>	red sea (Gulf of Aqaba)	
Crustacea	Xanthidae	Xanthid	<i>Xanthid sp2.</i>	red sea (Gulf of Aqaba)	Female with fertile eggs
Crustacea	Xanthidae	Pilodius	<i>Pilodius cf areolatus</i>	red sea (Gulf of Aqaba)	
Crustacea	Xanthidae	Pilodius	<i>Pilodius sp.</i>	red sea (Gulf of Aqaba)	
Crustacea	Xanthidae		<i>cf Pilodius</i>	red sea (Gulf of Aqaba)	
Crustacea	Xanthidae		Unknown xanthid	red sea (Gulf of Aqaba)	
Crustacea	Pilumnidae	Pilumnus	<i>Pilumnus cf verspertilio</i>		
Crustacea	Pilumnidae	<i>Pilumnus</i>	<i>Pilumnus cf incanus</i>		
Crustacea	Pilumnidae	pilumnus	<i>Pilumnus hirsutus</i>		
Crustacea	Trapeziidae	Trapezia	<i>Trapezia tigrina</i>		
Crustacea	Trapeziidae	Trapezia	<i>Trapezia cymodoce</i>		
Crustacea	Trapeziidae	Tetraloides	<i>Tetraloides nigrifrons</i>		
Crustacea	Trapeziidae		<i>Unknown</i>		
Crustacea	Trapeziidae		<i>Tetralia spp.</i>		
Crustacea	Trapeziidae		<i>Unknown</i>		
Crustacea	Pinnotheridae		<i>Pinnotheres</i>		
Crustacea	Cryptochiridae	Hapalocarcinus	<i>Hapalocarcinus marsupialis</i>		
Crustacea	Cryptochiridae	Opecarcinus	<i>Opecarcinus cf. lobifrons</i>		
Crustacea	Cryptochiridae	Cryptochirus	<i>Cryptochirus coralliodytes</i>		

## Mollusca

Class	Sub class	Family	Order	Genus	Species
Amphineura	Polyplacophora	Chitonidae		Acanthopleura	<i>Acanthopleura vaillantii</i>
Amphineura	Polyplacophora	Ischnochitonidae		Ischnochiton	<i>Ischnochiton yerburyi</i>
Amphineura	Polyplacophora	Acanthochitonidae		Acanthochitona	<i>Acanthochitona penicillata</i>
Amphineura	Polyplacophora	Cryptopacidae		Cryptoplax	<i>Cryptoplax sykesi</i>
Gastropoda	Prosobranchia	Patellidae	Eogastropoda		
Gastropoda	Prosobranchia	Nacellidae	Eogastropoda	Cellana	<i>Cellana radiata eucosmia</i>
Gastropoda	Prosobranchia	Lottiidae	Eogastropoda	Patelloida	<i>Patelloida profunda</i>
Gastropoda	Prosobranchia	Haliotidae	Eogastropoda	Haliotis	<i>Haliotis unilateralis</i>
Gastropoda	Prosobranchia	Fissurellidae	Eogastropoda	Diodora	<i>Diodora imbricata</i>
Gastropoda	Prosobranchia	Trochidae	Eogastropoda	Trochus	<i>Trochus erithreus</i>
Gastropoda	Prosobranchia	Trochidae	Eogastropoda	Trochus	<i>Trochus virgatus</i>
Gastropoda	Prosobranchia	Turbinidae	Eogastropoda	Turbo	<i>Turbo radiatus</i>
Gastropoda	Prosobranchia	Neritopsidae	Eogastropoda	Neritopsis	<i>Neritopsis aqabaensis</i>
Gastropoda	Prosobranchia	Neritidae	Eogastropoda	Nerita	<i>Nerita orbignyana</i>
Gastropoda	Prosobranchia	Cerithidae	Caenogastropoda	Cerithium	<i>Cerithium nodulosum</i>
Gastropoda	Prosobranchia	Turritellidae	Caenogastropoda	Turritella	<i>Turritella cochlea</i>
Gastropoda	Prosobranchia	Planaxidae	Caenogastropoda	Planaxis	<i>Planaxis savignyi</i>
Gastropoda	Prosobranchia	Potamidae	Caenogastropoda	Potamides	<i>Potamides conicus</i>
Gastropoda	Prosobranchia	Modulidae	Caenogastropoda	Modulus	<i>Modulus tectum</i>
Gastropoda	Prosobranchia	Littorinidae	Caenogastropoda	Echinolittorina	<i>Echinolittorina milleg rana</i>
Gastropoda	Prosobranchia	Rissoidae	Caenogastropoda	Rissoina	<i>Rissoina ambigua</i>
Gastropoda	Prosobranchia	Caecidae	Caenogastropoda	Caecum	<i>Caecum arabicum</i>
Gastropoda	Prosobranchia	Vitrinellidae	Caenogastropoda	Circulus	<i>Circulus octolirata</i>
Gastropoda	Prosobranchia	Strombidae	Caenogastropoda	Tibia	<i>Tibia insulaechorab</i>
Gastropoda	Prosobranchia	Seraphidae	Caenogastropoda	Terebellum	<i>Terebellum terebellum</i>
Gastropoda	Prosobranchia	Hipponicidae	Caenogastropoda	Cheilea	<i>Cheilea cicatricosa</i>
Gastropoda	Prosobranchia	Vanikoridae	Caenogastropoda	Vanikoro	<i>Vanikoro plicata</i>
Gastropoda	Prosobranchia	Capulidae	Caenogastropoda	Capulus	<i>Capulus badius</i>

Gastropoda	Prosobranchia	Trichotropidae	Caenogastropoda	Separatista	<i>Separatista helicoides</i>
Gastropoda	Prosobranchia	Xenophoridae	Caenogastropoda	Xenophora	<i>Xenophora solaroides</i>
Gastropoda	Prosobranchia	Vermetidae	Caenogastropoda	Dendropoma	<i>Dendropoma maxima</i>
Gastropoda	Prosobranchia	Cypraeidae	Caenogastropoda	Bistolida	<i>Bistolida erythraeensis</i>
Gastropoda	Prosobranchia	Ovulidae	Caenogastropoda	Margovolva	<i>Margovolva marginata</i>
Gastropoda	Prosobranchia	Trividae	Caenogastropoda	Protoerato	<i>Protoerato sulcifera</i>
Gastropoda	Prosobranchia	Lamellaridae	Caenogastropoda	Coriocella	<i>Coriocella safagae</i>
Gastropoda	Prosobranchia	Naticidae	Caenogastropoda	Eunaticina	<i>Eunaticina papilla</i>
Gastropoda	Prosobranchia	Bursidae	Caenogastropoda	Bufonaria	<i>Bufonaria echinata</i>
Gastropoda	Prosobranchia	Cassidae	Caenogastropoda	Semicassis	<i>Semicassis faurotis</i>
Gastropoda	Prosobranchia	Ficidae	Caenogastropoda	Ficus	<i>Ficus ficus</i>
Gastropoda	Prosobranchia	Personidae	Caenogastropoda	Distorsio	<i>Distorsio anus</i>
Gastropoda	Prosobranchia	Ranellidae	Caenogastropoda	Charonia	<i>Charonia tritonis</i>
Gastropoda	Prosobranchia	Tonnidae	Caenogastropoda	Malea	<i>Malea pomum</i>
Gastropoda	Prosobranchia	Atlantidae	Caenogastropoda	Atlanta	<i>Atlanta peroni</i>
Gastropoda	Prosobranchia	Triphoridae	Caenogastropoda	Viriola	<i>Viriola cancellata</i>
Gastropoda	Prosobranchia	Janthinidae	Caenogastropoda	Janthina	<i>Janthina exigua</i>
Gastropoda	Prosobranchia	Epitonidae	Caenogastropoda	Epitonium	<i>Epitonium amicum</i>
Gastropoda	Prosobranchia	Eulimidae	Caenogastropoda	Stilifer	<i>Stilifer linckiae</i>
Gastropoda	Prosobranchia	Muricidae	Neogastropoda		
Gastropoda	Prosobranchia	Coralliophilidae	Neogastropoda	Coralliophila	<i>Coralliophila costularis</i>
Gastropoda	Prosobranchia	Buccinidae	Neogastropoda	Pisania	<i>Pisania ignea</i>
Gastropoda	Prosobranchia	Columbellidae	Neogastropoda	Mitrella	<i>Mitrella albina</i>
Gastropoda	Prosobranchia	Nassariidae	Neogastropoda	Nassarius	<i>Nassarius albescens</i>
Gastropoda	Prosobranchia	Melongenidae	Neogastropoda	Volema	<i>Volema paradisiaca</i>
Gastropoda	Prosobranchia	Fascioliidae	Neogastropoda	Fusinus	<i>Fusinus verrucosus</i>
Gastropoda	Prosobranchia	Turbinellidae	Neogastropoda	Vasum	<i>Vasum turbinellus</i>
Gastropoda	Prosobranchia	Olividae	Neogastropoda	Oliva	<i>Oliva bulbosa</i>



Gastropoda	Prosobranchia	Harpidae	Neogastropoda	Harpa	<i>Harpa amouretta</i>
Gastropoda	Prosobranchia	Marginellidae	Neogastropoda	Prunum	<i>Prunum terverianum</i>
Gastropoda	Prosobranchia	Cystiscidae	Neogastropoda	Gibberula	<i>Gibberula sueziensis</i>
Gastropoda	Prosobranchia	Mitridae	Neogastropoda	Domiporta	<i>Domiporta carnicolor</i>
Gastropoda	Prosobranchia	Costellariidae	Neogastropoda	Vexillum	<i>Vexillum deshayesii</i>
Gastropoda	Prosobranchia	Conidae	Neogastropoda	Conus	<i>Conus acutangulus</i>
Gastropoda	Prosobranchia	Cancellariidae	Neogastropoda		
Gastropoda	Prosobranchia	Turridae	Neogastropoda	Inquisitor	<i>Inquisitor flavidulus</i>
Gastropoda	Prosobranchia	Terebridae	Neogastropoda	Hastula	<i>Hastula hectica</i>
Gastropoda	Prosobranchia	Architectonidae	Neogastropoda	Architectonica	<i>Architectonica perspectiva</i>
Gastropoda	Prosobranchia	Pyramidellidae	Neogastropoda	Pyramidella	<i>Pyramidella sulcata</i>
Gastropoda	Opisthobranchia	Acteonidae	Cephalaspidea	Pupa	<i>Pupa solidula</i>
Gastropoda	Opisthobranchia	Hydatinidae	Cephalaspidea	Hydatina	<i>Hydatina zonata</i>
Gastropoda	Opisthobranchia	Ringiculidae	Cephalaspidea	Ringicula	<i>Ringicula acuta</i>
Gastropoda	Opisthobranchia	Cylichnidae	Cephalaspidea		
Gastropoda	Opisthobranchia	Aglajidae	Cephalaspidea	Chelidonura	<i>Chelidonura livida</i>
Gastropoda	Opisthobranchia	Aglajidae	Cephalaspidea	Philineopsis	<i>Philineopsis cyanea</i>
Gastropoda	Opisthobranchia	Smaragdinellidae	Cephalaspidea	Smaragdinella	<i>Smaragdinella calyculata</i>
Gastropoda	Opisthobranchia	Bullidae	Cephalaspidea	Bulla	<i>Bulla arabica</i>
Gastropoda	Opisthobranchia	Haminoeidae	Cephalaspidea	Haminoea	<i>Haminoea pemphis</i>
Gastropoda	Opisthobranchia	Philineidae	Cephalaspidea	Philine	<i>Philine vaillanti</i>
Gastropoda	Opisthobranchia	Oxynoidae	Sacoglossa	Oxynoe	<i>Oxynoe viridis</i>
Gastropoda	Opisthobranchia	Juliidae	Sacoglossa	Julia	<i>Julia exquisita</i>
Gastropoda	Opisthobranchia	Elysiidae	Sacoglossa		
Gastropoda	Opisthobranchia	Limapontiidae	Sacoglossa	Stiliger	<i>Stiliger ornata</i>
Gastropoda	Opisthobranchia	Caliphyllidae	Sacoglossa	Polybranchia	<i>Polybranchia orientalis</i>
Gastropoda	Opisthobranchia	Akeridae	Anaspidea	Akera	<i>Akera soluta</i>
Gastropoda	Opisthobranchia	Aplysiidae	Anaspidea	Aplysia	<i>Aplysia oculifera</i>

Gastropoda	Opisthobranchia	Notarchidae	Anaspidea	Notarchus	<i>Notarchus indicus</i>
Gastropoda	Opisthobranchia	Pleurobranchidae	Notaspidea	Pleurobranchus	<i>Pleurobranchus grandis</i>
Gastropoda	Opisthobranchia	Cavoliniidae	Thecosomata	Cavolinia	<i>Cavolinia uncinata</i>
Gastropoda	Opisthobranchia	Polyceridae	Nudibrachia		
Gastropoda	Opisthobranchia	Gymnodorididae	Nudibrachia	Gymnodoris	<i>Gymnodoris inornata</i>
Gastropoda	Opisthobranchia	Hexabranchiidae	Nudibrachia	Hexabranchus	<i>Hexabranchus sanguineus</i>
Gastropoda	Opisthobranchia	Halgerdidae	Nudibrachia	Halgerda	<i>Halgerda willeyi</i>
Gastropoda	Opisthobranchia	Discodorididae	Nudibrachia	Discodoris	<i>Discodoris lilacina</i>
Gastropoda	Opisthobranchia	Dorididae	Nudibrachia	Hoplodoris	<i>Hoplodoris grandiflora</i>
Gastropoda	Opisthobranchia	Kentrodorididae	Nudibrachia	Jorunna	<i>Jorunna funebris</i>
Gastropoda	Opisthobranchia	Platydorididae	Nudibrachia	Platydoris	<i>Platydoris scabra</i>
Gastropoda	Opisthobranchia	Chromodorididae	Nudibrachia	Ardeadoris	<i>Ardeadoris egretta</i>
Gastropoda	Opisthobranchia	Dendrodorididae	Nudibrachia	Dendrodoris	<i>Dendrodoris nigra</i>
Gastropoda	Opisthobranchia	Goniodorididae	Nudibrachia	Okenia	<i>Okenia rhinoma</i>
Gastropoda	Opisthobranchia	Phyllidiidae	Nudibrachia	Phyllidiopsis	<i>Phyllidiopsis cardinalis</i>
Gastropoda	Opisthobranchia	Tritoniidae	Nudibrachia	Marionia	<i>Marionia cf rubra</i>
Gastropoda	Opisthobranchia	Bornellidae	Nudibrachia	Bornella	<i>Bornella stellifer</i>
Gastropoda	Opisthobranchia	Dotidae	Nudibrachia	Doto	<i>Doto orcha</i>
Gastropoda	Opisthobranchia	Tethydidae	Nudibrachia	Melibe	<i>Melibe rangii</i>
Gastropoda	Opisthobranchia	Arminidae	Nudibrachia		
Gastropoda	Opisthobranchia	Flabellinidae	Nudibrachia	Flabellina	<i>Flabellina bicolor</i>
Gastropoda	Opisthobranchia	Facellinidae	Nudibrachia	Facelina	<i>Facelina rhodopos</i>
Gastropoda	Opisthobranchia	Aeolididae	Nudibrachia	Aeolidiella	<i>Aeolidiella alba</i>
Gastropoda	Opisthobranchia	Glaucidae	Nudibrachia	Favorinus	<i>Favorinus tsuruganus</i>
Gastropoda	Pulmonata	Onchidiidae	Basommatophora	Onchidium	<i>Onchidium verruculatum</i>
Gastropoda	Pulmonata	Siphonariidae*	Basommatophora	Siphonaria	<i>Siphonaria cruenta</i>
Scaphopoda		Dentaliidae	Dentaliida, Gadilida	Dentalium	<i>Dentalium reevei</i>
Scaphopoda		Gadilinae	Dentaliida, Gadilida	Episiphon	<i>Episiphon subtorquatum</i>

Bivalvia		Nuculidae	Nuculoida	Nucula	<i>Nucula inconspicua</i>
Bivalvia		Nuculinidae	Nuculoida	Nuculana	<i>Nuculana cf. bellula</i>
Bivalvia		Solemyoidea	Nuculoida		
Bivalvia	Pteriomorpha	Arcidae	Arcoidea,	Acar	<i>Acar plicata</i>
Bivalvia	Pteriomorpha	Glycymeridae	Arcoidea	Glycymeris	<i>Glycymeris livida</i>
Bivalvia	Pteriomorpha	Mytilidae	Mytiloida, Pteroida	Botula	<i>Botula cinnamomea</i>
Bivalvia	Pteriomorpha	Pteriidae	Mytiloida, Pteroida	Pinctada	<i>Pinctada margaretfera</i>
Bivalvia	Pteriomorpha	Malleidae	Mytiloida, Pteroida	Malvufundus	<i>Malvufundus regulus</i>
Bivalvia	Pteriomorpha	Isognomonidae	Mytiloida, Pteroida		
Bivalvia	Pteriomorpha	Pinnidae	Mytiloida, Pteroida	Atrina	<i>Atrina vexillum</i>
Bivalvia	Pteriomorpha	Thyasiridae	Mytiloida, Pteroida		
Bivalvia	Pteriomorpha	Limidae	Limoida, Osteroida	Ctenoides	<i>Ctenoides annulata</i>
Bivalvia	Pteriomorpha	Gryphaeidae	Limoida, Osteroida	Hytissa	<i>Hytissa hyotis</i>
Bivalvia	Pteriomorpha	Ostreidae	Limoida, Osteroida	Dendrostrea	<i>Dendrostrea frons</i>
Bivalvia	Pteriomorpha	Plicatulidae	Limoida, Osteroida	Plicatula	<i>Plicatula plicata</i>
Bivalvia	Pteriomorpha	Pectinidae	Limoida, Osteroida	Semipallium	<i>Semipallium crouchi</i>
Bivalvia	Pteriomorpha	Properamussidae	Limoida, Osteroida		
Bivalvia	Pteriomorpha	Spondylidae	Limoida, Osteroida	Spondylus	<i>Spondylus smythae</i>
Bivalvia	Pteriomorpha	Anomiidae	Limoida, Osteroida	Anomia	<i>Anomia achaeus</i>
Bivalvia	Heterodonta	Chamidae	Veneroida	Chama	<i>Chama lazarus</i>
Bivalvia	Heterodonta	Lucinidae	Veneroida	Codakia	<i>Codakia tigerina</i>
Bivalvia	Heterodonta	Ungulinidae	Veneroida	Cardites	<i>Cardites akabana</i>
Bivalvia	Heterodonta	Carditidae	Veneroida		
Bivalvia	Heterodonta	Cardiidae	Veneroida		
Bivalvia	Heterodonta	Tridacnidae	Veneroida	Tridacna	<i>Tridacna maxima</i>
Bivalvia	Heterodonta	Mactridae	Veneroida	Mactra	<i>Mactra achatina</i>
Bivalvia	Heterodonta	Mesodesmatidae	Veneroida	Atactodea	<i>Atactodea striata</i>
Bivalvia	Heterodonta	Pharidae	Veneroida	Ensiculus	<i>Ensiculus cultellus</i>
Bivalvia	Heterodonta	Tellinidae	Veneroida	Arcopella	<i>Arcopella isseli</i>
Bivalvia	Heterodonta	Semelidae	Veneroida	Cumingia	<i>Cumingia striata</i>
Bivalvia	Heterodonta	Psammobidae	Veneroida	Asaphis	<i>Asaphis violascens</i>
Bivalvia	Heterodonta	Solenocurtidae	Veneroida		
Bivalvia	Heterodonta	Trapeziidae	Veneroida	Trapezium	<i>Trapezium oblongum</i>
Bivalvia	Heterodonta	Veneridae	Veneroida	Callista	<i>Callista florida</i>

Bivalvia	Adephodonta	Myidae	Myoida	Tugonella	<i>Tugonella decurtata</i>
Bivalvia	Adephodonta	Corbulidae	Myoida	Corbula	<i>Corbula erythraeensis</i>
Bivalvia	Adephodonta	Gastrochaenidae	Myoida	Gastrochaena	<i>Gastrochaena gigantea</i>
Bivalvia	Anomalodesmata	Laternulidae	Pholadomyoida	Laternula	<i>Laternula anatina</i>
Bivalvia	Anomalodesmata	Clavagellidae	Pholadomyoida	Brechites	<i>Brechites attrahens</i>
Bivalvia	Anomalodesmata	Poromyidae	Pholadomyoida	Poromya	<i>Poromya intracta</i>
Bivalvia	Anomalodesmata	Cuspidariidae	Pholadomyoida	Cardiomya	<i>Cardiomya singaporensis</i>
Cephalopoda	Coleoidea	Spirulidae		Spirula	<i>Spirula spirula</i>
Cephalopoda	Coleoidea	Sepiidae		Sepia	<i>Sepia officinalis</i>
Cephalopoda	Teuthoidea	Loliginidae	Teuthoidea	Sepioteuthis	<i>Sepioteuthis sepioidea</i>
Cephalopoda	Teuthoidea	Enoploteuthidae	Teuthoidea	Abralia	<i>Abralia (Enigmateuthis) dubia</i>
Cephalopoda	Teuthoidea	Ommastropidae	Teuthoidea	Sthenoteuthis	<i>Sthenoteuthis oualaniensis</i>
Cephalopoda	Teuthoidea	Octopodidae	Octopoda	Octopus	<i>Octopus aegina</i>
Cephalopoda	Teuthoidea	Argonautidae	Octopoda	Argonauta	<i>Argonauta argo</i>

## Fish

Family	Genus	Species	Common Name	Geographical distribution	Commercial		Alien	
					No	Yes	No	Yes
Lamnidae	Isurus	<i>oxyrinchus</i>	Shortfin mako	Cosmopolitan in temperate and tropical seas		yes	no	
Alopiidae	Alopias	<i>pelagicus</i>	Pelagic thresher	<a href="#">Circumglobal. Indo-Pacific: Red Sea, Arabian Sea, Maldives, Somalia, South Africa, Western Australia, China, Taiwan, Japan, New Caledonia, Hawaiian Islands and Tahiti. Eastern Pacific: Gulf of California and the Galapagos.</a>		yes	no	

Stegostomati dae	Stegostoma	<i>fasciatum</i>	Leopard shark	Widely ̄ distributed in the Indian Ocean and the Red Sea		yes	n o	
Rhincodontid ae	Rhincodon	<i>typus</i>	Whale shark	Whale shark is distributed circumglobally in tropical and warm temperate seas.		yes	n o	
Carcharhinid ae	Carcharhinus	<i>plumbeus</i>	Sandbar shark	The sandbar shark is cosmopolitan in tropical and warm temperate seas.		yes	n o	
Carcharhinid ae	Carcharhinus	<i>sorrah</i>	Spottail shark	They are found in tropical areas from the Red Sea and eastern Africa to the western Pacific.		yes	n o	
Carcharhinid ae	Galeocerdo	<i>cuvier</i>	Tiger shark	The species is distributed circumglobally in tropical and temperate seas.		yes	n o	
Triakidae	Iago	<i>omanensis</i>	Bigeye houndshar k	They are found in the Red Sea and southern Arabia to southwest India.		yes	n o	
Triakidae	Mustelus	<i>mosis</i>	Arabian smoothho und	It is widely distributed in the Indian Ocean.		yes	n o	
Sphyrnidae	Sphyrna	<i>lewini</i>	Scalloped hammerhe ad	It is distributed circumglobally including the Red Sea and the Arabian Gulf.		yes	n o	
Rhinobatidae	Rhinobatos	<i>punctifer</i>	Arabian guitarfish	This species occurs in the Red Sea and southern Arabia.		yes	n o	
Narcinidae	Heteronarce	<i>bentuviai</i>	Bentuvias electric ray	It inhabits the northern Red Sea		no	n o	
Torpedinidae	Torpedo	<i>panthera</i>	Scalloped torpedo ray	The scalloped torpedo ray is found in the Red Sea and southern Arabia to India and Sri Lanka.		no	n o	
Torpedinidae	Torpedo	<i>sinuspersici</i>	Variable torpedo ray	<a href="#">Western Indian Ocean: Red Sea eastward to India and southward</a>		no	n o	

				<a href="#">to Natal, South Africa</a>				
Dasyatidae	Himantura	<i>uarnak</i>	Honeycomb stingray	It is distributed throughout the entire Indian Ocean and the Red Sea, and has migrated into the Mediterranean via the Suez Canal.		no	no	
Dasyatidae	Taeniura	<i>lymma</i>	Reef stingray	It is distributed throughout the Indo-Pacific.		no	no	
Myliobatidae	Aetobatus	<i>narinari</i>	Spotted eagle ray	It is cosmopolitan in all warm seas, including the Arabian Gulf and the Red Sea.		no	no	
Mobulidae	Mobula	<i>diabolus</i>	Devil ray	The devil ray is distributed throughout the Indo-west Pacific.		no	no	
Muraenidae	Echidna	<i>nebulosa</i>	Snowflake moray	The snowflake moray is found throughout the Indo-Pacific.		no	no	
Muraenidae	Echidna	<i>polyzona</i>	Barred moray	<a href="#">Indo-Pacific: Red Sea and East Africa to the Hawaiian, Marquesan, and Tuamotu islands, north to the Ryukyu Islands, south to the Great Barrier Reef.</a>		no	no	
Muraenidae	Gymnothorax	<i>buroensis</i>	Vagrant moray	Indo-Pacific: Red Sea and East Africa to the Tuamotu Islands, north to the Ryukyu and Hawaiian islands. Eastern Central Pacific: Costa Rica and Panama and the Galapagos (Ref. 2334).		no	no	
Muraenidae	Gymnothorax	<i>flavimarginatus</i>	Yellow-edged moray	<a href="#">Indo-Pacific: Red Sea and South Africa eastward.</a>		no	no	

				<a href="#">to the Tuamoto and Austral islands, north to the Ryukyu and Hawaiian islands, south to New Caledonia.</a> <a href="#">Eastern Pacific: Costa Rica, Panama and the Galapagos</a>				
Muraenidae	Gymnothorax	<i>griseus</i>	Grey moray	Grey moray is common in the Red Sea but less common in the Indian Ocean.		no	n o	
Muraenidae	Gymnothorax	<i>javanicus</i>	Giant moray	<a href="#">Indo-Pacific: Red Sea and East Africa (Ref. 33390) to the Marquesas and Oeno Atoll (Pitcairn Group), north to the Ryukyu and Hawaiian islands, south to New Caledonia and the Austral Islands.</a>		no	n o	
Muraenidae	Gymnothorax	<i>johnsoni</i>	Whitespotted moray	Distributed from the eastern shore of South Africa and the Red Sea.		no	n o	
Muraenidae	Gymnothorax	<i>monochrous</i>	Drab moray	Indo-Pacific: East Africa to the Marshall Islands, north to the Ryukyu Islands; Marshall Islands in Micronesia. Likely to occur in Seychelles		no	n o	
Muraenidae	Gymnothorax	<i>nudivomer</i>	Yellowmouth moray	The yellowmouth moray is distributed from the Red Sea and eastern Africa to the western Pacific.		no	n o	
Muraenidae	<i>Gymnothorax</i>	<i>rueppelliae</i>	Banded moray	Indo-Pacific: Red Sea and East Africa (south to Bazaruto Island, Mozambique, to the Hawaiian,		no	n o	

				Tuamoto, and Marquesan islands, north to the Ryukyus, south to the southern Great				
Muraenidae	<i>Gymnomuraena</i>	<i>zebra</i>	Zebra moray	The zebra moray is reported from the Indo-Pacific and eastern Pacific.		no	no	
Muraenesocidae	<i>Muraenesox</i>	<i>cinereus</i>	Daggertooth pike conger	Daggertooth pike conger is distributed in the Red Sea, Arabian Gulf, eastward through Indonesia, northward to Japan and Korea, southward to northern Australia, recorded also in the Mediterranean as a Red Sea migrant through the Suez Canal.		no	no	
Congridae	<i>Conger</i>	<i>cinereus</i>	Moustache conger	It occurs in the Indian Ocean and the Red Sea.		no	no	
Congridae	<i>Gorgasia</i>	<i>sillneri</i>	Sillner's gardeneel	The species is endemic to the Red Sea.		no	no	
Congridae	<i>Rhynchoconger</i>	<i>trewavasae</i>		Western Indian Ocean: Gulf of Aqaba. Also found in the Mediterranean coast of Israel. Probably occurring in the Gulf of Suez but no specimens are available.		no	no	
Ophichthidae	<i>Callechelys</i>	<i>marmorata</i>	Marbled snake eel	Indo-Pacific: Red Sea and East Africa to the Society Islands, north to Taiwan.		no	no	
Ophichthidae	<i>Muaenichthys</i>	<i>gymnotus</i>	Indo-Pacific slender worm-eel	<a href="#">Indo-Pacific: Red Sea and East Africa (Ref. 3972) to the Line and Society islands, north to</a>		no	no	



				<a href="#">southern Japan and Johnston Island, south to Rapa and the southern Great Barrier Reef; Marshall and the Caroline islands in Micronesia.</a>				
Ophichthidae	<i>Myrichthys</i>	<i>maculosus</i>	Spotted snake eel	It occurs in the Indian Ocean and the Red Sea.		no	no	
Ophichthidae	<i>Ophichthus</i>	<i>echeloides</i>		Western Indian Ocean: Gulf of Aqaba and Red Sea.		no	no	
Ophichthidae	<i>Pisodonophis</i>	<i>cancrivorus</i>	Longfin snake eel	It is distributed throughout the Indo-Pacific.		no	no	
Clupeidae	<i>Etrumeus</i>	<i>teres</i>	Round herring	It is found in the Gulf of Suez (where it is rather abundant) and the Gulf of Aqaba (possibly throughout the Red Sea), Gulf of Aden, eastern Africa, western Atlantic, eastern Pacific, southern Australia and Japan.		yes	no	
Clupeidae	<i>Herklotsichthys</i>	<i>quadrimaculatus</i>	Blueline herring	Blueline herring is distributed from the Red Sea eastward to Japan, Samoa and Australia.		yes	no	
Clupeidae	<i>Spratelloides</i>	<i>delicatulus</i>	Delicate round herring	Indo-Pacific: Red Sea and East Africa to the Society Islands (but not the Tuamoto and Marquesan islands), north to southern Japan, south to northern Australia. Single specimen from eastern Mediterranean (Tel-Aviv, Israel).		yes	no	
Clupeidae	<i>Spratelloides</i>	<i>gracilis</i>	Silver-stripe	Indo-Pacific: Red Sea south to		yes	no	

			round herring	Zanzibar and east to the western Pacific (Japan south through the Philippines to southeastern and western Australia, east to Samoa (excluding the Cook, Society and Marquesas islands) and the Tuamoto Islands. Occurs in Palau and the Marshall Islands.				
Sternoptychidae	<i>Maurolicus</i>	<i>muelleri</i>	Silvery lightfish	Eastern Atlantic: Iceland and Norway to Senegal, including the western Mediterranean; also from Democratic Republic of the Congo to Namibia. Western Atlantic: Gulf of Maine to the Gulf of Mexico, Caribbean Sea and the Straits of Magellan. Northwest Atlantic: Canada. Southeast Pacific: Chile. Western Pacific. Gulf of Aqaba.		no	no	
Stomiidae	<i>Astronesthes</i>	<i>martensii</i>		Indo-West Pacific: Red Sea and East Africa to Indonesia.		no	no	
Stomiidae	<i>Stomias</i>	<i>affinis</i>	Günther's boafish	<a href="#">Circumglobal in tropical and subtropical waters. Eastern Atlantic: Mauritania south to Angola. Also across the Atlantic between 0 and 20°N, extending to</a>		no	no	

				<a href="#">35°N and 39°S in the western part (USA to Argentina).</a> <a href="#">South China Sea, East China Sea and waters near to Taiwan Province.</a>				
Synodontidae	<i>Saurida</i>	<i>gracilis</i>	Gracile lizardfish	Indo-Pacific: Red Sea and East Africa to the Hawaiian, Marquesan and Ducie islands, north to the Ryukyu and Ogasawara islands, south to the Great Barrier Reef, Lord Howe, and Rapa.		yes	no	
Synodontidae	<i>Saurida</i>	<i>tumbil</i>	Greater lizardfish	It is reported from the east coast of Africa, Madagascar, the Red Sea, Arabian Gulf, Pakistan, India and Sri Lanka.		yes	no	
Synodontidae	<i>Saurida</i>	<i>undosquamis</i>	Brushtooth lizardfish	Common throughout the Indo-Pacific.		yes	no	
Synodontidae	<i>Synodus</i>	<i>doaki</i>	Arrowtooth lizardfish	Indo-Pacific: East Africa, Japan, Chesterfield Islands, eastern Australia, northern New Zealand and Hawaiian Islands. Southeast Pacific: Nazca and Sala-y-Gomez.		no	no	
Synodontidae	<i>Synodus</i>	<i>hoshinonis</i>	Blackear lizardfish	It is reported from the Red Sea and the Mozambique Channel, elsewhere in the Andaman Sea and in the western Pacific.		no	no	
Synodontidae	<i>Saurus</i>	<i>japonicus</i>				no	no	

Synodontidae	<i>Synodus</i>	<i>variegatus</i>	Variiegated lizardfish	The variegated lizardfish occurs throughout the Indo-Pacific.		no	n o	
Synodontidae	<i>Trachinocephalus</i>	<i>myops</i>	Painted lizardfish	It is distributed in warm and tropical seas nearly all over the world except for the Pacific coast of the New World.		yes	n o	
Paralepididae	<i>Lestidiops</i>	<i>jayakari</i>	Pacific barracudina	Atlantic, Indian and Pacific: in tropical and subtropical waters, excluding the southeast Pacific		no	n o	
Chanidae	<i>Chanos</i>	<i>chanos</i>	Milkfish	Indo-Pacific: along continental shelves and around islands, where temperatures are greater than 20°C. Red Sea and South Africa to Hawaii and the Marquesas, north to Japan, south to Victoria, Australia. Eastern Pacific: San Pedro, California to the Galapagos.		yes	n o	
Myctophidae	<i>Benthosema</i>	<i>pterotum</i>	Skinnycheek lanternfish	<a href="#">Indo-West Pacific: Arabian Sea to about 25°S off Mozambique and to the western Pacific region.</a> <a href="#">Occurrence in the northwest Pacific and eastern Indian Oceans need confirmation.</a> <a href="#">Southeast Atlantic: Larvae were present in cruise collections off the eastern coast of South Africa, however,</a>		no	n o	

				<a href="#">adults have not been reported in this area</a>				
Myctophidae	<i>Diaphus</i>	<i>coeruleus</i>	Blue lantern fish	Indo-West Pacific: Red Sea and the Andaman Sea, Papua New Guinea, Indonesia, Taiwan, Chesterfield Islands, and Australia. South China Sea.		no	no	
Batrachoididae	<i>Thalassothia</i>	<i>cirrhosa</i>	Toadfish	Western Indian Ocean: Red Sea. Probably Somalia		no	no	
Lophiidae	<i>Lophiomus</i>	<i>setigerus</i>	Blackmouth angler	Indo-Pacific: throughout the area.		no	no	
Antennariidae	<i>Antennarius</i>	<i>coccineus</i>	Scarlet frogfish	Indo-Pacific: Red Sea and East Africa to the easternmost islands of the Pacific Plate. Eastern Pacific: in tropical coastal waters.		no	no	
Antennariidae	<i>Antennarius</i>	<i>commerson</i>	Giant frogfish	Giant frogfish is reported from the Red Sea and the Indian Ocean.		no	no	
Moridae	<i>Physiculus</i>	<i>marisrubri</i>		Western Indian Ocean: central Red Sea, Gulf of Aqaba.		no	no	
Ophidiidae	<i>Brotula</i>	<i>multibarbata</i>	Goatsbeard brotula	It is distributed throughout the Indo-Pacific.		no	no	
Bythitidae	<i>Dinematichthys</i>	<i>iluocoeteoides</i>	Yellow pigmy brotula	Eastern Indian Ocean: although reported to occur widely in the Indo-Pacific, specimens have only been collected at the Batu Islands, off Sumatra, Indonesia. Western Indian Ocean: Gravid females have		no	no	

				been collected from Seychelles Islands				
Exocoetidae	<i>Parexocoetus</i>	<i>brachypterus</i>	Sailfin flyingfish	It is widely distributed in the tropical Indian Ocean and also occurs in the Pacific.		yes	n o	
Hemiramphidae	<i>Hemiramphus</i>	<i>far</i>	Black-barred halfbeak	Indo-West Pacific: Red Sea and East Africa to Samoa, north to the Ryukyu Islands, south to northern Australia and New Caledonia. Migrated to the eastern part of the Mediterranean Sea via the Suez Canal.		yes	n o	
Hemiramphidae	<i>Hyporhamphus</i>	<i>affinis</i>	Tropical halfbeak	Indo-Pacific: Red Sea and East Africa through the Indian Ocean islands to western Australia, New Guinea, Philippines, and islands of Oceania. Not found in Hawaiian islands, and apparently absent from Indo-Malayan Archipelago.		yes	n o	
Belonidae	<i>Tylosurus</i>	<i>choram</i>	Red Sea houndfish	Western Indian Ocean: Red Sea to Gulf of Oman, including the eastern Mediterranean via the Suez Canal.		yes	n o	
Atherinidae	<i>Atherinomorus</i>	<i>lacunosus</i>	Robust silverside	It is found throughout the Indo-Pacific.		yes	n o	
Trachichthyidae	<i>Hoplostethus</i>	<i>mediterraneus</i> <i>mediterraneus</i>	Mediterranean slimehead	Generally cosmopolitan. Eastern Atlantic: Ireland to Senegal, Canary		yes	n o	

				Islands, and the Gulf of Guinea, including the Mediterranean; also Namibia and South Africa. Reported from Iceland . Western Indian Ocean: Red Sea and South Africa. Western Atlantic: Georges Bank to northern Gulf of Mexico, Great Antilles, and Venezuela to southern Brazil.				
Monocentridae	<i>Monocentris</i>	<i>japonica</i>	Pineapplefish	This pineapplefish is known from the Red Sea, Arabian Sea, South Africa, Mauritius, Sri Lanka, Australia, and Japan.		no	no	
Holocentridae	<i>Myripristis</i>	<i>chryseres</i>	Yellowfin soldierfish	It occurs from eastern Africa to Sri Lanka, Japan, the Hawaiian and Samoan Islands and Guam, recorded from the Red Sea..		no	no	
Holocentridae	<i>Myripristis</i>	<i>murdjan</i>	Blotcheye soldierfish	This species is reported from the Red Sea and Indian Ocean to the western Pacific.		no	no	
Holocentridae	<i>Myripristis</i>	<i>xanthacra</i>				no	no	
Holocentridae	<i>Neoniphon</i>	<i>sammara</i>	Blooddrop squirrelfish	It occurs throughout the Indo-Pacific from the Red Sea to the Mascarenes.		no	no	
Holocentridae	<i>Ostichthys</i>	<i>hypsiterygion sufensis</i>		This subspecies is known only from the Gulf of Aqaba		no	no	
Holocentridae	<i>Ostichthys</i>	<i>acanthorhinus</i>		<a href="#">Indo-West Pacific: Red Sea and Gulf of Oman to Indonesia.</a>		no	no	

Holocentridae	<i>Sargocentron</i>	<i>caudimaculatum</i>	Silverspot squirrelfish	This species is distributed in the Red Sea to southern Mozambique and perhaps Madagascar, and is widespread in the Indo-Pacific.		no	no	
Holocentridae	<i>Sargocentron</i>	<i>diadema</i>	Crown squirrelfish	Crown squirrelfish is reported from the Red Sea and the Indian Ocean.		no	no	
Holocentridae	<i>Sargocentron</i>	<i>ittodai</i>		<a href="#">Indo-Pacific: Red Sea and Natal, South Africa to the Marquesan Islands, north to southern Japan and the Ogasawara Islands, south to New South Wales, Australia.</a>		no	no	
Holocentridae	<i>Sargocentron</i>	<i>marisrubri</i>	Red Sea squirrelfish	It is reported from the Red Sea.		no	no	
Holocentridae	<i>Sargocentron</i>	<i>punctatissimum</i>		Western Indian Ocean: known only from two localities, Egypt (Gulf of Elat = Gulf of Aqaba), and Sudan.		no	no	
Holocentridae	<i>Sargocentron</i>	<i>rubrum</i>	Redcoat squirrelfish	It is known from the Indo-Pacific including the Red Sea.		no	no	
Holocentridae	<i>Sargocentron</i>	<i>spiniferum</i>		<a href="#">Indo-Pacific: Red Sea and East Africa to the Hawaiian and Ducie islands, north to southern Japan, south to Australia; throughout Micronesia.</a>		no	no	
Fistulariidae	<i>Fistularia</i>	<i>commersonii</i>	Smooth cornetfish	This species occurs throughout the Indo-Pacific and tropical eastern Pacific.		yes	no	



Fistulariidae	<i>Fistularia</i>	<i>petimba</i>	Serrate cornetfish	This species is distributed throughout the Indo-Pacific and tropical Atlantic.		yes	n o	
Centriscidae	<i>Aeoliscus</i>	<i>punctulatus</i>	Spotted shrimpfish	Spotted shrimpfish is reported from the east coast of Africa and the Red Sea.		no	n o	
Centriscidae	<i>Centriscus</i>	<i>scutatus</i>	Grooved razor-fish	<a href="#">Indo-Pacific: Red Sea and Arabian Gulf to New Guinea, north to southern Japan, south to New South Wales, Australia.</a>		no	n o	
Solenostomidae	<i>Solenostomus</i>	<i>cyanopterus</i>	Ghost pipefish	Indo-Pacific: Red Sea and East Africa to Fiji, north to southern Japan, south to Australia.		no	n o	
Solenostomidae	<i>Solenostomus</i>	<i>paradoxus</i>	Harlequin ghost pipefish	<a href="#">Indo-West Pacific: Red Sea and East Africa to Fiji, north to southern Japan, south to southeast Australia and New Caledonia. Recently recorded from Tonga (Ref. 53797).</a>		no	n o	
Syngnathidae	<i>Acentronura</i>	<i>tentaculata</i>	Shortpouch pygmy pipehorse	Indo-West Pacific: northern Red Sea and Mozambique to Torres Straits and Queensland, Australia		no	n o	
Syngnathidae	<i>Corythoichthys</i>	<i>flavofasciatus</i>	Network pipefish	It is distributed throughout the Indo-Pacific from the Red Sea to the Tuamota Islands.		no	n o	
Syngnathidae	<i>Corythoichthys</i>	<i>haematopterus</i>	Messmate pipefish	Indo-Pacific: East Africa to Vanuatu, north to southern Japan.		no	n o	

Syngnathidae	<i>Corythoichthys</i>	<i>nigripectus</i>	Black-breasted pipefish	Indo-Pacific: northern Red Sea and from Ulithi Atoll (Caroline Islands) eastward to the Society Islands.		no	no	
Syngnathidae	<i>Corythoichthys</i>	<i>schantzi</i>	Gilded pipefish	This species is reported from the Indo-Pacific, Red Sea to Ryukyu and Tonga Islands.		no	no	
Syngnathidae	<i>Doryrhamphus</i>	<i>dactyliophorus</i>	Banded pipefish	The banded pipefish is distributed throughout the Indo-Pacific.	no	no	no	
Syngnathidae	<i>Doryrhamphus</i>	<i>multiannulatus</i>	Multibar pipefish	The multibar pipefish is reported from the Red Sea and western Indian Ocean.	no	no	no	
Syngnathidae	<i>Halicampus</i>	<i>dunckeri</i>	Duncker's pipefish	Indo-West Pacific: Red Sea to the Solomon Islands, north to southern Japan, south to the southern Great Barrier Reef; Belau and Pohnpei in Micronesia.	no	no	no	
Syngnathidae	<i>Halicampus</i>	<i>macrorhynchus</i>	Ornate pipefish	Indo-West Pacific: northern Red Sea (Gulfs of Suez and Aqaba), Indonesia off Sumbawa Islands, Queensland in Australia, Port Moresby in Papua New Guinea, New Britain Islands and Guadalcanal Islands in the Solomon Islands.	no	no	no	
Syngnathidae	<i>Hippocampus</i>	<i>fuscus</i>			no	no	no	
Syngnathidae	<i>Hippocampus</i>	<i>histrix</i>	Thorny seahorse	Thorny seahorse is found at depths down to 30 m. It is distributed	no	no	no	

				throughout the Indo-Pacific.				
Syngnathidae	<i>Hippocampus</i>	<i>kuda</i>	Yellow seahorse	The yellow seahorse is distributed throughout the Indo-Pacific.	no	no	no	
Syngnathidae	<i>Micrognathus</i>	<i>brevirostris</i> <i>brevirostris</i>	Thorntail pipefish	Western Indian Ocean: endemic to the Red Sea, recorded from the Gulfs of Suez and Aqaba in the north to the Strait of Perim in the South.	no	no	no	
Syngnathidae	<i>Syngnathus</i>	<i>macrophthalmus</i>		Western Indian Ocean: known only from Suez, and around Hurghada (Al Ghardaqa), in the northwestern Red Sea.	no	no	no	
Syngnathidae	<i>Syngnathus</i>	<i>safina</i>		Western Indian Ocean: Gulf of Aqaba.	no	no	no	
Syngnathidae	<i>Trachyrhamphus</i>	<i>bicoarctatus</i>	Double-ended pipefish	The double-ended pipefish occurs throughout the Indo-Pacific.	no	no	no	
Scorpaenidae	<i>Dendrochirus</i>	<i>brachypterus</i>	Shortfin lionfish	Shortfin lionfish is reported from the Red Sea and the Indian Ocean.	no	no	no	
Scorpaenidae	<i>Inimicus</i>	<i>filamentosus</i>	Indian walkman	Indian walkman is reported from the Red Sea, East Africa to the Mascarenes.	no	no	no	
Scorpaenidae	<i>Pterois</i>	<i>miles</i>	Turkeyfish, lionfish	The lionfish is an Indo-west Pacific species.	no	no	no	
Scorpaenidae	<i>Pterois</i>	<i>radiata</i>	Clearfin turkeyfish	It occurs throughout the Indo-Pacific.	no	no	no	
Scorpaenidae	<i>Scorpaena</i>	<i>madurensis</i>		Eastern Atlantic: Azores, Madeira, and Morocco to the Canary Islands, Cape Verde and	no	no	no	

				Senegal. Also known from several localities in the Mediterranean Sea.				
Scorpaenidae	<i>Scorpaena</i>	<i>scrofa</i>	scrofa	<a href="#">Eastern Atlantic: British Isles (rare) to Senegal including Madeira, the Canary Islands, and Cape Verde. Also throughout the Mediterranean except Black Sea. South African species thought to be the same as population in the northeast Atlantic.</a>	no	no	no	
Scorpaenidae	<i>Scorpaenodes</i>	<i>varipinnis</i>		Indo-West Pacific: East Africa to Micronesia, north to Taiwan, south to Australia.	no	no	no	
Scorpaenidae	<i>Scorpaenodes</i>	<i>hirsutus</i>		Indo-Pacific: Red Sea and East Africa to the Marquesan and Pitcairn islands, north to Ryukyu and Hawaiian islands, south to Australia	no	no	no	
Scorpaenidae	<i>Scorpaenopsis</i>	<i>barbata</i>	Bearded scorpionfish	The bearded scorpionfish occurs throughout the Arabian Region.	no	no	no	
Scorpaenidae	<i>Scorpaenopsis</i>	<i>diabolus</i>	Devil scorpionfish	The devil scorpionfish occurs throughout the Indo-Pacific.	no	no	no	
Scorpaenidae	<i>Scorpaenopsis</i>	<i>oxycephalus</i>		Indo-West Pacific: Red Sea and Sodwana Bay, South Africa to the Mariana Islands, north to Taiwan; Palau and Guam in	no	no	no	

				Micronesia; probably more widespread.				
Scorpaenidae	<i>Sebastapistes</i>	<i>strongia</i>		<a href="#">Indo-Pacific: Red Sea and East Africa to the Society Islands, north to Taiwan, south to Queensland, Australia.</a>	no	no	no	
Scorpaenidae	<i>Synanceia</i>	<i>verrucosa</i>	Stonefish	It occurs throughout the Indo-Pacific.	no	no	no	
Triglidae	<i>Pterygotrigla</i>	<i>hemisticta</i>	Blackspotted gurnard	It is known from the western central Pacific, Japan, the eastern Indian Ocean and south western India. Recorded also from the Red Sea.	no	no	no	
Platycephalidae	<i>Cociella</i>	<i>crocodila</i>	Crocodile flathead	Indo-West Pacific: Red Sea and East Africa to the Solomon Islands, north to southern Japan, south to Australia	no	no	no	
Platycephalidae	<i>Papilloculiceps</i>	<i>longiceps</i>	Tentacled flathead	Western Indian Ocean: Red Sea, including the Gulf of Aqaba to South Africa and Madagascar.	no	no	no	
Platycephalidae	<i>Rogadius</i>	<i>prionotus</i>	Halfspined flathead	Western Indian Ocean in Delagoa Bay to Karachi and through Red Sea to the eastern Mediterranean	no	no	no	
Dactylopteridae	<i>Dactyloptena</i>	<i>peterseni</i>	Starryflying gurnard	Starryflying gurnard is reported from the Red Sea, northern Indian Ocean to Japan and southern Africa.	no	no	no	
Pegasidae	<i>Eurypegasus</i>	<i>draconis</i>	Short dragonfish	Short dragonfish is reported from the Red Sea, East African coast,	no	no	no	

				Madagascar, Mascarenes and Maldives.				
Serranidae	<i>Aethaloperca</i>	<i>rogae</i>	Redmouth grouper	Indo-West Pacific: Red Sea to South Africa and east to the Gilbert Islands. Probably found in all tropical islands of the Indian Ocean. Recorded from Europa Island	no	no	no	
Serranidae	<i>Anyperodon</i>	<i>leucogrammicus</i>	Slender grouper	Indo-Pacific: Red Sea south to Mozambique and east to the Phoenix Islands, north to Japan, south to Australia. Probably including all the islands of the tropical Indian Ocean.	no	no	no	
Serranidae	<i>Aulacocephalus</i>	<i>temminckii</i>	Goldribbon soapfish	Goldribbon soapfish is distributed from the Red Sea, Indian Ocean, to southern Japan and New Zealand.	no	yes	no	
Serranidae	<i>Cephalopholis</i>	<i>argus</i>	Peacock hind	Indo-Pacific: Red Sea to Durban, South Africa and eastward to French Polynesia and the Pitcairn group, north to the Ryukyu and Ogasawara islands, south to northern Australia and Lord Howe Island.	no	yes	no	
Serranidae	<i>Cephalopholis</i>	<i>hemistiktos</i>	Halfspotted grouper	Halfspotted grouper is reported from northern end of the Red Sea, Gulf of Oman, Arabian Gulf and	no	yes	no	

				the coast of Pakistan.				
Serranidae	<i>Cephalopholis</i>	<i>miniata</i>	Coral grouper	It occurs throughout the Indo-Pacific.	no	yes	n o	
Serranidae	<i>Cephalopholis</i>	<i>oligosticta</i>	Vermilion hind	It occurs throughout the Indo-Pacific.	no	yes	n o	
Serranidae	<i>Cephalopholis</i>	<i>sexmaculata</i>	Sixblotch grouper	<a href="#">Indo-Pacific: Red Sea to South Africa and eastward to French Polynesia. Reported from the Arafura Sea. Reports by Heemstra &amp; Randall from the Gulf of Oman, Pakistan, India, and Sri Lanka are unsubstantiated. Absent from the Persian Gulf and is not yet known from Lakshadweep Islands.</a>	no	yes	n o	
Serranidae	<i>Dicentrarchus</i>	<i>labrax</i>	Seabass	Seabass is distributed throughout the Mediterranean coasts, Black Sea and eastern coast of the Atlantic Ocean; introduced by man into the Gulf of Aqaba.		yes		yes
Serranidae	<i>Epinephelus</i>	<i>areolatus</i>	Areolate grouper	The areolate grouper is reported from the Arabian Region and East Africa to the western Pacific.	no	yes	n o	
Serranidae	<i>Epinephelus</i>	<i>epistictus</i>	Dotted grouper	<a href="#">Indo-West Pacific: Red Sea, Kenya to South Africa; Oman, west coast of India, Korea, Japan including Ogasawara Islands, China, Taiwan, Hong Kong, Indonesia,</a>	no	yes	n o	

				<a href="#">Papua New Guinea, the Arafura Sea and northern Australia.</a>				
Serranidae	<i>Epinephelus</i>	<i>fasciatus</i>	Blacktip grouper	It is a wide-ranging species, occurring throughout the Indo-Pacific.	no	yes	n o	
Serranidae	<i>Epinephelus</i>	<i>morrhua</i>	Comet grouper	It occurs throughout the Indo-Pacific.	no	yes	n o	
Serranidae	<i>Epinephelus</i>	<i>polyphekadi on</i>	Smalltooth grouper	The smalltooth grouper occurs throughout the Indo-Pacific.	no	yes	n o	
Serranidae	<i>Epinephelus</i>	<i>radiatus</i>	Oblique-banded grouper	Oblique-banded grouper is reported from the Red Sea, Indian Ocean to Australia and southern Japan.	no	yes	n o	
Serranidae	<i>Epinephelus</i>	<i>summana</i>	Summana grouper	Summana grouper is known from the Red Sea and the Gulf of Aden.	no	yes	n o	
Serranidae	<i>Epinephelus</i>	<i>tauvina</i>	Greasy grouper	Greasy grouper is reported from most of the Indo-Pacific, it ranges from the northern end of the Gulf of Aqaba south to Mozambique and east to Duice Atoll in the Pitcairn Group.	no	yes	n o	
Serranidae	<i>Grammistes</i>	<i>sexlineatus</i>	Golden-striped soapfish	Golden-striped soapfish is reported from the Red Sea and Arabian Sea.	no	yes	n o	
Serranidae	<i>Liopropoma</i>	<i>lunulatum</i>		Indo-Pacific: Mascarene Islands to the Society Islands	no	yes	n o	
Serranidae	<i>Plectropomus</i>	<i>pessuliferus marisrubri</i>	Roving coralgroup er	This subspecies is endemic to the Red Sea. The nominal subspecies is widely	no	yes	n o	



				distributed in the Indo-Pacific.				
Serranidae	<i>Serranus</i>	<i>cabrilla</i>	Comber	Comber is a Mediterranean immigrant fish species in the Red Sea and has escaped from aquaculture in the Gulf of Suez, reaching the southern Red Sea. It is frequently caught at the northern tip of the Gulf of Aqaba. Comber is reported from Mediterranean and eastern Atlantic, also from the English Channel to South Africa.	no	yes	n o	yes
Serranidae	<i>Variola</i>	<i>louti</i>	Lunartail grouper	It inhabits the Indo-Pacific.	no	yes	n o	
Serranidae	<i>Anthias</i>	<i>taeniatus</i>	Striped anthias	The striped anthias is only known from the Red Sea.	no	no	n o	
Serranidae	<i>Pseudanthias</i>	<i>fasciata</i>	Redstripe fairy basslet	It inhabits coral and rocky reefs. This species is found at depths down to at least 80 m. It is known from southern Japan, Taiwan, Australia, Sri Lanka and the Red Sea.	no	no	n o	
Serranidae	<i>Pseudanthias</i>	<i>heemstrai</i>	Heemstra's fairy basslet	This species is endemic to the Red Sea.	no	no	n o	
Serranidae	<i>Pseudanthias</i>	<i>squamipinnis</i>	Sea goldie	It occurs from the Red Sea and East Africa to the West Pacific.	no	no	n o	
Serranidae	<i>Pseudogramma</i>	<i>polyacanthum</i>	Honeycomb podge	Indo-Pacific: East Africa to the Line, Marquesan, and Ducie islands, north to southern Japan	no		n o	

				and the Hawaiian Islands, south to Lord Howe Island; throughout Micronesia.				
Moronidae	<i>Dicentrarchus</i>	<i>labrax</i>	Seabass	Seabass is distributed throughout the Mediterranean coasts, Black Sea and eastern coast of the Atlantic Ocean; introduced by man into the Gulf of Aqaba.	no	yes	no	
Pseudochromidae	<i>Chlidichthys</i>	<i>rubiceps</i>		Western Indian Ocean: Red Sea.	no	no	no	
Pseudochromidae	<i>Haliophis</i>	<i>guttatus</i>	African eel blenny	Western Indian Ocean: Red Sea to the northern Gulf of Aden, southern Oman, and the east coast of Africa between Kenya and Mozambique, and the west coast of Madagascar.	no	no	no	
Pseudochromidae	<i>Pseudochromis</i>	<i>dixurus</i>	Forktail dottyback	Western Indian Ocean: Red Sea.	no	no	no	
Pseudochromidae	<i>Pseudochromis</i>	<i>flavivertex</i>	Sunrise dottyback	Sunrise dottyback inhabits the Red Sea and Gulf of Aden.	no	no	no	
Pseudochromidae	<i>Pseudochromis</i>	<i>fridmani</i>	Orchid dottyback	Orchid dottyback is endemic to the Red Sea.	no	yes لها أهمية في تجارة أسماك الزينة	no	
Pseudochromidae	<i>Pseudochromis</i>	<i>olivaceus</i>	Olive dottyback	The olive dottyback is distributed in the Red Sea and Gulf of Aden.	no	yes لها أهمية في تجارة أسماك الزينة	no	
Pseudochromidae	<i>Pseudochromis</i>	<i>pesi</i>	Pale dottyback	It is known from the Red Sea and	no	no	no	

				along the East African coast to South Africa.				
Pseudochromidae	<i>Pseudochromis</i>	<i>springeri</i>	Blue-striped dotyback	Western Indian Ocean: Red Sea.	no	yes لها أهمية في تجارة أسماك الزينة	no	
Plesiopidae	<i>Callopleiops</i>	<i>altivelis</i>	Comet	It occurs throughout the Indo-Pacific.	no	yes لها أهمية في تجارة أسماك الزينة	no	
Plesiopidae	<i>Plesiops</i>	<i>nigricans</i>	Whitespotted longfin	Western Indian Ocean: apparently restricted to the waters of Gulf of Aden and the Red Sea.	no	yes لها أهمية في تجارة أسماك الزينة	no	
Terapontidae	<i>Terapon</i>	<i>jarbua</i>	Jarbua terapon	The jarbua occurs throughout the Indo-Pacific.	no	yes	no	
Kuhliidae	<i>Kuhlia</i>	<i>mugil</i>	Barred flagtail	It occurs throughout the Indo-Pacific and central eastern Pacific.	no	yes	no	
Priacanthidae	<i>Priacanthus</i>	<i>hamrur</i>	Goggle-eye	It occurs throughout the Indo-Pacific.	no	yes	no	
Priacanthidae	<i>Priacanthus</i>	<i>sagittarius</i>	Arrow bulleye	Indo-West Pacific: Red Sea and Reunion to Japan, northern Australia and Samoa.	no	no	no	
Priacanthidae	<i>Pristigenys</i>	<i>niphonia</i>	Japanese bigeye	<a href="#">Indo-West Pacific: Red Sea to South Africa; southern Japan to the Arafura Sea, western Australia and Queensland. Occurrence in India is questionable.</a>	no	no	no	

Apogonidae	<i>Apogon</i>	<i>aureus</i>	Golden cardinal fish	It occurs throughout the Indo-Pacific.	no	no	n o	
	<i>Apogon</i>	<i>bifasciatus</i>	Doublebar cardinal fish	It is reported from the Red Sea and eastern Africa to southern Japan.	no	no	n o	
Apogonidae	<i>Apogon</i>	<i>taeniatus</i>			no	no	n o	
Apogonidae	<i>Apogon</i>	<i>cyanosoma</i>	Goldstriped cardinal fish	It is distributed in the Red Sea and eastern Africa to the western Pacific.	no	no	n o	
Apogonidae	<i>Apogon</i>	<i>coccineus</i>	Ruby cardinalfish	<a href="#">Indo-Pacific: Red Sea and East Africa to the Marquesan and Easter islands, north to southern Japan, south to Lord Howe Island.</a>	no	no	n o	
Apogonidae	<i>Apogon</i>	<i>cookii</i>	Cook's cardinalfish	<a href="#">Indo-West Pacific: Red Sea and the Gulf of Oman south to Natal and east to the western Pacific where it ranges from Japan to the Great Barrier Reef and New Caledonia. Recently reported from Tonga.</a>	no	no	n o	
Apogonidae	<i>Apogon</i>	<i>endekataenia</i>	Candystripe cardinalfish	Western Pacific: Tokyo Bay to Taiwan and southward along the western Pacific. Reported from Samoa	no	no	n o	
Apogonidae	<i>Apogon</i>	<i>exostigma</i>	Eyeshadow cardinal fish	Eyeshadow cardinal fish is reported from the Red Sea and eastern Africa to the western Pacific.	no	no	n o	
Apogonidae	<i>Apogon</i>	<i>fleurieu</i>	Cardinalfish	Indo-West Pacific: Red Sea and Persian Gulf, Gulf of Oman	no	no	n o	

				and scattered localities in East Africa, Seychelles, India, Sri Lanka, the Indo-Malayan region, and Hong Kong.				
Apogonidae	<i>Apogon</i>	<i>fraenatus</i>	Bridled cardinalfish	<a href="#">Indo-Pacific: Red Sea to Durban, South Africa (Ref. 4329) and to the Line and Tuamoto islands, north to Ryukyu Islands, south to New South Wales, Australia.</a>	no	no	no	
Apogonidae	<i>Apogon</i>	<i>isus</i>		Western Indian Ocean: Red Sea.	no	no	no	
Apogonidae	<i>Apogon</i>	<i>kallopterus</i>	Iridescent cardinal fish	It occurs throughout the Indo-Pacific.	no	no	no	
Apogonidae	<i>Apogon</i>	<i>multitaeniatus</i>	Smallscale cardinal	Western Indian Ocean: endemic to the Red Sea and Gulf of Aden.	no	no	no	
Apogonidae	<i>Apogon</i>	<i>nigrofasciatus</i>	Blackbar cardinal fish	It occurs throughout the Indo-Pacific.	no	no	no	
Apogonidae	<i>Apogon</i>	<i>pseudotaeniatatus</i>	Doublebar cardinalfish	Indo-West Pacific: Red Sea and the Persian Gulf to the Indo-Malayan region, north to Japan.	no	no	no	
Apogonidae	<i>Archamia</i>	<i>fucata</i>	Orangelined cardinalfish	Indo-Pacific: Red Sea and east coast of Africa, eastward to the Marshall Islands, Samoa and Tonga; north to Ryukyu Islands; south to northern Australia.	no	no	no	
Apogonidae	<i>Cheilodipterus</i>	<i>lachneri</i>	Lachner's cardinal fish	Lachner's cardinal fish is endemic to the Red Sea.	no	no	no	
Apogonidae	<i>Cheilodipterus</i>	<i>arabicus</i>	Tiger cardinal	Western Indian Ocean: Red Sea, Tanzania, Mozambique,	no	no	no	

				Seychelles, and India.				
Apogonidae	<i>Cheilodipterus</i>	<i>macrodon</i>	Large-tooth cardinal fish	It occurs throughout the Indo-Pacific.	no	no	no	
Apogonidae	<i>Cheilodipterus</i>	<i>novemstriatus</i>	Nineline cardinal fish	This species occurs throughout the Arabian Region.	no	no	no	
Apogonidae	<i>Cheilodipterus</i>	<i>quinquelineatus</i>	Five-lined cardinal fish	<a href="#">Indo-Pacific: Red Sea to Mozambique and eastward to the Pitcairn Group, north to southern Japan, south to Lord Howe Island and Rapa.</a>	no	no	no	
Apogonidae	<i>Foa</i>	<i>brachygramma</i>	Weed cardinal fish	Indo-Pacific: East Africa to the Hawaiian Islands, north to southern Japan; Mariana Islands in Micronesia.	no	no	no	
Apogonidae	<i>Fowleria</i>	<i>variegata</i>	Variegated cardinal fish	Indo-West Pacific: Red Sea to Samoa, north to the Ryukyu Islands, south to the southern Great Barrier Reef; Guam in Micronesia. Western Indian Ocean: Mozambique	no	no	no	
Apogonidae	<i>Neamia</i>	<i>octospina</i>	Eight-spine cardinal fish	It occurs throughout the Indo-Pacific.	no	no	no	
Apogonidae	<i>Siphamia</i>	<i>permutata</i>		Western Indian Ocean: Red Sea.	no	no	no	
Acropomatidae	<i>Acropoma</i>	<i>japonicum</i>	Lanternbelly	Lanternbelly is distributed along the east coast of Africa from the Gulf of Aden, Red Sea, to Natal and along the western coast of India; also known from the Philippines, northern Australia and Japan.		no	no	

Malacanthidae	<i>Branchiostegus</i>	<i>sawakinensis</i>	Spotted tilefish	The spotted tilefish is reported from the Red Sea and South Africa.		no	no	
Malacanthidae	<i>Malacanthus</i>	<i>brevirostris</i>				no	no	
Rachycentridae	<i>Rachycentron</i>	<i>canadum</i>	Cobia	It is known from all seas except for the eastern Pacific.		no	no	
Echeneidae	<i>Echeneis</i>	<i>naucrates</i>	Sharksucker	This species is distributed circumglobally in warm and temperate seas.		no	no	
Echeneidae	<i>Remora</i>	<i>remora</i>	Remora	Remora is circumglobal in its distribution.		no	no	
Carangidae	<i>Alectis</i>	<i>ciliaris</i>	Threadfin jack	The threadfin jack is circumglobal in distribution.		yes	no	
Carangidae	<i>Alepes</i>	<i>djedaba</i>	Shrimpscaud	It ranges from the Red Sea and eastern Africa to the western Pacific; it has migrated into the Mediterranean through the Suez Canal.		yes	no	
Carangidae	<i>Carangoides</i>	<i>bajad</i>	Orangespotted jack	It is known from East Africa to Indonesia and the Philippines.		yes	no	
Carangidae	<i>Carangoides</i>	<i>equula</i>	Whitefin trevally	It occurs in the Red Sea, western Indian Ocean, Australia, Taiwan and Japan.		yes	no	
Carangidae	<i>Carangoides</i>	<i>fulvoguttatus</i>	Yellowspotted jack	It is reported from the Red Sea, the Indian Ocean and western Pacific.		yes	no	
Carangidae	<i>Caranx</i>	<i>ignobilis</i>	Giant trevally	It occurs throughout the Indo-Pacific.		yes	no	
Carangidae	<i>Caranx</i>	<i>heberi</i>				yes	no	
Carangidae	<i>Decapterus</i>	<i>macarellus</i>	Mackerel scad	It is a circumtropical species.		yes	no	

Carangidae	<i>Decapterus</i>	<i>macrosoma</i>	Shortfin scad	It occurs throughout the Indo-Pacific.		yes	n o	
Carangidae	<i>Decapterus</i>	<i>russelli</i>	Indian scad	It is reported from the Red Sea, Indian Ocean and western Pacific.		yes	n o	
Carangidae	<i>Elagatis</i>	<i>bipinnulata</i>	Rainbow runner	The rainbow runner is circumtropical in distribution.		yes	n o	
Carangidae	<i>Gnathanodon</i>	<i>speciosus</i>	Gold toothless jack	It occurs throughout the Indo-Pacific including the eastern Pacific.		yes	n o	
Carangidae	<i>Naucrates</i>	<i>ductor</i>	Pilotfish	This species is found worldwide in tropical and warm temperate seas.		yes	n o	
Carangidae	<i>Scomberoides</i>	<i>lysan</i>	Double-spotted queenfish	It occurs throughout the Indo-Pacific.		yes	n o	
Carangidae	<i>Seriola</i>	<i>dumerili</i>	Greater amberjack	It is circumtropical in distribution.		yes	n o	
Carangidae	<i>Seriolina</i>	<i>nigrofasciata</i>	Black banded jack	It inhabits the Red Sea, Indian Ocean and western Pacific.		yes	n o	
Carangidae	<i>Trachurus</i>	<i>indicus</i>	Arabian scad	Arabian scad is distributed throughout the Arabian Gulf, Pakistan, Red Sea, Gulf of Aden and continental shelves of Oman and Somalia, also known from Saya de Malha Bank.		yes	n o	
Coryphaenidae	<i>Coryphaena</i>	<i>hippurus</i>	Common dolphinfish	It is found in all tropical and warm temperate seas.		yes	n o	
Bramidae	<i>Taractichthys</i>	<i>steindachneri</i>		Recorded from the Indo-Pacific, from California to East Africa.		yes	n o	
Lutjanidae	<i>Lutjanus</i>	<i>bohar</i>	Twinspot snapper	It occurs throughout the Indo-Pacific.		yes	n o	
Lutjanidae	<i>Lutjanus</i>	<i>ehrenbergii</i>	Blackspot snapper	The blackspot snapper occurs in the Red Sea,		yes	n o	



				Indian Ocean and western Pacific.			
Lutjanidae	<i>Lutjanus</i>	<i>kasmira</i>				yes	n o
Lutjanidae	<i>Macolor</i>	<i>niger</i>				yes	n o
Lutjanidae	<i>Paracaesio</i>	<i>sordida</i>	Snapper	This species is occurs throughout the Indo-Pacific.		yes	n o
Lutjanidae	<i>Pristipomoides</i>	<i>filamentosus</i>				yes	n o
Lutjanidae	<i>Pristipomoides</i>	<i>sieboldii</i>				yes	n o
Lutjanidae	<i>Pristipomoides</i>	<i>typus</i>				yes	n o
Caesionidae	<i>Caesio</i>	<i>lunaris</i>	Lunar fusilier	It is distributed from East Africa, the Red Sea and the Arabian Gulf, to the central Pacific.		yes	n o
Caesionidae	<i>Caesio</i>	<i>striata</i>				yes	n o
Caesionidae	<i>Caesio</i>	<i>suevica</i>	Suez fusilier	This species is endemic to the Red Sea.		yes	n o
Caesionidae	<i>Caesio</i>	<i>varilineata</i>	Yellowstriped fusilier	This species is widely distributed in the Red Sea and the Indian Ocean.		yes	n o
Caesionidae	<i>Pterocaesio</i>	<i>chrysozona</i>	Goldband fusilier	Goldband fusilier is reported from East Africa to the western Pacific.		yes	n o
Nemipteridae	<i>Parascolopsis</i>	<i>eriomma</i>	Rosydwarf monocle bream	It is distributed in the Indo-west Pacific including the Red Sea.		yes	n o
Nemipteridae	<i>Scolopsis</i>	<i>ghanam</i>	Arabian threadfin bream	It is widely distributed in the Indian Ocean including the Red Sea and the Arabian Gulf.		yes	n o
Gerreidae	<i>Gerres</i>	<i>methueri</i>				yes	n o
Gerreidae	<i>Gerres</i>	<i>oyena</i>	Common silver-body	This species is distributed in the subtropical and tropical Indian Ocean and western Pacific.		yes	n o
Haemulidae	<i>Diagramma</i>	<i>pictum</i>	Painted sweetlips	This species is found at depths		yes	n o

				down to 80 m. It occurs throughout the Indo-western Pacific.				
Haemulidae	<i>Plectorhinchus</i>	<i>gaterinus</i>	Yellowfin sweetlips	This species is found at depths down to 55 m. It is reported from the Arabian Region and eastern Africa.		yes	n o	
Haemulidae	<i>Plectorhinchus</i>	<i>schotaf</i>	Grey sweetlips	Grey sweetlips is reported from the Red Sea and the Indian Ocean.		yes	n o	
Haemulidae	<i>Pomadasys</i>	<i>stridens</i>	Linedpiggy	It has penetrated into the eastern Mediterranean via the Suez Canal.		yes	n o	
Lethrinidae	<i>Gymnocranius</i>	<i>grandoculis</i>	Blue-lined large-eye bream	This species occurs throughout the Indo-Pacific.		yes	n o	
Lethrinidae	<i>Lethrinus</i>	<i>borbonicus</i>	Snubnose emperor	It is reported from the Arabian Region and eastern Africa.		yes	n o	
Lethrinidae	<i>Lethrinus</i>	<i>mahsena</i>	Mahsena emperor	It is reported from the Red Sea and Indian Ocean.		yes	n o	
Lethrinidae	<i>Lethrinus</i>	<i>nebulosus</i>	Spangled emperor	It occurs throughout the Indo-west Pacific.		yes	n o	
Lethrinidae	<i>Lethrinus</i>	<i>obsoletus</i>				yes	n o	
Lethrinidae	<i>Lethrinus</i>	<i>variegatus</i>	Variiegated emperor	It is reported from the Indo-west Pacific.		yes	n o	
Lethrinidae	<i>Monotaxis</i>	<i>grandoculis</i>	Bigeye emperor	It is distributed throughout the Indo-Pacific including the Red Sea.		yes	n o	
Sparidae	<i>Acanthopagrus</i>	<i>bifasciatus</i>	Two-bar sea bream	It is reported from Red Sea and the western Indian Ocean.		yes	n o	
Sparidae	<i>Argyrops</i>	<i>filamentosus</i>	Soldier sea bream	Soldier sea bream is reported from the Red Sea and		yes	n o	

				western Indian Ocean.				
Sparidae	<i>Argyrops</i>	<i>spinifer</i>	King soldier bream	King soldier bream is found in the Red Sea and is widespread in the tropical Indo-west Pacific.		yes	n o	
Sparidae	<i>Diplodus</i>	<i>noct</i>	Red Sea sea bream	This species is endemic to the Red Sea.		yes	n o	
Sparidae	<i>Polysteganus</i>	<i>coeruleopunctatus</i>	Blueskin sea bream	Blueskin sea bream is reported from the Red Sea to the south coast of Natal, South Africa.		yes	n o	
Sparidae	<i>Rhabdosargus</i>	<i>sarba</i>	Goldline sea bream	Goldline sea bream is collected from the Red Sea and western Indian Ocean.		yes	n o	
Sparidae	<i>Sparus</i>	<i>auratus</i>	Gilt-head sea bream	It occurs in the eastern Atlantic, Mediterranean and Black Sea. The specimens found in Aqaba probably escaped from aquaculture projects.		yes	n o	yes
Sciaenidae	<i>Atrubucca</i>	<i>geniae</i>				yes	n o	
Mullidae	<i>Mulloidichthys</i>	<i>flavolineatus</i>	Yellowstripe goatfish	The yellowstripe goatfish occurs throughout the Indo-Pacific.		yes	n o	
Mullidae	<i>Mulloidichthys</i>	<i>vanicolensis</i>	Yellowfin goatfish	The yellowfin goatfish inhabits the Red Sea and the Indo-Pacific.		yes	n o	
Mullidae	<i>Parupeneus</i>	<i>cyclostomus</i>	Goldsaddle goatfish	It is reported from the Indo-Pacific including the Red Sea.		yes	n o	
Mullidae	<i>Parupeneus</i>	<i>forsskali</i>	Red Sea goatfish	The Red Sea goatfish is endemic to the Red Sea and Gulf of Aden.		yes	n o	

Mullidae	<i>Parupeneus</i>	<i>heptacanthus</i>	Cinnabar goatfish	Cinnabar goatfish is reported from the Red Sea and East Africa to the Central Pacific.		yes	n o	
Mullidae	<i>Parupeneus</i>	<i>macronema</i>	Longbarbel goatfish	This species is reported from the Red Sea and East Africa to Indonesia.		yes	n o	
Mullidae	<i>Parupeneus</i>	<i>rubescens</i>	Rosy goatfish	The rosy goatfish is reported from the Red Sea and the western Indian Ocean.		yes	n o	
Mullidae	<i>Upeneus</i>	<i>moluccensis</i>		It is reported from the Red Sea and eastern Africa to the western Pacific, and reached the eastern Mediterranean via the Suez Canal.		yes	n o	
Mullidae	<i>Upeneus</i>	<i>pori</i>		It is known from the Gulf of Aqaba, Gulf of Suez, and the Mediterranean coast of Sinai.		yes	n o	
Mullidae	<i>Upeneus</i>	<i>dauidaromi</i>	Striped goatfish	Striped goatfish inhabits the Red Sea.		yes	n o	
Pempheridae	<i>Parapriacanthus</i>	<i>ransonneti</i>				yes	n o	
Pempheridae	<i>Pempheris</i>	<i>vanicolensis</i>	Cave sweeper	Cave sweepers occur in the Red Sea and Indian Ocean to the central Pacific.		yes	n o	
Kyphosidae	<i>Kyphosus</i>	<i>vaigiensis</i>	Brassy sea chub	The brassy sea chub occurs throughout the Indo-Pacific.		yes	n o	
Ehippidae	<i>Platax</i>	<i>orbicularis</i>	Circular batfish	The circular batfish occurs throughout the Indo-Pacific.		no	n o	
Chaetodontidae	<i>Chaetodon</i>	<i>auriga</i>	Threadfin butterflyfish	This species occurs throughout the Indo-Pacific.		yes لها أهمية في تجارة أسما	n o	

					ك الزينة		
Chaetodonti dae	<i>Chaetodon</i>	<i>austriacus</i>	Exquisite butterflyfis h	This species is endemic to the Red Sea. and southern Arabia	yes لها أهمية في تجارة أسما ك الزينة	n o	
Chaetodonti dae	<i>Chaetodon</i>	<i>fasciatus</i>	Striped butterflyfis h	It inhabits the Red Sea and the Gulf of Aden.	yes لها أهمية في تجارة أسما ك الزينة	n o	
Chaetodonti dae	<i>Chaetodon</i>	<i>jayakari</i>			yes لها أهمية في تجارة أسما ك الزينة	n o	
Chaetodonti dae	<i>Chaetodon</i>	<i>lineolatus</i>			yes لها أهمية في تجارة أسما ك الزينة	n o	
Chaetodonti dae	<i>Chaetodon</i>	<i>melannotus</i>	Blackback butterflyfis h	The blackback butterflyfish occurs from the Red Sea and eastern Africa to the central Pacific.	yes لها أهمية في تجارة أسما ك الزينة	n o	
Chaetodonti dae	<i>Chaetodon</i>	<i>paucifasciatu s</i>	Crown butterflyfis h	It inhabits the Red Sea and Gulf of Aden.	yes لها أهمية في تجارة أسما ك الزينة	n o	
Chaetodonti dae	<i>Chaetodon</i>	<i>semilarvatus</i>	Masked butterflyfis h	It inhabits the Red Sea and Gulf of Aden.	yes لها أهمية في تجارة أسما	n o	

					ك الزينة		
Chaetodonti dae	<i>Chaetodon</i>	<i>trifascialis</i>	Chevron butterflyfish	The chevron butterflyfish occurs throughout the Indo-Pacific.	yes لها أهمية في تجارة أسما ك الزينة	n o	
Chaetodonti dae	<i>Heniochus</i>	<i>diphreutes</i>	Pennant fish	It occurs throughout the Indo-Pacific.	yes لها أهمية في تجارة أسما ك الزينة	n o	
Chaetodonti dae	<i>Heniochus</i>	<i>intermedius</i>	Red Sea bannerfish	It is reported from the Red Sea and Gulf of Aden.	yes لها أهمية في تجارة أسما ك الزينة	n o	
Pomacanthid ae	<i>Apolemichthys</i>	<i>xanhotis</i>	Arabian smoke angelfish	The Arabian smoke angelfish is distributed from the Red Sea to the Gulf of Oman.	yes لها أهمية في تجارة أسما ك الزينة	n o	
Pomacanthid ae	<i>Centropyge</i>	<i>multispinis</i>	Brown- dwarf angelfish	The brown-dwarf angelfish is reported from the Red Sea and Indian Ocean, excluding the Arabian Gulf.		n o	
Pomacanthid ae	<i>Genicanthus</i>	<i>caudovittatus</i>	Zebra angelfish	The zebra angelfish inhabits the Red Sea and western Indian Ocean.	yes لها أهمية في تجارة أسما ك الزينة	n o	
Pomacanthid ae	<i>Pomacanthus</i>	<i>imperator</i>	Emperor angelfish	It inhabits the Red Sea and the Indian Ocean.	yes لها أهمية في تجارة أسما ك الزينة	n o	

Pomacanthid ae	<i>Pomacanthus</i>	<i>maculosus</i>	Yellowbar angelfish	Yellowbar angelfish is known from the Red Sea to the Arabian Gulf and south to Zanzibar.		yes لها أهمية في تجارة أسماك الزينة		
Pomacanthid ae	<i>Pygoplites</i>	<i>diacanthus</i>	Royal angelfish	The royal angelfish is reported from the Red Sea and the Indian Ocean.				
Pentacerotid ae	<i>Histioporus</i>	<i>typus</i>			no		n o	
Cichlidae	<i>Tilapia</i>	<i>sp.</i>			no			yes
Pomacentrid ae	<i>Abudefduf</i>	<i>sexfasciatus</i>	Scissortail sergeant	It occurs throughout the Indo-Pacific.	no		n o	
Pomacentrid ae	<i>Abudefduf</i>	<i>sordidus</i>	Blackspot sergeant	It occurs throughout the Indo-Pacific.	no		n o	
Pomacentrid ae	<i>Abudefduf</i>	<i>vaigiensis</i>	Sergeant major	It occurs throughout the Indo-Pacific.	no		n o	
Pomacentrid ae	<i>Amblyglyphid odon</i>	<i>flavilatus</i>	Yellowflan k damsel fish	It is reported from the Red Sea and the Gulf of Aden.	no		n o	
Pomacentrid ae	<i>Amblyglyphid odon</i>	<i>leucogaster</i>	Whitebelly damsel fish	It occurs throughout the Indo-Pacific.			n o	
Pomacentrid ae	<i>Amphiprion</i>	<i>bicinctus</i>	Two bar anemone- fish	Two bar anemone- fish is endemic to the Red Sea and Gulf of Aden.			n o	yes لها أهمية في تجارة أسماك الزينة
Pomacentrid ae	<i>Chromis</i>	<i>dimidiata</i>	Half-and- half chromis	It inhabits the Red Sea and the Indian Ocean.			n o	yes لها أهمية في تجارة أسماك الزينة
Pomacentrid ae	<i>Chromis</i>	<i>pelloura</i>	Duskytail chromis	It is endemic to the Red Sea, closely related to <i>C. axillaris</i> (Bennet) from the Indian Ocean.	no		n o	

Pomacentrid ae	<i>Chromis</i>	<i>pembae</i>	Yellow- edge chromis	It is reported from the Red Sea and the Indian Ocean.	no		n o	
Pomacentrid ae	<i>Chromis</i>	<i>ternatensis</i>			no		n o	
Pomacentrid ae	<i>Chromis</i>	<i>trialpha</i>			no		n o	
Pomacentrid ae	<i>Chromis</i>	<i>viridis</i>	Blue-green chromis	It occurs throughout the Indo-Pacific.		yes لها أهمية في تجارة أسما ك الزينة	n o	
Pomacentrid ae	<i>Chromis</i>	<i>weberi</i>	Weber's chromis	It is distributed in the Indo-Pacific.	no		n o	
Pomacentrid ae	<i>Chrysiptera</i>	<i>annulata</i>	Footballer	It is distributed throughout the western Indian Ocean.	no		n o	
Pomacentrid ae	<i>Chrysiptera</i>	<i>unimaculata</i>	One-spot damsel fish	One-spot damsel fish is distributed in the Red Sea, East Africa to the western Pacific.	no		n o	
Pomacentrid ae	<i>Dascyllus</i>	<i>aruanus</i>	Banded dascyllus	It occurs throughout the Indo-Pacific.		yes لها أهمية في تجارة أسما ك الزينة	n o	
Pomacentrid ae	<i>Dascyllus</i>	<i>marginatus</i>	Blackborde red dascyllus	It is reported from the Red Sea to the Gulf of Oman.		yes لها أهمية في تجارة أسما ك الزينة	n o	
Pomacentrid ae	<i>Dascyllus</i>	<i>trimaculatus</i>	Domino	It occurs throughout the Indo-Pacific.		yes لها أهمية في تجارة أسما ك الزينة	n o	
Pomacentrid ae	<i>Neopomacentrus</i>	<i>miryae</i>	Arabian damsel fish	It occurs from the Red Sea to the Gulf of Oman.	no		n o	



Pomacentridae	<i>Neoglyphidodon</i>	<i>melas</i>	Royal damselfish	It is found in the Red Sea, East Africa to the western Pacific.	no		no	
Pomacentridae	<i>Plectroglyphidodon</i>	<i>lacrymatus</i>	Jewel damselfish	It occurs throughout the Indo-Pacific.	no		no	
Pomacentridae	<i>Plectroglyphidodon</i>	<i>leucozonus</i>	Whiterbar damselfish	It inhabits the Indo-Pacific including the Red Sea.	no		no	
Pomacentridae	<i>Pomacentrus</i>	<i>albicaudatus</i>			no		no	
Pomacentridae	<i>Pomacentrus</i>	<i>aquilus</i>			no		no	
Pomacentridae	<i>Pomacentrus</i>	<i>sulfureus</i>	Sulphur damselfish	It is reported from the Red Sea and the western Indian Ocean.		yes لها أهمية في تجارة أسماك الزينة	no	
Pomacentridae	<i>Pomacentrus</i>	<i>trichourus</i>	Reticulated damselfish	The reticulated damselfish inhabits the Red Sea and eastern Africa south to Mozambique.	no		no	
Pomacentridae	<i>Pomacentrus</i>	<i>trilineatus</i>			no		no	
Pomacentridae	<i>Stegastes</i>	<i>nigricans</i>			no		no	
Pomacentridae	<i>Teixeirichthys</i>	<i>jordani</i>	Jordan's damselfish	Jordan's damselfish is distributed in the Red Sea and southward along the continental coast of Africa. It also occurs in Australia, China and Japan.	no		no	
Cirrhitidae	<i>Cirrhitichthys</i>	<i>oxycephalus</i>			no		no	
Cirrhitidae	<i>Oxycirrhites</i>	<i>typus</i>	Longnose hawkfish	It is distributed in the Indo-Pacific including the Red Sea, and the eastern Pacific.		yes لها أهمية في تجارة أسماك الزينة	no	
Cirrhitidae	<i>Paracirrhites</i>	<i>forsteri</i>	Blackside hawkfish	The blackside hawkfish is found in the Indo-		yes لها أهمية في	no	

				Pacific including the Red Sea.		تجارة أسماك الزينة		
Mugilidae	<i>Crenimugil</i>	<i>crenilabis</i>	Fringelip mullet	It occurs throughout the Indo-Pacific.		yes	n o	
Sphyraenidae	<i>Sphyraena</i>	<i>barracuda</i>	Great barracuda	It occurs throughout the Indo-Pacific and the tropical and subtropical Atlantic.	no		n o	
Sphyraenidae	<i>Sphyraena</i>	<i>flavicauda</i>	Yellowtail barracuda	It occurs from the Red Sea and eastern Africa to the western Pacific.	no		n o	
Sphyraenidae	<i>Sphyraena</i>	<i>forsteri</i>			no		n o	
Sphyraenidae	<i>Sphyraena</i>	<i>putnamae</i>	Sawtooth barracuda	It is known from the Red Sea, East Africa to the western Pacific.	no		n o	
Labridae	<i>Anampses</i>	<i>caeruleopunctatus</i>	Bluespotted wrasse	It occurs throughout the Indo-Pacific.	no		n o	
Labridae	<i>Anampses</i>	<i>lineatus</i>	Lined wrasse	The lined wrasse is known from the Indo-west Pacific.	no		n o	
Labridae	<i>Anampses</i>	<i>meleagrides</i>	Yellowtail wrasse	This species occurs throughout the Indo-Pacific.		yes لها أهمية في تجارة أسماك الزينة	n o	
Labridae	<i>Anampses</i>	<i>twistii</i>	Yellowbreasted wrasse	It occurs throughout the Indo-Pacific.		yes لها أهمية في تجارة أسماك الزينة	n o	
Labridae	<i>Bodianus</i>	<i>anthioides</i>	Lyretail hogfish	The lyretail hogfish occurs throughout the Indo-Pacific.		yes لها أهمية في تجارة أسماك الزينة	n o	
Labridae	<i>Bodianus</i>	<i>axillaris</i>	Axilspot hogfish	The axilspot hogfish occurs		yes لها	n o	

				throughout the Indo-Pacific.		أهمية في تجارة أسماك الزينة		
Labridae	<i>Bodianua</i>	<i>diana</i>	Diana's hogfish	This species is distributed from the Red Sea and eastern Africa to the western Pacific.		yes لها أهمية في تجارة أسماك الزينة	n o	
Labridae	<i>Bodianus</i>	<i>leucosticticus</i>	Fourline hogfish	This species is known from Mauritius, Reunion, Somalia, Red Sea, Mozambique, Natal and southern Japan.	no		n o	
Labridae	<i>Bodianus</i>	<i>opercularis</i>		This species is reported from the Red Sea, Madagascar and the eastern Indian Ocean.	no		n o	
Labridae	<i>Cheilinus</i>	<i>fasciatus</i>			no		n o	
Labridae	<i>Cheilinus</i>	<i>lunulatus</i>	Broomtail wrasse	The broomtail wrasse occurs throughout the Arabian Region.	no		n o	
Labridae	<i>Cheilinus</i>	<i>mentalis</i>	Mental wrasse		no		n o	
Labridae	<i>Cheilinus</i>	<i>trilobatus</i>	Abudjubbe's splendour wrasse	This species is endemic to the Red Sea.	no		n o	
Labridae	<i>Cheilinus</i>	<i>undulatus</i>	Humphead wrasse, Napoleonfish	It occurs throughout the Indo-Pacific.	no		n o	
Labridae	<i>Cheilio</i>	<i>inermis</i>	Cigar wrasse	The cigar wrasse occurs throughout the Indo-Pacific.	no		n o	
Labridae	<i>Choerodon</i>	<i>robustus</i>	Robust tuskfish	The robust tuskfish occurs throughout the Indo-Pacific.	no		n o	
Labridae	<i>Cirrhilabrus</i>	<i>blatteus</i>	Purple-boned wrasse	It is endemic to the Red Sea.	no		n o	

Labridae	<i>Cirrhilabrus</i>	<i>rubriventralis</i>	Social wrasse	The social wrasse is known from the Red Sea, Oman and Sri Lanka.	no		n o	
Labridae	<i>Coris</i>	<i>aygula</i>	Clown coris	It is widely distributed in the Indo-Pacific.		yes لها أهمية في تجارة أسماك الزينة	n o	
Labridae	<i>Coris</i>	<i>caudimacula</i>	Spottail coris	Spottail coris is known from the Red Sea and the Indian Ocean.	no		n o	
Labridae	<i>Coris</i>	<i>gaimard</i>			no		n o	
Labridae	<i>Coris</i>	<i>variegata</i>	Dapple coris	The dapple coris inhabits the Red Sea and East Africa to the Marshall Islands.	no		n o	
Labridae	<i>Epibulus</i>	<i>insidiator</i>	Slingjaw wrasse	The slingjaw wrasse occurs throughout the Indo-Pacific.		yes لها أهمية في تجارة أسماك الزينة	n o	
Labridae	<i>Gomphosus</i>	<i>caeruleus</i>	Red Sea birdwrasse	It is endemic to the Red Sea while the nominal subspecies occurs in the Indian Ocean.	no		n o	
Labridae	<i>Halichoeres</i>	<i>hortulanus</i>	Checkerboard wrasse	The checkerboard wrasse occurs throughout the Indo-Pacific.	no		n o	
Labridae	<i>Halichoeres</i>	<i>marginatus</i>			no		n o	
Labridae	<i>Halichoeres</i>	<i>nebulosus</i>	Nebulous wrasse	The nebulous wrasse is distributed in the Indo-west Pacific including the Red Sea.	no		n o	
Labridae	<i>Halichoeres</i>	<i>scapularis</i>	Zigzag wrasse	The zigzag wrasse is known from the Indo-west Pacific	no		n o	

				including the Red Sea.				
Labridae	<i>Hemigymnus</i>	<i>fasciatus</i>	Barred thicklip wrasse	The barred thicklip wrasse occurs throughout the Indo-Pacific.	no		no	
Labridae	<i>Hologymnosus</i>	<i>annulatus</i>	Ring wrasse	It occurs throughout the Indo-Pacific.			no	
Labridae	<i>Labroides</i>	<i>dimidiatus</i>	Cleaner wrasse	The cleaner wrasse occurs throughout the Indo-Pacific.		yes لها أهمية في تجارة أسماك الزينة	no	
Labridae	<i>Larabicus</i>	<i>quadrilineatus</i>	Fourline wrasse	It is known from the Red Sea and Gulf of Aden.		yes لها أهمية في تجارة أسماك الزينة	no	
Labridae	<i>Macropharyngodon</i>	<i>bipartitus bipartitus</i>				yes لها أهمية في تجارة أسماك الزينة	no	
Labridae	<i>Novaculichthys</i>	<i>macrolepidotus</i>			no		no	
Labridae	<i>Oxycheilinus</i>	<i>arenatus</i>	Arenatus wrasse	It occurs throughout the Indo-Pacific.	no		no	
Labridae	<i>Oxycheilinus</i>	<i>diagrammus</i>	Bandcheek wrasse	This species is reported from the Red Sea, East Africa to Micronesia and Samoa.	no		no	
Labridae	<i>Oxycheilinus</i>	<i>orientalis</i>			no		no	
Labridae	<i>Paracheilinus</i>	<i>octotaenia</i>	Magestic eightline wrasse	Magestic eightline wrasse is endemic to the Red Sea.	no		no	
Labridae	<i>Pseudocheilinus</i>	<i>evanidus</i>			no		no	
Labridae	<i>Pseudocheilinus</i>	<i>hexataenia</i>	Sixstripe wrasse	The sixstripe wrasse occurs		yes لها أهمية	no	

				throughout the Indo-Pacific.		في تجارة أسماك الزينة		
Labridae	<i>Pteragogus</i>	<i>cryptus</i>	Cryptic dwarf wrasse	It has been reported from the Red Sea and the Pacific.	no		n o	
Labridae	<i>Pteragogus</i>	<i>pelycus</i>	Seagrass dwarf wrasse	Seagrass dwarf wrasse is distributed in the Red Sea, East Africa, Seychelles, Mascarenes and Madagascar.	no		n o	
Labridae	<i>Stethojulis</i>	<i>albovittata</i>	Bluelined wrasse	It is distributed in the western Indian Ocean and the Red Sea.	no		n o	
Labridae	<i>Stethojulis</i>	<i>interrupta</i>	Cutribbon wrasse	This species occurs throughout the Indo-Pacific.	no		n o	
Labridae	<i>Thalassoma</i>	<i>rueppellii</i>	Klunzinger's wrasse	This species is seen at depths down to 20 m. It is endemic to the Red Sea.		yes لها أهمية في تجارة أسماك الزينة	n o	
Labridae	<i>Thalassoma</i>	<i>lunare</i>	Moon wrasse	The moon wrasse occurs throughout the Indo-Pacific.		yes لها أهمية في تجارة أسماك الزينة	n o	
Labridae	<i>Wetmorella</i>	<i>nigropinnata</i>			no		n o	
Labridae	<i>Xyrichtys</i>	<i>melanopus</i>		This species has been reported from the Red Sea to southern Africa, India and the Philippines.	no		n o	
Labridae	<i>Xyrichtys</i>	<i>niger</i>			no		n o	
Labridae	<i>Xyrichtys</i>	<i>pavo</i>	Peacock wrasse	The peacock wrasse occurs throughout the Indo-Pacific.	no		n o	

Labridae	<i>Xyrichtys</i>	<i>pentadactylus</i>	Fire-finger wrasse	It is known from the Red Sea and eastern Africa to the western Pacific.	no		n o	
Scaridae	<i>Calotomus</i>	<i>viridescens</i>	Dotted parrotfish	Dotted parrotfish is endemic to the Red Sea.		yes	n o	
Scaridae	<i>Cetoscarus</i>	<i>bicolor</i>	Bicolour parrotfish	The bicolour parrotfish occurs throughout the Indo-Pacific.		yes	n o	
Scaridae	<i>Chlorurus</i>	<i>genazonatus</i>	Purple-streak parrotfish	The purple-streak parrotfish is known from the Red Sea and the Gulf of Aden.		yes	n o	
Scaridae	<i>Chlorurus</i>	<i>gibbus</i>	Steephead ed parrotfish	This species occurs throughout the Indo-Pacific.		yes	n o	
Scaridae	<i>Chlorurus</i>	<i>sordidus</i>	Bullethead parrotfish	The bullethead parrotfish occurs throughout the Indo-Pacific.		yes	n o	
Scaridae	<i>Hipposcarus</i>	<i>harid</i>	Longnose parrotfish	It occurs throughout the Indo-Pacific.		yes	n o	
Scaridae	<i>Leptoscarus</i>	<i>vaigiensis</i>				yes	n o	
Scaridae	<i>Scarus</i>	<i>collana</i>	Greenband parrotfish	The greenband parrotfish is obviously a Red Sea endemic.		yes	n o	
Scaridae	<i>Scarus</i>	<i>ferrugineus</i>	Rusty parrotfish	The rusty parrotfish is distributed from the Red Sea to the Arabian Gulf.		yes	n o	
Scaridae	<i>Scarus</i>	<i>frenatus</i>				yes	n o	
Scaridae	<i>Scarus</i>	<i>fuscopurpleus</i>	Purple-brown parrotfish	The purple-brown parrotfish is distributed Throughout the Arabian Region		yes	n o	
Scaridae	<i>Scarus</i>	<i>ghobban</i>	Blue-barred parrotfish	The blue-barred parrotfish is wide-ranging, occurring throughout the Indo-Pacific and eastern Pacific.		yes	n o	
Scaridae	<i>Scarus</i>	<i>niger</i>	Dusky parrotfish	The dusky parrotfish occurs throughout the Indo-Pacific.		yes	n o	

Scaridae	<i>Scarus</i>	<i>psittacus</i>	Palenose parrotfish	The palenose parrotfish is distributed throughout the Indo-Pacific.		yes	n o	
Pinguipedidae	<i>Parapercis</i>	<i>hexophtalma</i>	Spotted sandperch	It is distributed in the Red Sea, Indian Ocean and western Pacific.	no		n o	
Pinguipedidae	<i>Parapercis</i>	<i>somaliensis</i>	Weeping sandperch	The weeping sandperch is known from the Red Sea and Somalia to Japan.	no		n o	
Trichonotidae	<i>Trichonotus</i>	<i>nikii</i>	Red Sea sanddiver	This species is endemic to the Red Sea.	no		n o	
Uranoscopidae	<i>Uranoscopus</i>	<i>fuscomaculatus</i>	Stargazers	It occurs throughout the Indo-Pacific.	no		n o	
Uranoscopidae	<i>Uranoscopus</i>	<i>marisrubri</i>	Stargazers	This species is endemic to the Red Sea.	no		n o	
Blenniidae	<i>Alloblennius</i>	<i>pictus</i>			no		n o	
Blenniidae	<i>Alticus</i>	<i>kirkii</i>			no		n o	
Blenniidae	<i>Antennablennius</i>	<i>hyphenetes</i>			no		n o	
Blenniidae	<i>Aspidontus</i>	<i>dussumieri</i>			no		n o	
Blenniidae	<i>Aspidontus</i>	<i>taeniatus taeniatus</i>			no		n o	
Blenniidae	<i>Atrosalarias</i>	<i>fuscus fuscus</i>			no		n o	
Blenniidae	<i>Belenniella</i>	<i>flaviumbrinus</i>			no		n o	
Blenniidae	<i>Cirripectes</i>	<i>castaneus</i>			no		n o	
Blenniidae	<i>Ecsenius</i>	<i>aroni</i>	Aron's blenny	This species is endemic to the Red Sea.	no		n o	
Blenniidae	<i>Ecsenius</i>	<i>midas</i>			no		n o	
Blenniidae	<i>Ecsenius</i>	<i>frontalis</i>			no		n o	
Blenniidae	<i>Ecsenius</i>	<i>gravieri</i>	Red Sea mimic-blenny	Red Sea mimic-blenny is reported from the Red Sea and the Gulf of Aden.	no		n o	
Blenniidae	<i>Ecsenius</i>	<i>nalolo</i>	Nalolo	It is distributed in the western Indian Ocean and the Red Sea.	no		n o	



Blenniidae	<i>Exallias</i>	<i>brevis</i>	Shortbodied blenny	It occurs throughout the Indo-Pacific.	no		n o	
Blenniidae	<i>Istiblennius</i>	<i>edentulus</i>	Rippled rockskipper	The rippled rockskipper is widely distributed in the Indo-Pacific including the Red Sea.	no		n o	
Blenniidae	<i>Istiblennius</i>	<i>periophthalmus</i>			no		n o	
Blenniidae	<i>Istiblennius</i>	<i>rivulatus</i>			no		n o	
Blenniidae	<i>Meiacanthus</i>	<i>nigrolineatus</i>	Blackline blenny	The blackline blenny is known from the Red Sea and Gulf of Aden.	no		n o	
Blenniidae	<i>Petroscirtes</i>	<i>ancylodon</i>			no		n o	
Blenniidae	<i>Petroscirtes</i>	<i>mitratus</i>			no		n o	
Blenniidae	<i>Plagiotremus</i>	<i>rhinorhynchus</i>			no		n o	
Blenniidae	<i>Plagiotremus</i>	<i>tapeinosoma</i>	Scale-eating blenny	The scale-eating blenny occurs throughout the Indo-Pacific.	no		n o	
Blenniidae	<i>Plagiotremus</i>	<i>townsendi</i>			no		n o	
Blenniidae	<i>Salarias</i>	<i>fasciatus</i>	Jewelled blenny	The jewelled blenny is widely distributed in the Red Sea and Indo-Pacific.	no		n o	
Tripterygiidae	<i>Enneapterygius</i>	<i>abeli</i>			no		n o	
Tripterygiidae	<i>Enneapterygius</i>	<i>destai</i>			no		n o	
Callionymidae	<i>Callionymus</i>	<i>filamentosus</i>			no		n o	
Gobiidae	<i>Amblyeleotris</i>	<i>steinitzi</i>	Steinitz' goby	Steinitz' goby occurs throughout the Indo-Pacific.	no		n o	
Gobiidae	<i>Amblyeleotris</i>	<i>sungami</i>	Magnus' goby	It occurs throughout the Indo-Pacific.	no		n o	
Gobiidae	<i>Amblygobius</i>	<i>albimaculatus</i>	Tailspot goby	Tailspot goby is distributed in the Arabian Region and eastern Africa down to South Africa.	no		n o	

Gobiidae	<i>Amblygobius</i>	<i>hectori</i>	Hector's goby	Hector's goby is distributed in the Red Sea and East Africa to the western Pacific.	no		n o	
Gobiidae	<i>Asterropteryx</i>	<i>semipunctatus</i>			no		n o	
Gobiidae	<i>Bathygobius</i>	<i>cyclopterus</i>	Roundfin goby	Roundfin goby is reported from the Red Sea, East Africa to Samoa and the Marshall Islands.	no		n o	
Gobiidae	<i>Bryaninops</i>	<i>natans</i>	Purple-eye dwarf goby	This species is reported from the Red Sea and the Indian Ocean.	no		n o	
Gobiidae	<i>Ctenogobius</i>	<i>maculosus</i>			no		n o	
Gobiidae	<i>guttata</i>	<i>Eviota</i>			no		n o	
Gobiidae	<i>Eviota</i>	<i>sebreei</i>			no		n o	
Gobiidae	<i>Fusigobius</i>	<i>longispinus</i>	Longspine goby	The longspine goby is distributed in the Red Sea and the Indian Ocean.	no		n o	
Gobiidae	<i>Coryphopterus</i>	<i>neophytus</i>			no		n o	
Gobiidae	<i>Gnatholepis</i>	<i>anjerensis</i>	Family goby	The family goby occurs throughout the Indo-Pacific.	no		n o	
Gobiidae	<i>Gobiodon</i>	<i>citrinus</i>	Lemon coral-goby	Lemon coral-goby is reported from the Red Sea to the Arabian Gulf.	no		n o	
Gobiidae	<i>Gobiodon</i>	<i>reticulatus</i>	Reticulate coral-goby	The reticulate coral-goby is distributed throughout the Arabian Region.	no		n o	
Gobiidae	<i>Istigobius</i>	<i>decoratus</i>			no		n o	
Gobiidae	<i>Lotilia</i>	<i>graciliosa</i>			no		n o	
Gobiidae	<i>Priolepis</i>	<i>cincta</i>	Banded-brown goby	It is reported from the Red Sea and East Africa to the western Pacific.	no		n o	
Gobiidae	<i>Trimma</i>	<i>flavicaudata</i>			no		n o	

Gobiidae	<i>Valencienna</i>	<i>puellaris</i>	Maiden sleeper goby	Maiden sleeper goby is distributed in the Red Sea, East Africa to the Samoa Islands.	no		no	
Gobiidae	<i>Vanderhorstia</i>	<i>sp.</i>			no		no	
Microdesmidae	<i>Ptereleotris</i>	<i>evides</i>	Scissortail dart-goby	The scissortail dart-goby is known from the tropical Indo-west Pacific.	no		no	
Acanthuridae	<i>Acanthurus</i>	<i>nigricans</i>	Black surgeonfish	The black surgeonfish is distributed in the Red Sea and the Gulf of Aden.	no		no	
Acanthuridae	<i>Acanthurus</i>	<i>nigrofuscus</i>	Brown surgeonfish	The brown surgeonfish occurs throughout the Indo-Pacific.	no		no	
Acanthuridae	<i>Acanthurus</i>	<i>sohal</i>	Sohal	The sohal occurs from the Red Sea to the Arabian Gulf.		yes لها أهمية في تجارة أسماك الزينة	no	
Acanthuridae	<i>Ctenochaetus</i>	<i>striatus</i>	Lined bristletooth	The lined bristletooth occurs throughout the Indo-Pacific.	no		no	
Acanthuridae	<i>Naso</i>	<i>hexacanthus</i>			no		no	
Acanthuridae	<i>Naso</i>	<i>lituratus</i>	Orangespine unicornfish	The orangespine unicornfish occurs throughout the Indo-Pacific.	no		no	
Acanthuridae	<i>Naso</i>	<i>unicornis</i>	Bluespine unicornfish	The bluespine unicornfish occurs throughout the Indo-Pacific.	no		no	
Acanthuridae	<i>Zebrasoma</i>	<i>veliferum</i>	Sailfin surgeonfish	The sailfin surgeonfish occurs throughout the Indo-Pacific.		yes لها أهمية في تجارة أسماك الزينة	no	

Acanthuridae	<i>Zebrasoma</i>	<i>xanthurum</i>	Yellowtail surgeonfish	It is distributed from the Red Sea to the Arabian Gulf.		yes لها أهمية في تجارة أسماك الزينة	no	
Siganidae	<i>Siganus</i>	<i>argenteus</i>	Forktail rabbitfish	The forktail rabbitfish occurs throughout the Indo-Pacific.		yes	no	
Siganidae	<i>Siganus</i>	<i>luridus</i>	Squartail rabbitfish	This species is known from the Red Sea and the western Indian Ocean. It migrated via the Suez Canal into the eastern Mediterranean.		yes	no	
Siganidae	<i>Siganus</i>	<i>rivulatus</i>	Rivulated rabbitfish	The rivulated rabbitfish has been recorded from the Red Sea and the Gulf of Aden. It reached the Mediterranean via the Suez Canal.		yes	no	
Siganidae	<i>Siganus</i>	<i>stellatus</i>	Stellate rabbitfish	The stellate rabbitfish is distributed in the Red Sea and the Indian Ocean.	no		no	
Trichiuridae	<i>Trichiurus</i>	<i>lepturus</i>	Largehead cutlassfish	Cosmopolitan in tropical and temperate seas.	no		no	
Gempylidae	<i>Thyrsitoides</i>	<i>marleyi</i>		Only known from the Red Sea.	no		no	
Scombridae	<i>Auxis</i>	<i>thazard thazard</i>	Frigate tuna	It is cosmopolitan in tropical and warm temperate seas.	no		no	
Scombridae	<i>Euthynnus</i>	<i>affinis</i>	Kawakawa, eastern littletuna	The eastern littletuna occurs throughout the Indo-Pacific.	no		no	
Scombridae	<i>Grammatorcylus</i>	<i>biliniatus</i>			no		no	
Scombridae	<i>Gymnosarda</i>	<i>unicolor</i>	Dogtooth tuna	Dogtooth tuna occurs throughout the Indo-Pacific.	no		no	

Scombridae	<i>Katsuwonus</i>	<i>pelamis</i>	Skipjack tuna	Skipjack tuna is cosmopolitan in tropical and subtropical seas.	no		n o	
Scombridae	<i>Rastrelliger</i>	<i>kanagurta</i>	Indian mackerel	Indian mackerel is widespread in the Indo-west Pacific; it has entered the eastern Mediterranean Sea through the Suez Canal.	no		n o	
Scombridae	<i>Sarda</i>	<i>orientalis</i>	Striped bonito	Striped bonitos occur throughout the Indo-Pacific and the eastern Pacific.	no		n o	
Scombridae	<i>Scomber</i>	<i>japonicus</i>	Chub mackerel	The chub mackerel is cosmopolitan in subtropical and temperate seas.	no		n o	
Scombridae	<i>Scomberomorus</i>	<i>commerson</i>	Narrowbar red Spanish mackerel	The narrowbarred Spanish mackerel occurs throughout the Indo-Pacific.		yes	n o	
Scombridae	<i>Thunnus</i>	<i>alalunga</i>		This species is cosmopolitan in subtropical seas. It was first recorded from the Red Sea		yes		yes
Scombridae	<i>Thunnus</i>	<i>albacares</i>	Yellowfin tuna	The yellowfin tuna is cosmopolitan in tropical and warm temperate seas.		yes	n o	
Scombridae	<i>Thunnus</i>	<i>tonggol</i>	Longtail tuna	Longtail tuna is known from Somalia, the Red Sea, Gulf of Aden, Pakistan, the coasts of India, the Maldiv Islands and Sri Lanka, eastward to Japan and Australia.		yes	n o	
Istiophoridae	<i>Istiophorus</i>	<i>platypterus</i>	Sailfish	The sailfish is cosmopolitan in		yes	n o	

				tropical and temperate seas.				
Ariommatidae	<i>Ariomma</i>	<i>brevimanus</i>		It is a rare species which has so far been recorded from the Red Sea and Japan.		yes	no	
Bothidae	<i>Arnoglossus</i>	<i>tapeinosoma</i>			no		no	
Bothidae	<i>Bothus</i>	<i>pantherinus</i>	Leopard flounder	The leopard flounder is known from the Red Sea and the Indian Ocean.	no		no	
Pleuronectidae	<i>Samaris</i>	<i>cristatus</i>	Crested flounder	The crested flounder is known from the Red Sea, Indian Ocean and western Pacific.	no		no	
Soleidae	<i>Pardachirus</i>	<i>marmoratus</i>	Moses sole	Moses sole is distributed in the Red Sea and western Indian Ocean.	no		no	
Soleidae	<i>Soleichthys</i>	<i>heterorhinos</i>	Banded sole	The banded sole is known from the Red Sea and the Indian Ocean.	no		no	
Cynoglossidae	<i>Paraplagusia</i>	<i>bilineata</i>			no		no	
Cynoglossidae	<i>Cynoglossus</i>	<i>sp.</i>			no		no	
Balistidae	<i>Abalistes</i>	<i>stellaris</i>	Starry triggerfish	The starry triggerfish is distributed in the Red Sea and the Indo-west Pacific.	no		no	
Balistidae	<i>Balistapus</i>	<i>undulatus</i>	Orangestriped triggerfish	This species occurs throughout the Indo-Pacific.			no	
Balistidae	<i>Odonus</i>	<i>niger</i>	The redtooth triggerfish occurs throughout the Indo-Pacific.	The redtooth triggerfish occurs throughout the Indo-Pacific.		yes لها أهمية في تجارة أسماك الزينة	no	
Balistidae	<i>Pseudobalistes</i>	<i>fuscus</i>	Blue triggerfish	The blue triggerfish occurs throughout the Indo-Pacific.		yes لها أهمية في	no	

						تجارة أسماء الزينة		
Balistidae	<i>Rhinecanthus</i>	<i>assasi</i>	Picasso triggerfish	The Picasso triggerfish occurs throughout the Arabian Region.		yes لها أهمية في تجارة أسماء الزينة	n o	
Balistidae	<i>Sufflamen</i>	<i>albicaudatum</i>	Bluethroat triggerfish	The bluethroat triggerfish is known from the Red Sea and Gulf of Aden.	no		n o	
Monacanthidae	<i>Aluterus</i>	<i>monoceros</i>	Unicorn leatherjacket	The unicorn leatherjacket is cosmopolitan in tropical and subtropical seas.	no		n o	
Monacanthidae	<i>Aluterus</i>	<i>scriptus</i>	Scribbled filefish	unicates. It is found at depths down to 80 m.	no		n o	
Monacanthidae	<i>Amanses</i>	<i>scopas</i>	Broom filefish	The broom filefish occurs throughout the Indo-Pacific.	no		n o	
Monacanthidae	<i>Cantherhines</i>	<i>pardalis</i>	Wire-net filefish	The wire-net filefish occurs throughout the Indo-Pacific.	no		n o	
Monacanthidae	<i>Paramonacanthus</i>	<i>falcatus</i>	File fish	This species is known from the Red Sea and the Gulf of Aden.	no		n o	
Monacanthidae	<i>Pervagor</i>	<i>randalli</i>	Redtail filefish	Redtail filefish is reported from the Red Sea and Gulf of Aden.	no		n o	
Monacanthidae	<i>Thamnaconus</i>	<i>modestoides</i>	Modest filefish	Modest filefish is endemic to the Red Sea.	no		n o	
Ostraciidae	<i>Ostracion</i>	<i>cubicus</i>	Cube boxfish	The cube boxfish occurs throughout the Indo-Pacific.	no		n o	
Ostraciidae	<i>Ostracion</i>	<i>cyanurus</i>	Bluetail trunkfish	The bluetail trunkfish is occurs throughout the Arabian Region.	no		n o	
Ostraciidae	<i>Tetrosomus</i>	<i>gibbosus</i>	Pyramid boxfish	The pyramid boxfish is known from the Red Sea and the tropical	no		n o	

				Indo-west Pacific.				
Tetraodontid ae	<i>Arothron</i>	<i>diadematus</i>	Masked puffer	The masked puffer is confined to the Red Sea.		yes لها أهمية في تجارة أسماك الزينة	no	
Tetraodontid ae	<i>Arothron</i>	<i>hispidus</i>	Whitespotted puffer	It inhabits the tropical Indo-west Pacific, including the Red Sea.	no		no	
Tetraodontid ae	<i>Arothron</i>	<i>stellatus</i>	Blackspotted puffer	The blackspotted puffer occurs throughout the Indo-Pacific.	no		no	
Tetraodontid ae	<i>Canthigaster</i>	<i>coronata</i>	Crowned sharpnose puffer	The crowned sharpnose puffer occurs throughout the Indo-Pacific.	no		no	
Tetraodontid ae	<i>Canthigaster</i>	<i>margaritata</i>	Pearl sharpnose puffer	The pearl sharpnose puffer is confined to the Red Sea.	no		no	
Tetraodontid ae	<i>Canthigaster</i>	<i>pygmaea</i>			no		no	
Tetraodontid ae	<i>Lagocephalus</i>	<i>sceleratus</i>	Silverstripe puffer	The silverstripe puffer occurs throughout the Indo-Pacific.	no		no	
Tetraodontid ae	<i>Torquigener</i>	<i>flavimaculosus</i>	Red Sea pufferfish	The Red Sea pufferfish is known from the Gulf of Aqaba to the Gulf of Aden and further south at least to Zanzibar.	no		no	
Diodontidae	<i>Cylichthys</i>	<i>spilostylus</i>	Yellowspotted burrfish	The yellowspotted burrfish is known from the Red Sea and the northern Indo-Pacific.	no		no	
Diodontidae	<i>Diodon</i>	<i>hystrix</i>	Porcupinefish	The porcupinefish is circumtropical in distribution.	no		no	
Molidae	<i>Masturus</i>	<i>lanceolatus</i>						



## 2. Ecological Assessment of Marine Ecosystems in Aqaba, Jordan

Note: All the information in the second part is from the "Ecological Assessment of Coastal Ecosystems in Aqaba, Jordan/ Marine Habitat Map" (JREDS, 2019)

### 2.1. Summary

The main objective of this project/study is to determine the status of coastal ecosystems along the Jordanian coast of the Gulf of Aqaba to provide a clear direction for the conservation, sustainable use and effective management of marine resources. In order to achieve this main objective, the team worked hard to implement 2 parts: Part I: Ecological Assessment process (fine-scale sea floor scanning), and Part II: Comprehensive Geographical Analysis of spatial planning on marine biodiversity along the Jordanian coast of the Gulf of Aqaba and collect and compile all related information required for Marine Habitat Mapping Conservation.

A total of 7 km of the Jordanian coast on the Aqaba Gulf were surveyed in the period between 8<sup>th</sup> until 18<sup>th</sup> May 2019. The investigated sites (15 sites) were surveyed at distance intervals of 500 m which include usual dive sites and area between them to determine the benthic cover, species diversity hotspots, threats, and predict the potential distribution.

The cover of benthic habitat structure including biotic components (hard coral, soft coral, dead standing coral, macroalgae, turf algae, coralline algae, seagrass, and other invertebrates) and abiotic components (hard substrate, rubble, and sand) were measured. Biotic and abiotic components cover percentage were recorded within three benthic zones (Depth 1-10, Depth 11-20, and Depth 21-30 m) to determine the effect of depth. It was recorded that depth level correlates positively/negatively with biotic components cover (hard, soft corals, seagrass, and microalgae).

The cover of seagrass varied among the sites, ranged from 35 to 55% in shallow water (0-10 m), and ranged from 20 to 40% in deep water (11-30m). It was shown that seagrass distribution negatively correlates with depth, which is consistent with many studies conducted in the region. The average of all sites in each depth zone present that hard and soft corals positively increase with the depth.

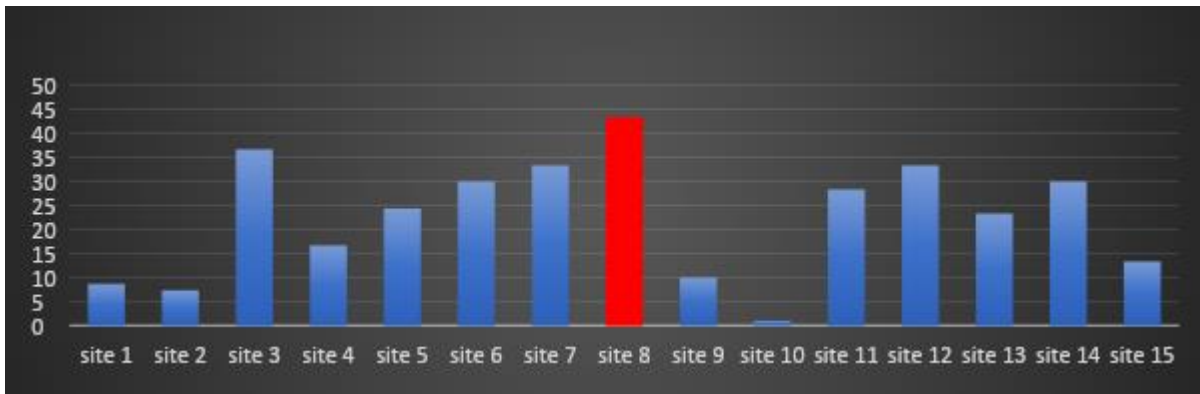
That average of total biotic components cover in the 3 depth zones (1-10, 11-20, and 21-30 m) present that: The highest records for hard coral cover was recorded in site number 8 (King Abdullah Reef); The highest records for soft coral cover was recorded in site number 4 (Seven Sisters and the Tank); The highest records for seagrass cover was recorded in site number 1 (Blue Coral (Tala Bay South)); The highest records for total biotic cover was recorded in sites number 2 (Eel Canyon ) and 8 (King Abdullah Reef).

Categories used in the surveys: (a) benthic attributes, (b) ordinal ranks of percentage cover, and (c) ordinal ranks of taxon abundance.

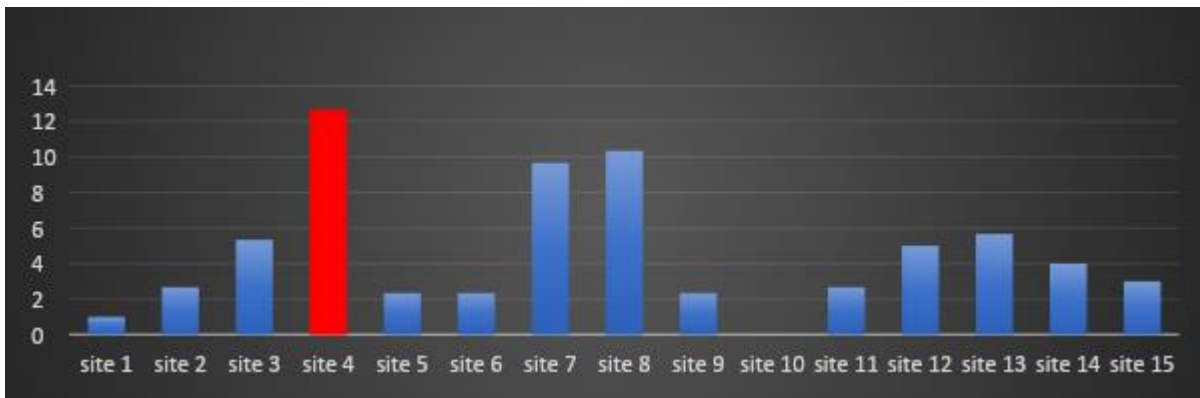
Attribute		Ranks used in calculating Replenishment index CI	
ecological	physical	% cover	Rank
Hard coral	Hard substrate	0	0
Dead standing coral	Continuous pavement	1 – 10 %	1
Soft coral	Large blocks (diam. > 1 m)	11 – 30 %	2
Coralline algae	Small blocks (diam. < 1 m)	31 – 50 %	3
Turf algae	Rubble	51 – 75 %	4
Macro-algae	Sand	76 – 100 %	5

Site characteristics, including visual estimates of cover of various sessile benthic groups and substrate categories.

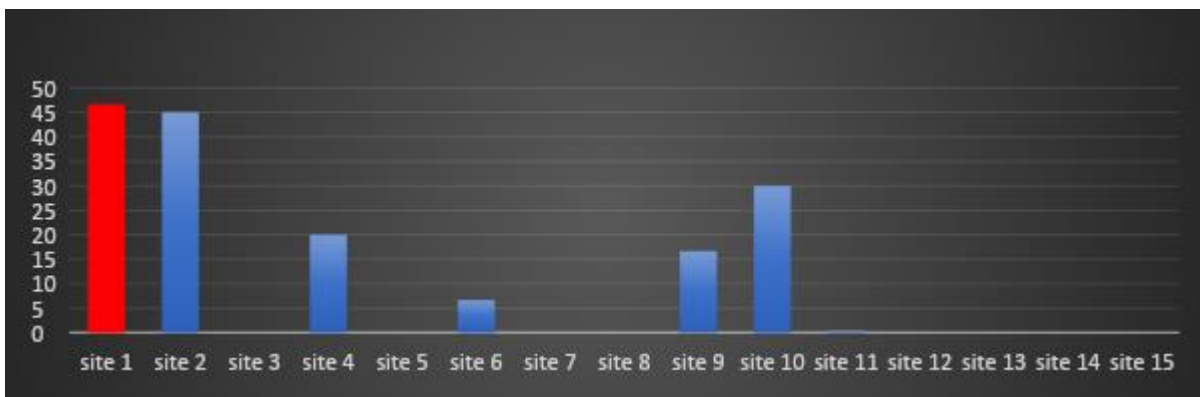
Site name	Site	Hard coral %	Soft coral %	Other invertebrates %	Macroalgae %	Turf algae %	Coralline algae %	Seagrass %	All dead coral %	Hard substrate %	Rubble %	Sand - silt %	Exposure to waves (1-4)	Reef development (1-4)
Blue Coral (Tala Bay South)	1	9	1	0.5	1	0.5	0	45	1	11	1	30	2	2
Eel Canyon	2	7.5	2.5	1.5	1.5	1.5	1	45	1	11	2.5	25	3	2
Gorgon 1 & 2	3	35	5	3	2	2	1	0	1	22	4	25	3	3
Seven Sisters and the Tank	4	17	10	2	3	2	1	20	1	21	3	20	3	3
Japanese Garden	5	25	2	1.5	2.5	0.5	0	0	1	35	4.5	28	3	4
Rainbow Reef	6	30	2.5	2	2	1	0.5	6.5	2	23	5.5	25	2	2
Black Rock	7	33	10	5	3.5	1	1.5	0	1.5	23	4.5	17	3	3
King Abdullah Reef	8	43	10	2.5	1.5	0.5	0.5	0	2	24	8.5	7.5	3	3
King Abdullah Reef North	9	10	2.5	0.5	2	1	0.5	16	1	16	2.5	48	2	3
Ras Al-Yamaniah (Eel gardens)	10	0.5	0	0	3	0	0	30	2	0.5	0	64	2	2
First Bay North	11	28	2.5	1.5	1	1	0.5	0.5	1.5	29	4.5	30	3	4
Marine Science Station	12	33	5	2	2.5	2.5	1	0	1.5	26	4.5	22	3	4
Power Station South	13	23	5	1	1	2	2	0	3	45	4	14	3	3
Power Station Center	14	30	4	1	1.5	0.5	1	0	2.5	31	3.5	25	3	3
Power Station North	15	13	3	0.5	1.5	1.5	0.5	0	1.5	27	4.5	47	3	3



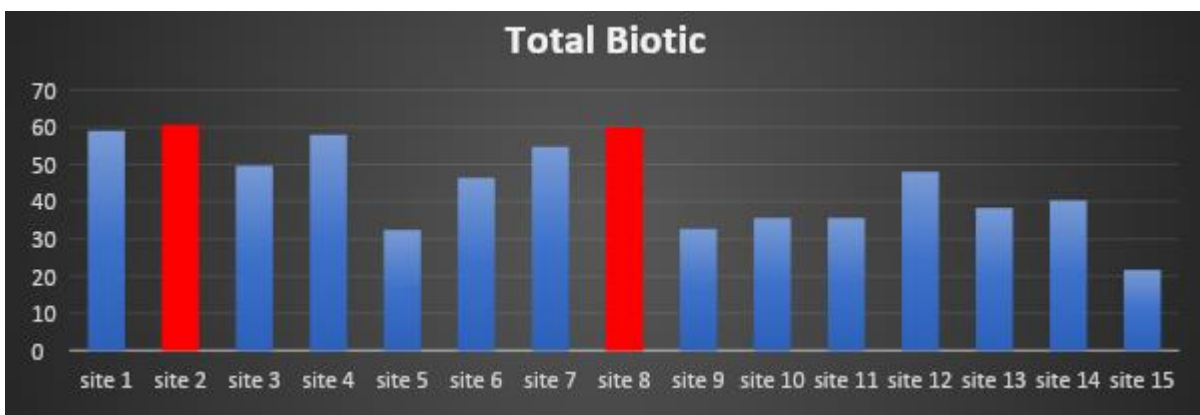
Average of Hard Coral cover (%) among the study area (0-30 m depth)



Average of Soft Coral cover (%) among the study area (0-30 m depth)



Average of Seagrass cover (%) among the study area (0-30 m depth)



Average of total biotic components cover (%) among the study area (0-30 m depth)

Seagrasses—a one of a kind gathering of flowering plants that have adjusted to exist completely submersed in the ocean—significantly impact the physical, compound, and organic situations in waterfront waters, going about as biological specialists (Wright and Jones, 2006) and giving various significant ecological services to the marine environment (Costanza, 1997). Seagrasses are appropriated over the globe, however dissimilar to other scientific categorizations with overall dispersion, they display low ordered assorted variety: roughly 60 species around the world (Iair Hartog, 1970).

Inside the Gulf of Aqaba, coral reefs have been viewed as the dominating biological system, drawing in scientific consideration, yet in addition, conservation/restoration efforts, aquarium displays and exceed educational projects. Seagrasses, which are referred to worldwide as a profoundly significant biological system, have not gotten much consideration by people in general, researchers or experts associated with protection and the board in this region.

As an important element for ecosystem services, seagrass species (*Halophila stipulacea*) was recorded in 7 sites (47% of the total sites). This species is native to the Indian Ocean that spread into the Mediterranean after the opening of the Suez Canal. This sea grass is widespread through the Gulf of Aqaba. Recently it has arrived in the Caribbean where it is also spreading. The cover of this species varied among the sites and ranged from 35 to 55% in shallow water (0-10m) and ranged from 20 to 40% in deep water (11-30m). It was shown that seagrass distribution negatively correlates with depth and this is consistent with many studies conducted in the region.

Seagrasses species cover, distribution in two different depth within the study area

Site	Seagrass cover %		Seagrass species
	Shallow (0-10 m)	Deep (11-30 m)	
1	45	35	<i>Halophila stipulacea</i>
2	50	40	<i>Halophila stipulacea</i>
3	45	35	<i>Halophila stipulacea</i>
6	35	20	<i>Halophila stipulacea</i>
9	50	35	<i>Halophila stipulacea</i>
10	55	40	<i>Halophila stipulacea</i>
11	55		<i>Halophila stipulacea, Halodule uninervis</i>

The average of all sites in each depth zone present that hard and soft corals positively increase with the depth. The reverse is true in the case of seagrass, it was found that the highest presence for seagrasses are located in the shallow water (zone 1).

Average of benthic cover % among different depth levels (red=highest records)

No	Benthic Structure	Depth 1-10 m	Depth 11-20 m	Depth 21-30 m
1	Hard coral	18	23	27
2	Soft coral	2	4	7
3	Dead standing coral	2	2	2
4	Macroalgae	2	2	2
5	Turf algae	1	1	1
6	Coralline algae	1	0	1
7	Seagrass	19	13	3
8	Other Invertebrates	1	1	2
9	<b>Total Biotic</b>	<b>46</b>	<b>45</b>	<b>43</b>
10	Hard substrate	20	20	30
11	Rubble	4	4	3

12	Sand	30	31	23
13	Total Abiotic	54	55	57

Percentage of benthic components cover recorded in zone 1 (depth 0-10 m)

Site No	Hard coral	Soft coral	Dead standing coral	Macroalgae	Turf algae	Coralline algae	Seagrass	Other Invertebrates	Total Biotic	Hard substrate	Rubble	Sand	Total Abiotic
1	1						80		81	3		16	19
2	5	1	1	1	1		50		59	10	1	30	41
3	50	3	5	1	2	2		1	64	23	3	10	36
4	10	3	2	5	2	1	40		63	15	3	19	37
5	25	2	2	3	2			1	35	45	5	15	65
6	10	1	2	2	2	1	20	1	39	6	5	50	61
7	35	4	3	5	1	2			50	20	5	25	50
8	35	7	3	1	1	1		2	50	25	10	15	50
9	5	1	1	4	1	1	30		43	20	2	35	57
10				4			60	1	65			35	35
11	30	1	1	1	1	1	1	1	37	28	5	30	63
12	15	2	1	3	2	1		1	25	20	5	50	75
13	25	5	2	2	2	2		2	40	30	5	25	60
14	20	5	2	1	1	1		3	33	25	2	40	67
15	5	1	1	2	1	1		1	12	25	3	60	88

Percentage of benthic components cover recorded in zone 2 (depth 11-20 m)

Site No	Hard coral	Soft coral	Dead standing coral	Macroalgae	Turf algae	Coralline algae	Seagrass	Other Invertebrates	Total Biotic	Hard substrate	Rubble	Sand	Total Abiotic
1	5	1	1	1			60		68	12		20	32
2	7	2	2	1	2		45	1	60	10	5	25	40
3	40	5	1	1		1			48	25	2	25	52
4	15	20	1	2	2	1	20	1	62	15	3	20	38
5	23	2	2	2				1	30	25	5	40	70
6	30	5	3	3	1	1		2	45	25	10	20	55
7	30	10	8	3	1	1		1	54	16	5	25	46
8	60	5	2	1				2	70	23	5	2	30
9	5	1	1	1			20		28	10	2	60	72
10	1						30	1	32	1		67	68
11	20	2	2	2				1	27	30	3	40	73
12	35	3	2	3	3	1		2	49	35	6	10	51
13	30	7	2	2	1	1		2	45	35	5	15	55
14	30	2	1	1		1		3	38	25	7	30	62
15	10	1		1	1			2	15	15	5	65	85

Percentage of benthic components cover recorded in zone 3 (depth 21-30 m)

Site No	Hard coral	Soft coral	Dead standing coral	Macroalgae	Turf algae	Coralline algae	Seagrass	Other Invertebrates	Total Biotic	Hard substrate	Rubble	Sand	Total Abiotic
1	20	2	2	2	1			1	28	20	2	50	72
2	10	5	2	2	2		40	2	63	15	2	20	37
3	20	8	3	3		1		2	37	18	5	40	63
4	25	15	3	2	1	1		2	49	35	1	15	51
5	25	3	1	2				1	32	35	3	30	68
6	50	1	2	1				1	55	40	2	3	45
7	35	15	5	2		1		2	60	35	3	2	40
8	35	19	2	2				2	60	25	10	5	40
9	20	5		1				1	27	20	3	50	73
10				5				5	10			90	90
11	35	5	1					2	43	30	5	22	57
12	50	10	3	2	3	1		1	70	25	2	3	30
13	15	5		1	1	3		5	30	70			70
14	40	5	1	2		1		1	50	43	2	5	50
15	25	7	1	1	2			2	38	40	5	17	62



According to ecological assessment of marine ecosystems in Aqaba's report, the majority of reef loss or damage is not deliberate. Coral reefs are being degraded by an accumulation of stresses arising from human activities. In simple terms, stresses can be grouped by the actions of people extracting material from, and placing materials upon coral reefs. Overfishing, pollution and coastal development top the list of chronic stressors. In many situations chronic stresses are overwhelming the resilience (or the capacity for self-repair) of reef communities. Some coral reefs are covered with sand, rock and concrete to make cheap land and stimulate economic development. Others are dredged or blasted for their limestone or to improve navigational access and safety. In addition to this, long-term changes in the oceans and atmosphere (rising sea temperatures and levels of CO<sub>2</sub>), and acute stresses from highly variable seasons, severe storms, earthquakes and volcanic eruptions affect coral reefs.

Coral reef diving, snorkeling & swimming is an all-time favorite of most scuba divers. However, like it or not, scuba divers are causing substantial damage to the world's coral reefs. Scientific evidence shows that divers are directly and/or indirectly responsible for damaging the reef life with some of their thoughtless behaviours. Not to say that all divers are harming reef life intentionally, however, due to some divers' lack of proper training, it is done unknowingly at times. Coral reef diving possesses some unique challenges compared to other methods of diving. A diver needs to have a passion and affection for nature when diving on a coral reef. Coral reefs are not solely beautiful colored rocks in the sea; they are living organisms that need extreme care and attention.

Coral reef ecosystems support important commercial, recreational, and subsistence fishery resources in the Aqaba Region. Fishing also plays a central social and cultural role in coastal communities, where it is often a critical source of food and income. The impacts from unsustainable fishing on coral reef areas can lead to the depletion of key reef species in many locations. Such losses often have a ripple effect, not just on the coral reef ecosystems themselves, but also on the local economies that depend on them. Additionally, certain types of fishing gear can inflict serious physical damage to coral reefs, seagrass beds, and other important marine habitats.

Coral reef fisheries, though often relatively small in scale, may have disproportionately large impacts on the ecosystem if conducted unsustainably. Rapid human population growth, increased demand, use of more efficient fishery technologies, and inadequate management and enforcement have led to the depletion of key reef species and habitat damage in many locations. Coral reefs are formed by tiny animals that live in association with microscopic algae called zooxanthellae. These delicate relationships can be affected by different factors. Both increasing ocean temperatures and pollution are known culprits. However, it turns out that the bacteria found in plastic waste also disturbs this delicate relationship.

Researchers found that the presence of plastic debris increased the odds of corals getting sick—by a lot. Coral reefs from places contaminated with plastic had an 89% chance of developing a disease. In plastic-free regions, these odds were just 4%!

During the last decade, the marine resources of Aqaba have been under heavy pressure from different stakeholders: mass tourism, the construction of mega projects, and the increasing industrial activity and trade, which threaten this unique and vulnerable marine ecosystem. Many threats have been recorded within the study area by the team like diving density, snorkeling & swimming (visitor numbers), overfishing, trash/solid waste, Coral damage (partial mortality), etc. The level of these threats recorded from 1 very low to 5 very high. This level may change based on the activity seasons.

It was recorded that diving, snorkeling & swimming (visitor numbers) were the most threatened activities within the study area. Site number 9 (King Abdullah Reef North) was the highest site affected by the threats.

Table 10. Threats and pressure levels recorded within the study area.

Site No	Diving	Snorkeling & Swimming (Visitor numbers)	Fishing	Trash/Solid waste	Coral damage (partial mortality)
1	Moderate	High	Very Low	Very Low	Very Low
2	Low	Moderate	Very High	Moderate	Low
3	Very High	High	Very Low	Very Low	Low
4	High	Very High	Very Low	Very Low	Very Low
5	Very High	Very High	Very Low	Very Low	Very Low
6	Very High	Moderate	Very Low	Very Low	Very Low
7	High	High	Very Low	Very Low	Low
8	Very High	Very High	Very Low	Very Low	Very Low
9	Very High	Very High	Very High	Very High	Moderate
10	High	Very High	Very High	Low	Very Low
11	High	Very High	Very Low	Very Low	Very Low
12	Very Low	Very Low	Very Low	Very Low	Very Low
13	Moderate	Very Low	Very Low	Very Low	Very Low
14	Moderate	Very Low	Moderate	High	Moderate
15	Moderate	Very Low	Moderate	Moderate	Low