

**The Republic of Yemen
Ministry of Water and Environmnet
Environment Protction Authority**



**THE REPUBLIC OF YEMEN MARINE BIOTIC ECOSYSTEM
(RESOURCES-HABITATS AND SPECIES)**

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Introduction

Marine and human populations are the vast biomass that joins the coastal zones and islands with their surrounding seas world wide. The density of coastal economic development is increasing. Managing such ecosystem requires an integrated approach that ensure the multiple interests, use of resources for social or economic benefit for present and future generation so that the conservation of Biodiversity; sustainable use of its components are maintained. The coastline of Yemen extends to well over 2500Km and borders the Red Sea, the Gulf of Aden / Arabian Sea and Indian Ocean. Yemen also has a large number of islands in all its seas. The largest of which is Socotra Island in the Socotra Archipelago of the Indian Ocean. The unique geographical location of the country at the southern end of the Arabian Peninsula forms also the connection bridge between two large continents (Asia & Africa). This location endowed Yemen with a rich variety and greater number of plant and animal species, which are increasingly threatened by ever expanding human activities. The present disk assessment study describes the existing information on the unique Marine Biodiversity of Yemen.

Objective of the study

- Collect, review and evaluate existing information on Marine Biodiversity included within Yemen.
- Develop a concise description of the Marine Biodiversity including lists, tables.
- Identify the currently subsistence and economic uses of Marine Biodiversity.
- Identify activities and processes that threaten Marine Biodiversity of Yemen.

MARINE PHYSICAL ENVIRONMENT

The Yemen coast is characterized by its coastal plain between the marine waters and the mountain that parallels the shore line. The height of mountain influences the local weather, especially wind. Therefore, the land masses surrounding the Yemen Red Sea and Gulf of Aden / Arabian Sea are characterized by hot and dry climates with little vegetations. Strong winds blowing across these areas often carry sand and dust.

- *Meteorology*:-

- 1- *Winds*: - The southern Red Sea (S. latitude 20°N), Gulf of Aden / Arabian Sea are subject to the reversing monsoon. Because of the mountains, the winds blow into the Gulf of Aden / Arabian Sea from easterly direction during the NE monsoon and into the Red Sea from the SSE (October to May). While, during the SW monsoon (June to September) winds are blown from the NNW over the southern Red Sea and from SSW over the Gulf of Aden creating strong upwelling process along the southern coastal area (Morcos & Varley, 1990).
- 2- *The rainfall* over the Red Sea and its coastal region is usually small; in the form of short interval showers associated with thunder storms and occasionally associated with dust storms (Rushdi; etal, 1994). Rainfalls occur mainly during the period from October to March. It is subjected to great variations from year to year as it is usual in very dry climate (Morcos, 1970). The average annual rainfall over the southern region around Perim Island has a value of 43mm, where the maximum is

estimated to be equal to 50mm (Morcos, 1970). The high mountains surrounding the Red Sea have a great influence on its weather, notably the rainfall. This is due to the fact that the summer rains produced by the south-west monsoon, which after crossing the central Africa, it loses most of its moisture content before reaching the Red Sea (DouAbul & Haddad, 1996). Rainfalls along the western Gulf of Aden coast are light. However, most of rainfalls on the southern coastal area occur during the NE monsoon with annual fall of 129.5 for Aden and Riyan area (Can-Oxy, 1993). The SW monsoon brings very dry conditions to the western Gulf of Aden because most of its moisture was lost on the Somalia high lands.

3- *Evaporation*: - In the Red Sea the maximum evaporation occurs in November and minimum in May, with average annual evaporation from the whole Red Sea is 210cm yr^{-1} , (Morcos, 1970, 1990). There is no specific data covering the rate of evaporation in the Gulf of Aden / Arabian Sea.

4- *Tides and Tidal Current*: - Tides of the Red Sea follow a completely different pattern from those of the Gulf of Aden and the Indian Ocean. The tides are essentially oscillatory and mainly of semi-diurnal type. A difference of 6h between the times in the north and in the south, so that, when it is low water at the southern end, it is high water at the northern end and vice versa.

In the Gulf of Aden / Arabian Sea the tides are mixed diurnal and semi-diurnal type. There are two low waters and two high waters per day, but these are generally different. Tidal currents passing through constrictions caused by current formed sand bars, reefs, and islands commonly exceed $1\text{-}2\text{m sec}^{-1}$ (Sheppard; etal, 1992). Tidal currents importance is clearly recognized in providing the water movement necessary for active benthic biota, even in areas where there is little water exchange. In Babel-Mandab straits the tidal currents remains as far as 16°N . In the Gulf of Aden / Arabian Sea tidal currents are weak, where flood currents sets southeast and ebb currents flows in the opposite direction (DouAbul and Abubakr, 1996). Surface current in the southern Red Sea are drift currents depending on the wind which varies with monsoon blowing in the Arabian Sea (Edward, 1987, Morcos, 1970). The southerly currents (June-September) in the vicinity of Babel-Mandab reach a high values of 65cm s^{-1} (Morcos, 1990). During this time, the surface water of the Gulf of Aden flows out into the Arabian Sea as east-going current, which is replaced by the flowing water from the Red Sea via Babel-Mandab. This process is reversed during the NE monsoon (November to April), where surface water is directed from the Arabian Sea into the Gulf of Aden and to the Red Sea through the strait of Babel-Mandab. The prevailing SSE wind in the southern Red Sea reinforces the northern surface currents (Morcos, 1990).

5- *Salinity*: - The Red Sea is among the most saline water bodies of the world seas. The surface salinity decrease from 40-41 ‰ at the northern part to less than 36.5 ‰ near Perim Island. The northward increase in salinity is attributed to the evaporation and mixing of low saline Gulf of Aden surface in flow. The average annual salinity of the surface water (Upper 50m) in the Gulf of Aden / Arabian Sea is about 36.5 ‰ (Morcos, 1987).

6- *Nutrients*: - Nutrients in the form of nitrate, phosphate, ammonium and silicate are necessary for the growth and productivity of the phytoplankton. The Red Sea waters are generally very poor in nutrients, especially in the open waters compared to the Gulf of Aden (Weikert, 1987). In the southern part of the Red Sea and due to the effect of the inflow of rich water from the Gulf of Aden, nutrients are higher

than that of the central and northern Red Sea. Accordingly, primary productivity increases from north to south (Halim, 1984); with average annual production in the euphotic zone ranges within 500 to more than 1,000 mg C m⁻² d⁻¹ in the southern most part (250-500 mg C m⁻² d⁻¹, North of ≈ 17°N); (Weikert, 1987). The coastal area of the Gulf of Aden / Arabian Sea has a primary productivity of more than 1g C m⁻² d⁻¹ during summer, indicating that productivity and nutrients level are high, and (Sheppard; etal, 1992). This is due to the upwelling process characterized the region. The upwelling process along the southern coastal line of Yemen which brings cold, nutrient-rich water in the peak of summer is an event of considerable biological importance. This upwelling is responsible for the stimulation of brown algal growth as well as promoting primary production. The later supports the rich pelagic fisheries along the coast line.

Habitats

Critical Habitats

A critical habitat in the context of this report is defined as a habitat that is deemed to be crucial at some phase of the life-history of a particular species. Without this critical habitat, either the species could not fully complete its reproductive or breeding cycles, and/or the offspring could not reach sexual maturity.

Generally, all marine coastal habitats (e.g. mudflats, mangroves, seagrass beds, rocky reefs, coral reefs, continental shelf, etc.) will be critical to some species. Various marine and costal habitats have been identified as being critical to particular phases of the life histories of specific organisms. These habitats may provide refuges and/or territories that harbor resident populations, be part of migratory routes, spawning or breeding aggregation areas, juvenile nursery areas, or simply provide essential feeding opportunities, but these are by no means any less important to conserve and protect from degradation caused by human activities.

However, it is thought that threats such as habitat degradation are often contributing factors to the overall health of an ecosystem, and hence directly affect the populations of those species that any particular ecosystem may support. Such species might be listed in the threatened categories of the IUCN (i.e. Critically Endangered, Endangered and Vulnerable).

Soft-bottom habitats

Soft bottom habitats are important nursery areas for invertebrates and fish species, the juveniles of which use these sheltered areas (e.g. seagrasses, mangroves and salt marshes) to seek refuge from predators and also to feed on the organisms which thrive on the nutrients present in the trapped sediments. Although they account for only a small percentage of the aquatic habitat these healthy areas provide rich habitats, such as mangroves, salt marshes, seagrasses, algae, mud, sand and rocks, and support a wide array of invertebrate prey (e.g. mollusks and crustaceans) for fishes, as well as protection from fish predators. Soft bottom habitats are also particularly important areas in terms of nutrient recycling (e.g. the breakdown of mangrove detritus by shore crabs). Soft bottom habitats can also be dynamic (e.g. changeable) environments subject to flooding after heavy rainfall, which can markedly change salinity and/or water temperature.

The fact that many population centers in Yemen are located within close proximity to coastal and/or soft bottom habitats environments means that these habitats and their associated communities are often vulnerable to the effects of habitat degradation and overexploitation by humans.

Sub tidal rocky and rocky reef habitats

Much of the southern coastline of Yemen and most islands consist of rocky and rocky reef habitats in some shape or form. These habitats support a rich diversity of endemic invertebrate and fish species that contribute to the maintenance of healthy ecosystems. Threatened species that inhabit such rocky reef areas include the reef fishes, lobsters, rays, shark and turtles. Over fishing in general of fishes and invertebrates is the most common threat to sub tidal rocky reef fish communities.

Continental shelf habitats (0 - 200m)

Continental shelf habitats (including coral reefs, surf beaches, rocky headlands, etc.) harbor most of the well-known fishes that occur worldwide (Paxton, 1998). Continental shelves around the world have supported large fisheries over hundreds of years of continuous exploitation. Many of the species that occur in continental shelf habitats are now showing signs of over fishing. Fishes living in continental shelf waters are prone to the effects of both habitat degradation and over fishing, and are often some of the first fishes to become threatened due to the accessibility of the waters in which they occur.

The coast line of Yemen is characterized by a variety of habitats which supports a closely inter-linked and forms a unified system of major ecological and economical importance. Table (1) presents an over view of the main coastal / marine habitats of Yemen and their occurrences. Among these habitats a number of sites are of special scientific, ecological and economical interest along the coast line of Yemen (Table 2). Marine / coastal habitats are endowed and combined with a high biodiversity in terms of total number of flora and fauna species. They also provide natural ecosystems suitable for almost all kinds of commercial fisheries.

The flora and fauna of the Yemeni marine ecosystems are mainly of the Indo-pacific origin, with high percentage of endemic species. Previous studies had largely focused on the description, distribution; potential and the state of health of their habitats. These studies which clarified the general biota patterns were investigated by IUCN (1987a, b), Price; etal (1987), EH&A (1989), Can-Oxy (1993), Dekker and Capelle (1994), Rushdi; etal (1994), MA&P (1996a, b); DouAbul and Haddad (1996).

Table (1): Main coastal and marine habitats of ecological importance

<i>Coral reef</i>	<i>Mangrove</i>	<i>Palm trees</i>	<i>Reed & Halophyte</i>	<i>Rock / Algal</i>	<i>Sabkha</i>	<i>Seagrass Beds</i>	<i>Turtle Nesting Sites</i>
Abu Zahr	Al Khawbah	Abu Zahr	Ahwar	Al Fataq	Al Luhayah	Al Jabanah	Al Quirm
Abdel Kuri Is.	Al Luhayah	Ahwar	Qaw'a	Al Hami	Al Mukha	Al Urj	Ahwar
Al Mukha	Al Urj	Al Fazzah	Ras Imran	Al Qiran	Al Urj	Ar Rauys	Al Fataq
Bir Ali - Balhaf	Ar Rauys	Al Jabanah	Socotra Is.	Burum	Dhubab	Bab El-Mandeb	Al Kawkhah
Broum	Dhubab	Al Manzar	Wadi Riam	Damqut	Gholayfigah	N. Dhubab	Al Khobat
Creater Aden	Habl	Al Mujaylis	N. Mujaylis	Fowa	Habl	Habl	Al Raydah
Darasa Is.	Kamaran Is.	Al Urj	Al Fazzah	Jebel Swada	Mawshij	Khor Kalfut	Ar Ruays
N. Dhubab	Midi	Az Zahari	N. Az-Zahari	Khor Kalfut	Midi	Khor Omairah	Areha
Humar Is.	N.Bab El-Mandeb	Gholayfigah		Ras Qaw'a	Salif	Mawshij	Hunish Is.
Hunish Archi.	Salif	Nukhaylah		Ras Dharbat Ali	E. Ras Omran	Midi	Islands near Midi
Khor Omairah	Shouran(Bir Ali)	Qatabah		Shehir/Dhabbah	Wadi Hassan delta	Nukhaylah	Jebal Al Raydan
Ras Fartak	Socotra Archi.	Shuheer		East Shuqra		Salif	Sarma Jithmoun
Ras Isa		N.Wadi Raim		Yetnoon		Socotra Archi.	Khor kalfut
Samha Is.		Yakhtul		Gosier		Qatabah	Maabut
Shuqra		Ar Ruays				S. Mawshij	N. Dhubab
Socotra Archi		Aden				Ras Al Arah	Shehir/ Dhubab
Tikfash Is.						Suquiah	Socotra
Ukban Is.							Zugar Is.
Yakhtul							
E. Nishtoon							
Monoq							
N. Ibn Abbas							
Hodeidah							

Table (2): Coastal Marine Sites of Special Scientific and Ecological Interest along the coastal line of Yemen (IUCN, 1987; MAE, 1989; Rushdi; etal, 1994)

Site	Interest	Source
Perim Island	Coral reefs, hard bottom communities	Ghadaf & Stim, 1983
Ghuraira Lagoon	Coral reefs, hard bottom communities	Ghadaf & Stim 1983
Ras al Ara	Offshore shallows	Red Sea & G. of Aden Pilot, 1967
Khor Omaira	Large protected bay, turtle feeding and breeding, sea grass, shellfish, mariculture potential.	CEMP, 1985
Bandar Fuqum	Shallow bay, rich fishing	CEMP, 1985
Ras Abu Quijara	Rocky shores, submarine hard bottom communities, coral fields	Ghadaf & Stim, 1983
Farisi Lagoon	Mud flats, bird and fish food resources	CEMP, 1985
Aden Inner Harbor	Mud flats, bird and fish food resources	CEMP, 1985
Khormaksar Beach	Exposed sandy beach	CEMP, 1985
Shuqra	Offshore rocks, coastal reef	RS & Gulf of Aden Pilot, 1967
Jabal Shouran	A crater filled with salt water, reportedly fringed with overhanging mangroves	Red Sea & G A Pilot 1967
Ghadarain Islets	Rocky communities, sea birds	Red S & GA Pilot 1967
Baraqa Islet	Rocky communities, sea birds	Red S & GA Pilot 1967
Bandar Barum	Coastal reef	Red S & GA Pilot 1967
Ras Sharma/ Jithmoun	Turtle breeding ground	MA&P, 1996 & DouAbul & Abubakr 1996
Ras Fartak	Rocky communities, sea grass	CEMP 1985
Nishtun	Rich fishing grounds, rock and muddy bottoms	CEMP 1985
Liban	Unique terrestrial/marine environment, turtles	Ghadaf and Stim 1983; Sheppard, 1995
N-Midi	Seagrass, Mangrove & Recreational sandy beach.	IUCN 1987
N-Habl	Seagrass, Mangrove & Recreational sandy beach, focal point for wild life of the region.	IUCN 1987
Al-Luhayah	Seagrass , Mangrove , Reefs on Humar Island	IUCN 1987
Ukban Island	Sandy beach, coral reef, fossil reef, fisheries area / nursery ground.	IUCN 1987
Ibn Abbas	Mangrove, Seagrass, nursery / breeding / feeding areas.	IUCN 1987
Al-Salif	Mangrove	IUCN 1987 ; Rushdi, etal 1994
Ras Isa	Coral reef , Sandy beach , Focal point for coral reef associated species .	IUCN 1987 ; EH & A 1987 ; Rushdi, etal 1994
Al-Manzer to Ghulayfiqah	Silt flats , dunes , sandy beach , palm trees , nursery / feeding / breeding areas	IUCN 1987
Al-Fazzah	Palm sand, reed beds, focal point for the wild life of the region.	IUCN 1987
Abu-Zahr	Sand beach , palms , seagrass , coral areas , ideal location for recreational / educational establishment	IUCN 1987
Mawshig	Coral reef, Nursery / feeding / breeding ground for reef fish and turtles, Recreational resource.	IUCN 1987
Ar Ru'ays	Sandy beach, palms, seagrass, Mangrove, salt ponds or sabkhat.	IUCN 1987
N-S Al-Mukha	Coral reef & occasional seagrass beds.	IUCN 1987 ; Rushdi, etal 1994

MARINE FLORA

Phytoplankton

Phytoplanktons are primary producers or autotrophs, that is, they use energy from sunlight to produce the bulk of their own substance from simple inorganic components. Primary factors that can limit photosynthesis rate are sunlight and nutrients which include nitrogen, phosphorus, silicon, carbon and many others in trace amounts. The standing crop or biomass of phytoplankton is limited not only by the photosynthetic rate, but also by the grazing of secondary producers such as zooplankton and fish (planktivores), and to a lesser extent, temperature. The standing stock of phytoplankton is measured by the rate of carbon fixation per unit area of ocean surface ($\text{mg C} / \text{m}^2 / \text{day}$), by enumeration of the number of cells per unit volume (cells / L) or by amount of chlorophyll *a* present per unit volume ($\text{mg chl } a / \text{m}^3$).

In upwelling systems, essential nutrients are supplied to the upper layers of the water column through physical transport of the deeper-, nutrient rich-waters. As a consequence, upwelling waters are the most productive waters in the world oceans. Mean annual primary productivity in ocean communities has been reported as 300, 100 and 50 $\text{g C} / \text{m}^2 / \text{year}$ for upwelled, continental shelf, and oceanic waters respectively (Parsons *et al*, 1984). Under suitable conditions of nutrients, light, temperature and sufficient seed population, a phytoplankton bloom occurs. During a bloom, cell reproduction is at a maximum and densities in the Gulf of Aden may exceed millions of cells / L (Stirn *et al*, 1985). Abundance of phytoplankton reaches a minimum in spring and peaks in summer and fall (Stirn *et al*, 1985). Spatial variation of phytoplankton biomass is also apparent in the Gulf of Aden. On a larger scale, Halim (1984) indicates chlorophyll *a* concentrations vary markedly with the two monsoon seasons. These variations are due to a combination of: a) physical processes such as upwelling, water column structure and gyres; b) chemical factors such as nutrients availability; and c) biological factors such as grazing pressure and initial patchiness of seed stock.

Inorganic phosphate and silicon concentrations are above limitation levels throughout the year according to Stirn *et al*, (1985). Monthly averages of phosphate rarely fell below $0.4 \mu\text{M P-PO}_4$ while silicate values remained above $0.4 \mu\text{M Si-Si (OH)}_4$.

Three major groups of phytoplankton account for the bulk of phytoplankton in all waters. These are: diatoms, flagellates and coccolithophores. In the Gulf of Aden, diatoms dominate over dianoflagellates which in turn dominate over coccolithophores during the pre-monsoon period (Mutlag *et al*, 1992).

The plankton community of the Yemen Red Sea / Gulf of Aden waters shows that the majority of species are of Indo-Pacific origin. A total of 206 species of diatoms and dinoflagellates was reported by Halim (1969), from the Red Sea, Gulf of Aden / Arabian Sea. However; 32 species of which are restricted to the southern section of the Red Sea and Gulf of Aden. A total of 56 species of phytoplankton were recorded from Ras Isa peninsula offshore water (EH&A, 1989). Another 21 species were also recorded from Khalij Kamaran (Rushdi; *etal*, 1994). This bring the total of species number recorded to about 283 species of phytoplankton from Yemeni waters of the Red Sea; Gulf of Aden / Arabian Sea . Annex (1) lists a total of 147 species identified from the Yemeni Red Sea neritic zone.

Previous studies were either limited to certain areas of regional nature or being occurred in the international water with no emphases on the Yemeni water .

A list of 130 phytoplankton species were recorded from the Gulf of Aden in February and May 1985 by Mutlag; etal (1992). Dominant species were found to be : the diatoms *Nitzchia closterium*, *N. delicatissima*, *Chaetoceros anastomosans*, *C. compressus*; *Bacteristrum delicatulum* and *Lepotocylindrus danicus*; the dinoflagellates *Gymnodium sp.* and *Goniaulax minima*; and the coccolithophores *Pontosphaera huxbyi*; *P. Pellucida* and *Coccdithus leptopus*. It was difficult to get hold of this study for the purpose of knowing the full name of species listed.

Benthic Flora

Two distinct types of plants exist in the Yemen benthic environment; large marine algae (Kelps and rock weeds) and flowering plants (Seagrass and mangrove). As will all primary products, benthic flora plays an important role in deriving energy from the sun and passing it up the food chain. Benthic flora is therefore limited to waters which are sufficiently shallow to allow penetration of sunlight in adequate quantities for photosynthetic processes.

Macroalgae such as Kelps are attached to the substrate with a hold fast. This attachment system limits their distribution to rocky shores. They occur below the low-tide level so that their large blades or lamina may be constantly bathed in nutrients. Rock reeds also require a rocky substrate, but occur chiefly between high and low-tide levels where they are adapted to withstand periods of drying.

The marine macroalgae of Yemen have received little direct attention. The flowering benthic plants (seagrasses) have a true root system and are usually found in more sheltered areas than macroalgae. Their roots must be able to penetrate the substrate and hence they are found in softer, more sedimented substrate than macroalgae.

Generally, benthic flora (algae and seagrass) pass their energy along through direct grazing and by providing organic matter to detritivores. Herbivores, such as abalone, sea urchins, gastropods, dugongs, and turtles consumed seagrass and algae directly. However; a large part of the organic material enters the energy web via the detritus and filter feeding chains. For example, wave action continually erodes the tips of the plants, releasing small particles of organic matter into the water. These in turn can be utilized by zooplankton, bacteria and accumulation of organic and inorganic matter among their blades and stems providing direct food source for some invertebrates and fishes. They harbor juveniles of various commercial fish and crustaceans forming nursery areas. Seagrass may also play an important role in promoting the stabilization of the seabed against wave action and other erosion forces. Fisheries associated with these habitats are particularly rich and abundant; such as the substantial fisheries resources off the coast of Hadramawt and Al-Mahara (algal beds) and Penaeid shrimp off the coast between Al-Salif, Midi and south west of Hodeidah in the Red Sea (Seagrass beds).

A total of 39 species represented 4 genera of marine algae were recorded from the intertidal area between Dhubab-Yakhtul and Al Salif-Al Urj in the Red Sea (Rushdi; etal 1994). The area to the north of Al Hudeidah was dominated by *Sargassum sp.*; whereas the reef flat to the North of Dhubab is dominated by a dense stands of the green algae *Caulerpa mexicana* and the brown macroalgae *Dectyota liturata* (IUCN, 1987) .

The occurrence of algae in the southern sub tidal area is mainly concentrated in Hadramout and Al Maharah regions due to the high primary productivity of the upwelling system. A total of 153 species belonging to 3 genera (Chlorophyta = 46 ; Phaeophyta = 23 ; Rhodophyta = 84) were recorded from the area between Mukalla and Gosier in Hadramout Governat (Ormond & Banaimoon, 1994) . The marine flora of the area between the west of Hadramout and Babel-Mandeb has received little or almost no attention. However; the area between Ras Oawa'a and Babel-Mandab is dominated by *Sargassum sp.* with little *Codium sp.* & *Padina sp.* . A diverse community of brown algae *Dictyota*, *Padina* & green algae *Halimeda* and *Udotea* were recorded from the intertidal zone between Shugra and Ahwar (DouAbul & Abubakr, 1996) . The sub tidal area of Socotra Archipelago supports about 24 species of macroalgae. Table (3) lists marine algal species recorded from the Yemeni sub tidal area.

Table (3): Algae, seagrass & halophytes species list from the Yemeni marine waters (IUCN, 1987; Ormond & Banaimoon, 1994; Rushdi, etal, 1994; DouAbul & Abubakr, 1996; MAE, 1996b)Numbers indicate: (1) Red Sea, (2) Gulf of Aden, (3) Socotra Archipelago.

Cholorophyta	<i>Caulerpa occidentalis</i>	3
<i>Enteromorpha clathrata</i>	<i>Codium elongatum</i>	2
<i>Enteromorpha compressa</i>	<i>Codium iyengarii</i>	2
<i>Enteromorpha flexuosa</i>	<i>Codium tomentosum</i>	2
<i>Enteromorpha intestinalis</i>	<i>Codium sp.</i>	2
<i>Ulva fasciata</i>	<i>Codium dwarkense</i>	3
<i>Ulva lactuca</i>	<i>Halimeda tuna</i>	1/2/3
<i>Ulva cf. pertusa</i>	<i>Halimeda papyracea</i>	2
<i>Ulva cf. rigida</i>	<i>Halimeda cf. renschii</i>	2
<i>Chaetomorpha antennina</i>	<i>Udotea indica</i>	2
<i>Chaetomorpha aerea</i>	<i>Udotea palmetta</i>	2
<i>Chaetomorpha capillaris</i>	<i>Struvea anastomosans</i>	2
<i>Chaetomorpha crassa</i>	<i>Struvea sp.</i>	2
<i>Cladophora koiei</i>	<i>Siphonocladus tropicus</i>	2
<i>Cladophora nitellopsis</i>	<i>Chlorodesmis hildebrandtii</i>	2
<i>Cladophora prolifera</i>	<i>Turbinaria sp.</i>	2
<i>Cladophora sericoides</i>	<i>Rosenvingea sp.</i>	2
<i>Cladophora vagabunda</i>	<i>Rhizoclonium kochianum</i>	1
<i>Boodlea composita</i>	<i>Valonia spp.</i>	1
<i>Valoniopsis pachynema</i>	<i>Pradiola spp.</i>	1
<i>Bryopsis pennata</i>	<i>Ulothrix spp.</i>	1
<i>Bryopsis pennata var. leprieurii</i>	<i>Chaetomorpha sp.</i>	3
<i>Bryopsis pennata var. secunda</i>	<i>Cladophora sp.</i>	3
<i>Caulerpa cupressoides</i>	<i>Dictyosphaeria cavernosa</i>	3
<i>Caulerpa crpressiodes var. lycopodium</i>	<i>Enteromorpha sp.</i>	3
<i>Caulerpa fastigiata</i>	<i>Halimeda macroloba</i>	3
<i>Caulerpa racemosa</i>	<i>Spongocladia vaucheriaeformis</i>	3
<i>Caulerpa racemosa var. peltata</i>	<i>Ulva (?)rigida tropica</i>	3
<i>Caulerpa racemosa var. macrophysa</i>	Phaeophyta	
<i>Caulerpa racemosa var. turbinata</i>	<i>Dictyopteris delicatula</i>	2
<i>Caulerpa mexicana</i>	<i>Dictyota ceylanica</i>	2
<i>Caulerpa scalpelliformis</i>	<i>Dictyota devaricata</i>	2
<i>Caulerpa sertularioides</i>	<i>Dictyota dichotoma</i>	2
<i>Caulerpa serrulata</i>	<i>Dictyota liturata</i>	1
<i>Caulerpa prolifers</i>	<i>Dictyota spp.</i>	3
<i>Caulerpa laptevirens</i>		
<i>Caulerpa floridana</i>		

<i>Ectocarpus</i> spp.	1	<i>Gelidiella acerosa</i>	2
<i>Padina gymnospora</i>	1/2/3	<i>Gelidium pusillum</i>	2
<i>Padina tetrastromatica</i>	2/3	<i>Pterocladia nana</i>	2
<i>Padina pavonica</i>	2	<i>Pterocladia cf. capillacea</i>	2
<i>Padina</i> sp.	2	<i>Grateloupia filicina</i>	2
<i>Padina boryana</i>	1/3	<i>Halymenia floresia</i>	2
<i>Spatoglossum asperum</i>	2	<i>Halymenia venusta</i>	2
<i>Spatoglossum variabile</i>	2	<i>Halymenia durvillaei</i>	2
<i>Stoechospermum marginatum</i>	2	<i>Amphiroa anceps</i>	2
<i>Colpomenia sinuosa</i>	2	<i>Jania capillacea</i>	2
<i>Myriogloi sciurus</i>	2	<i>Portieria hornemannii</i>	2
<i>Jolyna laminarioides</i>	2	<i>Gracilaria canaliculata</i>	2
<i>Cystoseira trinodis</i>	1/2	<i>Gracilaria corticata</i>	2
<i>Cystoseira myrica</i>	1/2	<i>Gracilaria dentata</i>	2
<i>Sargassum binderi</i>	1/2/3	<i>Gracilaria foliifera</i>	1
<i>Sargassum asperifolium</i>	2	<i>Gracilaria foliifera f. aeruginosa</i>	2
<i>Sargassum boveanum</i>	1/2	<i>Gracilaria cf. millardetii</i>	2
<i>Sargassum duplicatum</i>	2	<i>Gracilaria textorii</i>	2
<i>Sargassum ilicifolium</i>	2	<i>Gracilaria verrucosa</i>	2
<i>Sargassum latifolium</i>	2	<i>Gracilaria</i> sp.	2
<i>Sargassum</i> sp.	2	<i>Gracilariopsis lemaneiformis</i>	2
<i>Sargassopsis zanardinii</i>	2	<i>Polycavernosa debilis</i>	2
<i>Turbinaria elatensis</i>	1	<i>Meristotheca papulosa</i>	2
<i>Colpomenia sinuosa</i>	3	<i>Sarconema filiforme</i>	2
<i>Pocockiella variegata</i>	3	<i>Sarconema scinaoides</i>	2
<i>Turbinaria</i> sp.	3	<i>Solieria dura</i>	2
<i>Cytoseira</i> sp.	3	<i>Solieria robusta</i>	2
<i>Lithothamnium</i> sp.	3	<i>Agardhiella</i> sp.	2
<u>Rhodophyta</u>		<i>Hypnea cornuta</i>	1
<i>Porphyra vietnamensis</i>	2	<i>Hypnea musiformis</i>	2
<i>Porphyra cf. Denticulata</i>	2	<i>Hypnea pannosa</i>	2
<i>Palmaria palmata</i>	2	<i>Hypnea valentiaea</i>	2
<i>Palmaria</i> sp.	2	<i>Botryocladia leptopoda</i>	2
<i>Dermonema frappieri</i>	2	<i>Botryocladia leptopoda f. luxurians</i>	2
<i>Galaxaura marginata</i>	1/2	<i>Coelarthrum muelleri</i>	2
<i>Galaxaura obtusata</i>	2	<i>Coelarthrum opuntia</i>	2
<i>Scinaia fascicularis</i>	2	<i>Rhodymenia cf. dissecta</i>	2
<i>Scinaia hatei</i>	2	<i>Rhodymenia cf. australis</i>	2
<i>Scinaia indica</i>	2	<i>Lomentaria squarrosa</i>	2
		<i>Champia globulifera</i>	2

<i>Champia parvula</i>	1/2	<i>Gelidium crinale</i>	1
<i>Champia plumosa</i>	2	<i>Jania</i> spp.	1
<i>Champia somalensis</i>	2	<i>Liagora distenta</i>	1
<i>Gastroclonium iyengarii</i>	2	<i>Corallina</i> spp.	1
<i>Callithamnion</i> cf. <i>cordatum</i>	2	<i>Melobesia</i> spp.	1
<i>Callithamnion</i> sp.	2	(?) <i>chondria</i> sp.	
<i>Centroceras clavulatum</i>	2	<u>Xanthophyta</u>	
<i>Ceramium flaccidum</i>	2	<i>Dichotomosiphon</i> spp.	1
<i>Ceramium strictum</i>	2	<u>Halophytes (Socotra)</u>	
<i>Ceramium taylorii</i>	2	<i>Arthrocnemon macrostachium</i>	
<i>Ceramium transversale</i>	2	<i>Acuplex farinosa</i>	
<i>Ceramium</i> cf. <i>tenuissimum</i>	2	<i>Aeluropus lagopoides</i>	
<i>Ceramium</i> sp.	2	<i>Arzoon canariensi</i>	
<i>Spyridia filamentosa</i>	2	<i>Aerva microphyla</i>	
<i>Crouania</i> sp.	2	<i>Commicarpus simonyi</i>	
<i>Griffithsia</i> cf. <i>globifera</i>	2	<i>Heliotropium socotranum</i>	
<i>Wrangelia sceptrafer</i>	2	<i>Halopyrum mucronatum</i>	
<i>Wrangelia</i> cf. <i>globifera</i>	2	<i>Indigofera nephrocarpa</i>	
<i>Dasya elongata</i>	2	<i>Limonium cyndrilifolium</i>	
<i>Dasya baillouviana</i>	2	<i>Odyssea mucronata</i>	
<i>Dasya ocellata</i>	1	<i>Sueda</i> sp.	
<i>Heterosiphonia crispella</i>	2	<i>Tephrosia apollinea</i>	
<i>Acanthophora muscoides</i>	2	<i>Tamarisk</i> cf. <i>muscatensii</i>	
<i>Acanthophora spicifera</i>	2	<i>Zygophyllum</i> aff. <i>quaterensi</i>	
<i>Chondria dasyphylla</i>	1/2	<i>Zygophyllum</i> sp. (cf. <i>album</i>)	
<i>Chondria sedifolia</i>	2	<u>Seagrass</u>	
<i>Herposiphonia</i> cf. <i>secunda</i>	2	<i>Halophila stipulacea</i>	1
<i>Laurencia</i> cf. <i>elata</i>	2	<i>Halophila ovalis</i>	1/2
<i>Laurencia paniculata</i>	1	<i>Halodule uninervis</i>	1/2/3
<i>Laurencia obtusa</i>	2	<i>Thalassodendron ciliatum</i>	1
<i>Laurencia papillosa</i>	2	<i>Thalassia hemprichii</i>	1
<i>Laurencia parvipapillata</i>	2	<i>Cymodocea serulata</i>	1/2/3
<i>Laurencia pinnatifida</i>	2	<i>Cymodocea rotundata</i>	1/2
<i>Laurencia</i> cf. <i>paterntiramea</i>	2	<i>Enhalus acoroides</i>	1
<i>Laurencia</i> sp.	2	<i>Syringodium isoetifolium</i>	1
<i>Melnothamnus somalensis</i>	2	<u>Mangrove</u>	
<i>Polysiphonia crassicolis</i>	1/2	<i>Avicennia marina</i>	1/3
<i>Polysiphonia variegata</i>	2	<i>Rhizophora mucronata</i>	1
<i>Polysiphonia</i> sp.	2		
<i>Lithothamnium</i> spp.	1		

Seagrass beds:- A total of 9 species of the seagrasses are recorded from the Yemen Red Sea sub tidal area on a wide range of substrates from mud to coarse sand along 42% of the coastline (IUCN 1987) (Table 3) . Table (2) named the main location of seagrass beds. The *Halodule uninervis*, *Halophila ovalis*, *Cymodocea serrulata* and *C. rotundata* were the only seagrass species recorded from the southern coastal area; their distribution is limited to Khor Omira, Ras Al-Ara to Suquiah and West of Mashhour to Babel Mandab, (DouAbul & Abubakr, 1996) *Halodule uninervis*, *Halodule sp.* And *Cymodocea serrulata* were the only seagrass species reported from Socotra Archipelago water (MAE, 1996 b).

The importance of seagrass beds is very high due to their high primary productivity which is enhanced by large number of epiphytes. Decaying materials enter the detritus food chain; aid in stabilization of the seabed against wave action and other erosion forces. Moreover, they promote sedimentation and accumulation of organic and inorganic matter, providing direct food source for some invertebrates, fish, dugongs and turtles. They also harbor juveniles of various commercial fish and crustaceans, forming nursery areas.

Mangrove:- Mangrove is an important biological feature of Yemeni coast along the Red Sea . Two species of mangrove were recorded from the Yemen Red Sea coastal area; *Avicennia marina* and *Rhizophora mucronata*. The former species is widely spread both on main land and on some offshore island (Table 2).

The total area of *A. marina* in Yemen Red Sea form 12% of the coastal strip with 100-200m wide and up to 5m high. The majority of mangrove stand occurs to the North of Al-Urj; where as the large stand occur around the Oreste point on the Yemen / Saudi border and Al-Luhayah / Bahr Ibn Abbas area. *R. mucronata* was recorded from a small island of one hectare area in Khor Kathib near Al-Hudeidah, However; Kamaran Island supports a large and healthy stand of this species. In the Southern coastal area a small stand of *A. marina* was reported from one site near Bir-Ali. This species is also recorded from Socotra Archipelago (MAE, 1996a, b).

There are many factors which restricted the distribution of mangrove along the Yemeni coast such as tidal range, degree of shelter, limited freshwater input and desertification. However; mangrove swamps accumulate and retain sediments; preventing coastal erosion and form an oasis of high primary productivity in an otherwise barren zone (Jones; etal 1987). Mangrove swamps provides the basis for many important marine food chain. Their leaves fall into the water where they decomposed. The resulting detritus and bacteria provide food for meiofauna, mollusks and crustaceans including some commercially important species of shrimps. They also provide nursing sites for a range of offshore and sea birds including the Red Sea Reefherons, Spoonbill pelican, Ospreys and African collared doves. Table (4) lists the main fauna groups associated with the Yemen Red Sea mangrove swamps (Rushdi; etal, 1994).

Halophytes:- Halophytic vegetation usually occurs where a fresh ground water supply is limited or absent and where saline intrusion is rare. Sabkhahs along the coastal line of Yemen support high densities of these salt bushes. Five species of halophytes were recorded from the Red Sea coastal area of Yemen, where as 16 species were recorded

from Socotra Archipelago coastal plan (Rushdi; etal, 1994, MA&E, 1996b), (Table 3).
The Red Sea species were:-

- 1- *Odyssea mucronata* .
- 2- *Halopeplis perfoliata* .
- 3- *Arthrocnemum glaucum* .
- 4- *Zygophyllum album* .
- 5- *Suaeda fruticosa* .

This type of flora has the ability of limiting beach erosion and allows other less tolerant species to germinate. Succulents species like *Z. album* & *S. fruticosa* and dune grasses (Gromineae) usually form a stabilizing factor of sand transport along the edges of the Sabkhah with high densities south of Al-Khawkha and Al-Mukha. *O. mucronata* was more common between Al-Hudeidah and Al-Mukha. Halophytic vegetation supports a variety of fauna such as insects and birds. They may also provide nesting places for several sea birds. Moreover; they form a grazing ground for goats and camels.

Fresh water vegetation:- Freshwater dependent vegetation may be defined as those plants which have a relatively low salinity tolerance and require an almost continuous supply of freshwater (IUCN, 1987) . Therefore, this type of vegetation is restricted to the coastal area where the fresh water source is close to the surface (10cm deep) in Al-Urj, Al Khawkhah and Yakhtul .

Four species of fresh water dependent vegetations were recorded from the Yemen coastal area of the Red Sea, Gulf of Aden / Arabian Sea and Indian Ocean. The first of which is the date palm *Phoenix dactylifera* with a distribution covers most of the area between Al-Hudeidah and Yakhtul, in the Red Sea region and Ahwar in the Gulf of Aden (Table 2) . Date palms have an important socio-economic rule for the region forming a good source of income for farmers and employment.

The second species was the Dom palm *Hypaene thebaica* which recorded from Al-Urj and Al-Jabanah north of Al-Hudeidah. This species is used as a source of fire wood for cooking and making ropes and mattress. Palm like trees *Pandanus odoratissimus* were recorded from only two sites in the Red Sea coastal plain of Al-Mujaylis and Al-Fassah. *Salvadora persica* trees dominate the inland area south of Al Mukha toward Dhubab in the Red Sea and Between Ras Qawa'a and Khor Omirah. *S. persica* roots are used as tooth brush by many people. Coconut trees nourished along the eastern section of the southern coastal area of Yemen.

Reeds and Grasses are usually associated with Dom and palm trees and form grazing habitats for goats and sheeps. Birds, Foxes and domestic animals are the most inhabitants of the fresh water vegetated habitats.

Table (4): Fauna groups & species associated with Mangrove swamps along the coast line of Yemen Red Sea (After Rushdi, etal 1994)

<p><u>Spongia</u> <i>Heteronema erecta</i> <i>Bajulus laxis</i> <i>Biemna fortis</i></p> <p><u>Coelenterate</u> <i>Cytasis nassa</i> <i>Cryptodendrum spp.</i></p> <p><u>Polychaeta</u> <i>Glycera spp.</i> <i>Armandia spp.</i> <i>Marphysa mossambica</i></p> <p><u>Mollusca</u> <i>Trochus erythreus</i> <i>Cerithidea cingulata</i> <i>Nerita polita</i> <i>Nerita undata</i> <i>Littorina scabra</i> <i>Strombus tricornis</i> <i>Strombus mutabilis</i> <i>Conus tessulatus</i> <i>Conus arenatus</i> <i>Terebralia palustris</i> <i>Cerithium scabridum</i> <i>Planaxis sulcatus</i> <i>Modiolus auriculatus</i></p>	<p><u>Crustacea</u> <i>Gonodactylus chiragra</i> <i>Gonodactylus demani</i> <i>Balanus amphitrite</i> <i>Penaeus semisulcatus</i> <i>Penaeus hathor</i> <i>Metopograpsus messor</i> <i>Uca inversa</i> <i>Uca vocans</i> <i>Uca tetragonan</i> <i>Uca lactea albimana</i> <i>Uca urvillei</i> <i>Dotilla sulcata</i> <i>Eurycarcinus natalensis</i></p> <p><u>Echinodermata</u> <i>Echinometa mathaei</i> <i>Echinotrix calamaris</i> <i>Diadema setosum</i></p> <p><u>Insects</u> <i>Lacusta migratorius</i> <i>Schistolerca gregaria</i></p> <p><u>Birds</u> <i>Egretta gularis</i> <i>Platalea leucoralia</i> <i>Pandion haliactus</i> <i>Streptoelia roseogrisea</i></p>
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Marine Fauna

Zooplankton:- Zooplankton organisms include a much more diverse assemblage than phytoplankton, but fewer in numbers and less total biomass. Zooplankton comprises most of the primary consumers in the marine biotopes.

Little has been done to study the zooplankton of the Yemeni marine environment weather in the Red Sea or Gulf of Aden / Arabian Sea. A total of 139 species of zooplankton were recorded from the Yemeni water (Annex 2); representing 9 main groups as follows:

1- Protozoan Tintinnids	55 sp.
2- Chondrophora and Siphonophora	12 sp.
3- Scyphomedusa	10 sp.
4- Ostracods and Cladocera	7 sp.
5- Copepods	34 sp.
6- Decapoda	1 sp.
7- Chaetognatha	11 sp.
8- Echinodermata	2 sp.
9- Tunicates	7 sp.

Many types of invertebrates and fishes have larval stages that are planktonic, and numerous other animals float and drift throughout their life cycle. Planktonic larvae of benthic fauna form the major proportion of the plankton population of the near shore water during summer due to the high density of benthos in the shallower water and the small distance from the bottom.

Eggs and larvae of polychaets, mollusks, copepods, cirripeds, decapods, echinoderms and fish were the most intensively distributed in this area where most of the benthic groups are represented, thus enriching the plankton biomass and diversity (table 5) (EH&A, 1989 Rushdi,etal, 1994). The distribution range of the Gulf of Aden zooplankton extends to the southern part of the Red Sea where Hanish sill forms the maximum limits (Beckmann, 1984). The decapods shrimp and Ichthyoplankton (eggs & larvae) compose the most important group of the zooplankton, since they are the basis of any renewable fishery stocks. Shrimps, pelagic fish lay their eggs in shallow coastal water at the favor of optimal temperatures, foods and currents favorable to their migration and secure their survival.

Table (5): Zooplankton copepod species recorded from the Gulf of Aden through to Hanish sill (Beckmann, 1984)

<i>Eucalanus crassus</i>	<i>Globorotalia menardii</i>
<i>Eucalanus attenuatus</i>	<i>Tomopteris sp.</i>
<i>Eucalanus elongatus</i>	<i>Bivalvia larvae</i>
<i>Rhincalanus nasutus</i>	<i>Haloptilus acutifrons</i>
<i>Rhincalanus cornutus</i>	<i>Haloptilus longicornis</i>
<i>Mecynocera clausi</i>	<i>Copepoda nauplii</i>
<i>Mormonilla sp.</i>	<i>Cirripedia larvae</i>

Benthic Fauna

The fauna of the Yemeni water is derived from the huge Indo-Pacific fauna. Biological studies in the area of Yemen and surrounding waters have largely focused on coral reef, beginning in the 18th century and continuing to the present (for review see Mergner, 1984; Sheppard & Sheppard, 1991). Other habitats and fauna have received less attention. The most extensive studies of habitat fauna of the Yemeni water are those of IUCN (1987a, b); EH&A (1989); Rushdi, et al (1994); Dekker & Capelle (1994); MA&P(1996a,b); DouAbul & Abubakr(1996).

Bottom fauna includes organisms that live in/on marine bottoms from the supralittoral to great depths. They form characterized communities for the different ecosystem zones. The marine coastal zone of Yemen is formed from three zones as any where else in the world. These zones are:

- 1- Supralittoral (Littoral) fringe: - This zone represents the top marginal belt of the littoral zone and is an arid area influenced by the spray and wetted by waves only in rough weather or by extreme spring tide.
- 2- Eulittoral (Midlittoral) zone: - This area includes the major part of the intertidal region which is alternately exposed and submerged by the high and low tides. In this zone, the representation of organisms is higher than that in the former zone and is well adapted to withstand the fluctuating conditions such as temperature, light, salinity, etc.

In rocky shores of Yemen in Ras Isa, Babel-Mandab, Aden, Hadramout and Al-Mahara show pattern of zonation in their distribution in the midlittoral region. The reason for the zonation pattern is due to the different in the ability to withstand the fluctuating conditions. For example, in Ras Isa midlittoral area, the chthamalid barnacles mark the top of this zone, and replaced at lower level by the large barnacle *Tetradita squamosa rufotincta*. At lower level a richer and more abundant assemblage of organisms are present; such as gastropods, bivalve, crabs and echinoderms.

- 3- Sub littoral zone: - Above this zone, a sub littoral fringe which is the lowest part of the shore and forms the transition from the eulittoral to the sub littoral zone. This fringe is crowned by distinctive flora and fauna and exposed only during spring tide. The sub littoral zone in Yemen is marked by the appearance of the live corals *Millepora*, *Porites* and *Stylophora* with a gradual decline of algal density and increase of live corals or the rocky sub littoral, such as that of Hanish Island, Ras Isa. Algae were the dominant in the eastern rocky sub littoral of Hadramout and Al-Mahara. The sandy sub littoral of the Yemen Red Sea is marked by increase density of seagrass. In general, fauna in this zone which extends deeper to the edge of the continental shelf are very diverse and abundant.

Available data and literature described the bottom marine fauna of Yemen indicate the presence of 7 taxa groups: Porifera, Coelenterata (>200spp.), Polychaete (4spp.), Mollusca (872spp.), Crustacea (122spp.), Echinodermata (157spp.), Turtles (5spp).

Porifera (Sponges):- Little is found in the literature about the porifera of Yemen. However 3 species from Red Sea and 5 species from Socotra Archipelago were recorded (Annex 3).

Coelentrata (Entozoan-Corals):- Corals are found throughout the world's oceans, however, specific physical and chemical conditions must be present to facilitate reef growth. In general, water temperature must remain between 18 and 30° C throughout the year, sediment and fresh water input must be limited to prevent burial and osmotic stress, substrate depth must be shallow to allow sufficient light penetration to support photosynthetic processes, and water circulation must be sufficient to move food supply to the reef building organisms.

Coral reefs of the Indian Ocean have been mapped by a number of researchers and Scheer (1984) provides a summary. The western extremities of the Gulf of Aden are shown to have coral reefs built by some 36 genera. Upwelling processes most likely limit the eastward extent of coral reefs by the depression of temperature to levels below that which coral flourish. Near shore temperature may also exceed 40° C (Banaimoon, 1988) which is fatal to corals (Bock, 1978).

Generally, corals in the Yemen water of the Gulf of Aden are limited in comparison to that of the Yemen Red Sea water (IUCN, 1987; Rushdi *et al*, 1994). There are many factors which limit the coral growth and diversity such as cold water introduced by seasonal upwelling in Hadramout and Al-Mahara coastal areas, the limited habitat available for coral growth, the turbidity caused by the high energy waves and fresh water runoff and the domination of the most hard substrates by algae.

Corals and coral reef is a distinctive feature of Yemen sub tidal marine waters in the Red Sea, Socotra Archipelago and many regions in the Gulf of Aden / Arabian Sea and Indian Ocean. Three types of reef formation are recorded to occur along the coastline of Yemen in the Red Sea (IUCN 1987, Rushdi; etal 1994); these are:

- 1- Patch reefs of small separated hill like reefs and solitary coral occur at irregular intervals in the south of Khalij Kamaran.
- 2- Fringing reefs forming elongated ridges running offshore parallel with the coastal line (West Ras Isa Peninsula; South Al-Urj; between Yakhtul and Dhubab, Shagra, Belhaf, Wadi Rabeb, Socotra Archipelago.
- 3- Bottom reef of a shallow water and hard substrate (ex. Near Al-Khawbah; south Al-Hudeidah; Hanish Archi.).

Coral species are formed of two types. Soft coral is the first of which with 10 species and 4 families. The second type is the stony corals which form the majority, where 12 families recorded from Gulf of Aden / Arabian Sea and Socotra Archipelago and 14 families from the Red Sea. These families contain a total of about 200 species. Annex (3) lists 109 species of coral species documented in the literature.

Polychaeta:- Four species only were recorded from the Red Sea, Gulf of Aden and Socotra Archipelago; these species are :

- | | |
|-----------------------------------|---------------------------------------|
| 1- <i>Spirobranchus giganteus</i> | 2- <i>Sabellastarte sanctijosephi</i> |
| 3- <i>Diopatra sp.</i> | 4- <i>Pomatoeios kraussii</i> |

The later were recorded only from the Gulf of Aden / Arabian Sea where as *Diopatra sp.* were not recorded from Red Sea

Mollusca:- A total of 950 - 1000 species of mollusks were recorded from Red Sea proper, in which about 850 live species were recorded from southern and central regions, (Sharabati 1984; Mastaller 1987). However; molluskan community from the Yemeni Red Sea area form a total of 625 species representing four classes. The largest of which is the Gastropod with 86 families and Bivalvia with 47 families. Polyplacophora and Scaphopoda were represented by 4 families each and Cephalopoda with one family (Annex, 4). Molluskan communities of the Yemen Red Sea water can be classified into four groups according to their distribution where typical species characterizing each section of the sub tidal area are listed in table (6). The major features of the molluskan distribution can mainly be accounted for by differences in the distribution of habitats. Therefore, a clear picture of molluskan distribution in the Yemeni Red Sea water was given by IUCN (1987); Rushdi, etal (1994) and Dekker & Capelle (1994). Table (7) lists the most common species associated with different habitats.

The molluskan of the Yemeni southern coastal area was not sufficiently studied. However, the oldest study was that of Shopland (1902) from Aden inner Harbor and little Aden. This author has recorded a total of 729 species belonging to four classes. The largest class was the Gastropod (506) and Bivalvia (220), two species represent the Scaphopoda and only one species represented the class Cephalopoda (Annex, 5). Although such a great record from one site shows the richness of the southern coastal water of Yemen at the beginning of the century. The effect of pollution in the crowded Aden Harbor during the past 102 years must have a negative impact on the molluskan community and updating study seems to be necessary.

More recent records along the coastal line of the Gulf of Aden / Arabian Sea and Socotra Archipelago shows the existence of 13 species of the class Polyplacophora (Socotra = 4 species) and 146 species represented the Gastropod (Socotra = 105 species) and 63 species of Bivalve (Socotra = 43 species) .

Table (6):- Classification of molluskan community groups according to their distribution along the Yemeni Red Sea coastline.
(Adopted from Dekker & Capelle 1994).

Northern section (Midi to Al Salif and islands)	Middle Section (Al Salif to Al Khawkhah)	Southern Section (Al Khawkhah to Bab el Mandab)	Northern & Southern section (but rare or not found in the middle section)
<i>Area navicularis</i> <i>Cerithiidae sp.</i> <i>Circe crocea</i> <i>Conus fragilissimus</i> <i>Cronia martensi</i> <i>Drupella concatenata</i> <i>Isanda hornungi</i> <i>Nerita sp.</i> <i>Spondylus spinosus</i> <i>Timoclea marica</i> Islands: <i>Ctena divergens</i> <i>Epitonium amicum</i> <i>Fragum nival</i> <i>Otopleura mitralis</i> <i>Parvicardium sueziense</i> <i>patelloida maraisi</i> <i>Rissoina clathrata</i> <i>Septifer forskali</i>	<i>Barnea erythaea</i> <i>Brachydontes ?pulex</i> <i>Bulla ampulla</i> <i>Calyptraeidae sp.</i> <i>Isanda doriae</i> <i>Meropesta sdanderi</i> <i>Naticidae sp.</i> <i>Soletellina ruppelliana</i> <i>Timoclea roemeriana</i> <i>Tirela ponderosa</i> <i>Tugonia decurtata</i> <i>Venerupis cf. rugosa</i>	<i>Haustellum longicaudus</i> <i>Nassarius isseli</i> <i>Nerita adenensis</i> <i>N. albicilla</i>	<i>Acrosterigma flava</i> <i>Agagus stellamaris</i> <i>Cypraea caurica</i> <i>Eucithara celebensis</i> <i>Euplica varians</i> <i>Favartia cyclostoma</i> <i>Homalocantha digitata</i> <i>Nerita sanguinolenta</i> <i>Tellina palatum</i> <i>T. pinguis</i>

Crustacea:- Crustacean marine benthic fauna of Yemen formed from different groups of animals which inhabit all type of habitats. They include members of potential and commercially significance; such as shrimps, lobsters and swimming crabs.

In the Yemen Red Sea region a total of 53 species of crustaceans belonging to 6 families were recorded. The largest of which is the Brachyuran crabs with 34 species and Penaeidae with 9 species. Table (8) lists the crustacean species from the Red Sea region and their habitats. A total of 24 species were recorded from the southern area along the Gulf of Aden / Arabian Sea. Brachyuran crabs were represented by 5 families and 20 species (Table 9). *Balanus amphitrite* and *Tetraclita squamosa rufotincta* were the only cirripidae species recorded. The commercially important *Penaeus semisulcatus*, Spiny lobster *Panulirus homarus* and swimming crab *Portunus pelagicus* were also recorded (DouAbul & Abubakr 1996). A total of 45 species of crustaceans were recorded from Socotra Archipelago (Table 10) where 24 species of which were Brachyuran crabs (MAE, 1996 b).

Table (7): Most common Molluskan groups and species associated with different habitats (Rushdi; etal 1994, DouAbul & Haddad, editors, 1996)

Rocky shore	Sandy shore	Sea grass	Mangrove
<u>Patellidae</u> <i>Cellana karachiensis</i> <i>Cellana rota</i>	<u>Nassariidae</u> <i>Nassarius coronatus</i> <i>Nassarius arcularius</i> <i>plicatus</i>	<u>Cerithiidae</u> <i>Cerithium scabridum</i> <i>Cerithium caeruleum</i> <i>Clypeomorus</i> <i>bifasciatus</i>	<u>Littorinidae</u> <i>Littorina scabra</i>
<u>Fissurellidae</u> <i>Diodora ruppellii</i>	<u>Conidae</u> <i>Conus textile</i> <i>Conus tessulatus</i> <i>Conus omaria</i>	<u>Nassariidae</u> <i>Nassarius coronatus</i> <i>Nassarius dorsatus</i> <i>Nassarius arcularius</i> <i>plicatus</i>	<u>Cerithiidae</u> <i>Crithium punctatus</i>
<u>Chitonidae</u> <i>Acanthopleura haddon</i> <i>Acanthochiton penicillatus</i> <i>Chiton plates</i> <i>Tonica suezensis</i>	<u>Naticidae</u> <i>Mammilla melanostoma</i> <i>Natica onca</i> <i>Polinices tumidus</i>	<u>Nassariidae</u> <i>Nassarius coronatus</i> <i>Nassarius dorsatus</i> <i>Nassarius arcularius</i> <i>plicatus</i>	<u>Conidae</u> <i>Conus tessulatus</i> <i>Conus arenatus</i>
<u>Cypraeidae</u> <i>Cypraea nebrites</i> <i>Cypraea carneda</i> <i>Cypraea annulus</i> <i>Cypraea cameleopardalis</i> <i>Cypraea lynx</i> <i>Cypraea angustata</i> <i>Cypraea turdus</i> <i>Cypraea pantherina</i> <i>Cypraea grayana</i> <i>Cypraea gracilis</i> <i>Cypraea caurica</i> <i>Cypraea moneta</i> <i>Cypraea tigris</i>	<u>Turritellidae</u> <i>Turritella terebra</i>	<u>Naticidae</u> <i>Mammilla</i> <i>melanostoma</i> <i>Polinices tumidus</i> <i>Natica onca</i>	<u>Trochidae</u> <i>Trochus erythraeus</i>
<u>Bursidae</u> <i>Bursa granulatis</i>	<u>Strombidae</u> <i>Tibia insulaechorab</i> <i>Strombus tricornis</i> <i>Strombus gibberulus</i> <i>albus</i>	<u>Potamididae</u> <i>Cerithidea cingulata</i>	<u>Potamididae</u> <i>Cerithidea cingulata</i> <i>Terebralia palustris</i>
<u>Cymatiidae</u> <i>Cymatium pileareaquatile</i>	<u>Strombidae</u> <i>Strombus gigas</i> <i>Strombus labiatus</i> <i>Strombus erythrinus</i> <i>Strombus spp.</i>	<u>Conidae</u> <i>Conus tessulatus</i> <i>Conus achatinus</i> <i>Conus taeniatus</i>	<u>Planaxidae</u> <i>Planaxis sulcatus</i>
<u>Turbinidae</u> <i>Turbo radiatus</i>	<u>Architectonicidae</u> <i>Architectonica</i> <i>perspectiva</i>	<u>Trochidae</u> <i>Trochus erythraeus</i> <i>Claniculus</i> <i>pharaonius</i> <i>Euchelus asper</i>	<u>Neritidae</u> <i>Nerita polita</i> <i>Nerita undata</i>
<u>Planaxidae</u> <i>Planaxis sulcatus</i>	<u>Melongenidae</u> <i>Volema pyrum</i> <i>Volema paradisiaca</i>	<u>Potamididae</u> <i>Cerithidea cingulata</i>	<u>Melovgenidae</u> <i>Volema pyrum</i> <i>Volema paradisiaca</i>
<u>Bullidae</u> <i>Bulla ampulla</i>	<u>Bullidae</u> <i>Bulla ampulla</i>	<u>Conidae</u> <i>Conus tessulatus</i> <i>Conus achatinus</i> <i>Conus taeniatus</i>	<u>Strombidae</u> <i>Strombus tricornis</i> <i>Strombus mutabilis</i>
<u>Conidae</u> <i>Conus textile</i> <i>Conus tessulatus</i> <i>Conus amadis</i> <i>Conus flavidus</i> <i>Conus spectrum</i> <i>Conus generalis</i> <i>Conus arenatus</i>	<u>Olividae</u> <i>Ancilla castenea</i> <i>Oliva bulbosa</i>	<u>Trochidae</u> <i>Trochus erythraeus</i> <i>Claniculus</i> <i>pharaonius</i> <i>Euchelus asper</i>	<u>Pholadidae</u> <i>Pholas australasiae</i>
<u>Trochidae</u> <i>Clanculus pharaonius</i> <i>Euchelus asper</i> <i>Trochus erythraeus</i>	<u>Muricidae</u> <i>Murex scolopax</i>	<u>Strombidae</u> <i>Strombus tricornis</i> <i>Strombus mutabilis</i> <i>Strombus fasciatus</i> <i>Tibia insulaechorab</i>	<u>Mvtilidae</u> <i>Modiolus auriculatus</i>
<u>Cerithiidae</u> <i>Clypeomorus bifasciatus</i> <i>Cerithium caeruleum</i> <i>Cerithium nodulosum</i> <i>Cerithium scabridum</i>	<u>Diplodontidae</u> <i>Diplodonta ravayensis</i>	<u>Olividae</u> <i>Ancilla castenea</i> <i>Oliva bulbosa</i>	<u>Ostreidae</u> <i>Ostrea cucullata</i>
	<u>Psammobiidae</u> <i>Asaphis deflorata</i>	<u>Muricidae</u> <i>Murex scolopax</i> <i>Chicoreus virgineus</i>	<u>Planaxidae</u> <i>Planaxis sulcatus</i>
	<u>Gariidae</u> <i>Gari maculosa</i> <i>Trachycardium</i> <i>lacunosum</i>	<u>Cypraeidae</u> <i>Cypraea turdus</i> <i>Cypraea moneta</i> <i>Cypraea annulus</i>	<u>Bullidae</u> <i>Bulla ampulla</i>
	<u>Pectinidae</u> <i>Chlamys senatoria</i> <i>Chlamys superficilais</i>	<u>Psammobiidae</u> <i>Asaphis maculosa</i>	<u>Conidae</u> <i>Conus textile</i> <i>Conus tessulatus</i> <i>Conus amadis</i> <i>Conus flavidus</i> <i>Conus spectrum</i> <i>Conus generalis</i> <i>Conus arenatus</i>
	<u>Malleidae</u> <i>Malleus malleus</i>	<u>Gariidae</u> <i>Gari maculosa</i>	<u>Trochidae</u> <i>Clanculus pharaonius</i> <i>Euchelus asper</i> <i>Trochus erythraeus</i>
		<u>Pteriidae</u> <i>Pinctada</i> <i>margaritifera</i>	<u>Cerithiidae</u> <i>Clypeomorus bifasciatus</i> <i>Cerithium caeruleum</i> <i>Cerithium nodulosum</i> <i>Cerithium scabridum</i>

<p><u>Strombidae</u> <i>Strombus mutabilis</i> <i>Strombus tricornis</i> <i>Strombus gibberulus albus</i> <i>Strombus fasciatus</i></p> <p><u>Neritidae</u> <i>Nerita albicilla</i> <i>Nerita sanguinolenta</i></p> <p><u>Muricidae</u> <i>Chicoreus virgineus</i> <i>Murex troscheli</i></p> <p><u>Ellobiidae</u> <i>Cassidula angulifera</i> <i>Cassidula rugata</i></p> <p><u>Arcidae</u> <i>Anadara secticostata</i> <i>Anadara urupigimelana</i> <i>Barbatia helblingii</i> <i>Barbatia foliata</i> <i>Barbatia fusca</i> <i>Arca spp.</i></p> <p><u>Mytilidae</u> <i>Modiolus philippinarum</i> <i>Modiolus auriculatus</i></p> <p><u>Pteriidae</u> <i>Pinctada margaritifera</i> <i>Pteria aegyptiaca</i> <i>Pinctada fucata</i> <i>Pinctada radiata</i></p> <p><u>Pectinidae</u> <i>Chlamys senatovia</i> <i>Chlamys superficialis</i> <i>Chlamys reuschenbergerii</i></p> <p><u>Spondylidae</u> <i>Spondylus exilis</i></p> <p><u>Veneridae</u> <i>Periglypta reticulata</i></p> <p><u>Gariidae</u> <i>Trachycardium lacunosum</i></p> <p><u>Carditidae</u> <i>Cardita bicolor</i></p> <p><u>Psammobiidae</u> <i>Asaphis deflorata</i></p> <p><u>Chamidae</u> <i>Chama pacifica</i></p> <p><u>Tridacnidae</u> <i>Tridacna squamosa</i></p> <p><u>Pinnidae</u> <i>Pinna spp.</i></p>	<p><u>Veneridae</u> <i>Tivela damaoides</i> <i>Gafrarium pectinatum</i> <i>Periglypta reticulata</i></p> <p><u>Glycymerididae</u> <i>Glycymeris striatularis</i></p> <p><u>Mactridae</u> <i>Mactra lilacea</i></p> <p><u>Donacidae</u> <i>Donax vittatus</i></p> <p><u>Arcidae</u> <i>Anadara secticostata</i> <i>Barbatia foliate</i></p>	<p><i>Pinctada fucata</i></p>	<p><u>Strombidae</u> <i>Strombus mutabilis</i> <i>Strombus tricornis</i> <i>Strombus gibberulus albus</i> <i>Strombus fasciatus</i></p> <p><u>Neritidae</u> <i>Nerita albicilla</i> <i>Nerita sanguinolenta</i></p> <p><u>Muricidae</u> <i>Chicoreus virgineus</i> <i>Murex troscheli</i></p>
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**Table (8): Red Sea Crustacean species list and their habitats
(Rushdi; etal 1994)**

<u>Isopodae</u>		<u>Portunidae</u>	
<i>Excitrolana orientalis</i>	(Sandy)	<i>Lupa pelagica</i>	(Rocky)
<i>Eurydice spp.</i>	(Sand/silt)	<i>Scylla serrata</i>	(Rocky)
<u>Amphipodae</u>		<i>Portunus pelagicus</i>	(Most habitat except coral reef)
<i>Ampelisca spp.</i>	(Rocky/muddy)	<u>Grapsidae</u>	
<i>Bybis gaimardi</i>	(Rocky/muddy)	<i>Perisesarma guttatum</i>	(Mud/mangrove)
<i>Urothae elegans</i>	(Rocky/muddy)	<i>Metopograpsus messor</i>	(Rocky/mud/mangrove)
<i>Orchomene spp.</i>	(Rocky/muddy)	<i>Grapsus albolineatus</i>	(Rocky)
<u>Cirripedae</u>		<u>Ocypodidae</u>	
<i>Balanus amphitrite</i>	(Rocky/muddy)	<i>Ocypoda saratan</i>	(Mud/mangrove)
<i>Tetraclita squamosa rufotincta</i>	(Rocky)	<i>Macrophthalmus depressus</i>	(Rocky/mud/mangrove)
<u>Penaeidae</u>		<i>Macrophthalmus grandidieri</i>	(Rocky/mud/mangrove)
<i>Penaeus latisulcatus</i>		<i>Uca inversa</i>	(Mud/mangrove)
<i>Penaeus semisulcatus</i>	(Sand/silt offshore)	<i>Uca lactea albimana</i>	(Mud/mangrove)
<i>Penaeus indicus</i>	(Sand/silt offshore)	<i>Uca urvillei</i>	(Mud/mangrove)
<i>Penaeus japonicus</i>	(Sand/silt offshore)	<i>Uca vacans</i>	(Mud/mangrove)
<i>Penaeus monodon</i>	(Sand/silt offshore)	<i>Uca tetragonan</i>	(Mud/mangrove)
<i>Penaeus hathor</i>	(Muddy mangrove swamp)	<i>Dotilla sulcata</i>	(Mud/mangrove)
<i>Trachypenaeus curvirostris</i>		<u>Xanthidae</u>	
<i>Metapenaeus monoceros</i>	(Sand/silt offshore)	<i>Capilius convexus</i>	(Rocky)
<i>Metapenaeus stebbingi</i>	(Sand/silt offshore)	<i>Leotodius exaratus</i>	(Rocky)
<u>Palinuridae</u>		<i>Eriphia smithi</i>	(Rocky)
<i>Palinurus peicillatus</i>		<i>Etisus laevimanus</i>	(Rocky)
<i>Palinurus versicolor</i>		<i>Pilumnus vespertilio</i>	(Rocky)
<i>Palinurus ornatus</i>	(Coral reef and rocky substrates crevices offshore)	<i>Phymodius granulatus</i>	(Rocky)
<u>Alpheidae</u>		<i>Trapezia cymodoces</i>	(Rocky)
<i>Alpheus lobidins</i>	(Sandy/ rocky)	<i>Eurycarcinus natalensis</i>	(Mangrove)
<i>Alpheus lottini</i>	(Sandy/ rocky)	<u>Procellanidae</u>	
<i>Alpheus rapax</i>	(Mangrove)	<i>Petrolisthes boscii</i>	(Rocky)
<u>Stomatopoda</u>		<u>Diogenidae</u>	
<i>Gonodactylus demani</i>	(Rocky)	<i>Clibanarius longitarsus</i>	(Mud/mangrove)
<i>Gonodactylus chiragra</i>	(Rocky/ mangrove inside sponge)	<i>Diogenes avarus</i>	(All habitats)
<u>Hippidae</u>		<i>Diogenes gardinier</i>	(All habitats)
<i>Emerita holthuisi</i>	(Sandy)		

Table (9): Brachyran and Anomuran crabs recorded from the Gulf of Aden coastal area (DouAbul & Abubakr, 1996)

Brachyra	
Portuniidae	<i>Portunus pelagicus</i> <i>Charybdis annulata</i> <i>Charybdis nataor</i> <i>Thalamita admete</i>
Ocypodidae	<i>Ocypodae saratan</i> <i>Uca sp.</i>
Grapsidae	<i>Geograpsus stormi</i> <i>Grapsus albolineatus</i> <i>Grapsus longitarsis</i> <i>Pachygrapsus mamoratus</i> <i>Plagusia tuberculata</i>
Xanthidae	<i>Actaea polyacantha</i> <i>Actaea savignyi</i> <i>Epiactaea margaritifera</i> <i>Etisus electra</i> <i>Liomera cinctimana</i> <i>Liomera rugata</i> <i>Pilmonus longicorni</i>
Paguridae	<i>Calibnarius signatus</i> <i>Calibnarius virecence</i>
Anomura	
	<i>Pisidia dehaani</i> <i>Pisidia delagoae</i> <i>Clibanarius virescens</i> <i>Clibanarsus singnatus</i>

Table (10): Crustacean species list of Socotra Archipelago (MAE, 1996 b)

<u>Crustacea</u>	<u>Brachyura</u>
<i>Chthamalus ?malayensis</i>	<i>Menaethius monoceros</i>
<i>Chthamalus sp.</i>	<i>Cyphocarcinus sp.</i>
<i>Euraphia sp.</i>	(?) <i>Philyra sp.</i>
<i>Balanus sp.</i>	<i>Ocypode saratans</i>
<i>Tetracalita squamosa</i>	<i>Ocypode sp. (Cf. rotundata)</i>
<i>Gonodactylus demani demani</i>	<i>Ocypode sp. (Cf. cordimana)</i>
<i>Squilla sp.</i>	<i>Grapsis albilineatus</i>
<i>Ligia exotica</i>	<i>Metopograpsus messor</i>
<i>Cymodoce sp.</i>	<i>Grapsus sp.</i>
<i>Athanus sp.</i>	<i>Portunus pelagicus</i>
<i>Alpheus djeddensis</i>	<i>Epixanthus sp.</i>
<i>Alpheus lottini</i>	<i>Actea sp.</i>
<i>Alpheus (?)frontalis</i>	<i>Medaeus sp.</i>
<i>Jocaste lucina</i>	<i>Trapezia (?)cymodoce</i>
<i>Periclimenes sp.</i>	<i>Trapezia spp.</i>
<i>Panulirus sp.</i>	<i>Tetralia cavimana</i>
<i>Panulirus versicolor</i>	<i>Tetralia spp.</i>
<i>Panulirus homarus</i>	<i>Cymo sp.</i>
<i>Clibanarius virescens</i>	<i>Pilodius sp</i>
<i>Clibanarius signatus</i>	<i>Phymodius sp.</i>
<i>Ceonobita scaevola</i>	<i>Pilumnus vespertilio</i>
	<i>Pilumnus sp.</i>
	(?) <i>Hapalocarcinus sp.</i>
	(?) <i>Cryptochirus sp.</i>

Echinodermata:- A total of 157 species of echinoderm fauna were recorded from the Red Sea proper representing 5 classes. Their presence in the fauna of Yemen Red Sea is certain, since that the distribution of about 72 species of these organisms extends to the southeast Arabia (Price, 1982). Those species recorded from both the Red Sea and southeast Arabia are most likely be presented in the fauna of the Gulf of Aden / Arabian Sea region of Yemen, due to the fact that these areas are geographically all part of the Indo-Pacific realm and the origin of most of their biota are also from this great realm (Annex, 6).

Fishes:- The fish fauna of the Yemen Red Sea, Gulf of Aden / Arabian Sea and Indian Ocean are mainly of Indo-Pacific origin. The Yemen Red Sea fish group is large and more diverse than that of the Gulf of Aden / Arabian Sea due to the different habitats and reef fish inhabit the coral reef strand along almost all the coastal line. Sharks have a significant soci-economic role in the livelihood of the fishermen, particularly the artisanal in Yemen. Shark fins, livers and meat are exploited commercially (Hariri, 2002). In the same way other bony fishes are a vital source of income for local and national hard currency source, and an important cheap source of protein to the poor and rich people alike.

A total of 153 families and 969 fish species were recorded from the Yemeni waters. Cartilaginous fishes include 11 families of rays and batoidei (44 Species) and 18 families of sharks contain 68 species. The rest are bony fishes (Osteichthyes) which include 124 families and 857 species (Annex, 7 & 8). Great numbers of which are under great threats due to the intense fisheries pressure imposed on them (table 11). A large number of these species are sharks, reef fisher, and mollusks.

Table (11) list of the mainly threatened and endangered marine organisms of the Yemeni marine environment excluding mangroves, seagrasses, turtles, and corals.

Molluska	
<u>Family: Strombidae</u>	
<i>Tibia insulaechorab cuta</i>	
<i>Lambis truncate sebae</i>	
<i>Strumbus tricornis</i>	
<u>Family: Pteriidae</u>	
<i>Pinctada margaritifera</i>	Pearl Oyster
<u>Family: Trochidae</u>	
<i>Trochus virgatus</i>	
<i>Tectus dentatus</i>	
<u>Family: Veneridae</u>	
<i>Circenita callipyga</i>	
<u>Family: Sepiidae</u>	
<i>Sepia Arabica</i>	Cuttlefishes
<i>Sepia braggi</i>	
<i>Sepia brevimana</i>	
<i>Sepia kobeensis</i>	
<i>Sepia latimanus</i>	
<i>Sepia murrayi</i>	
<i>Sepia omani</i>	
<i>Sepia pharaonis</i>	
<i>Sepia prashadi</i>	
<i>Sepia recurvirostra</i>	
<i>Sepia trygonina</i>	
<i>Sepia inermis</i>	
Crustacea	
<u>Family :Penaeidae</u>	
<i>Metapenaeopsis coniger</i>	Penaeid shrimps & Prawns
<i>Metapenaeus monoceros</i>	
<i>Parapenaeus investigatoris</i>	Deep Sea Shrimp
<i>Penaeopsis balssi</i>	
<i>Penaeopsis jerryi</i>	
<i>Penaeus indicus</i>	
<i>Penaeus japonicus</i>	
<i>Penaeus monodon</i>	
<i>Penaeus semisulcatus</i>	
<i>Penaeu latisulactus</i>	
<u>Family: Portunidae</u>	
<i>Portunus pelagicus</i>	Crabs

Family: Palinuridae

Panulirus homarus
Panulirus longipes
Panulirus ornatus
Panulirus penicillatus
Panulirus versicolor
Puerulus angulatus
Puerulus sewelli

Spiny lobsters
Rock Lobster

R. Lobster

Deep Sea Lobster

Echinodermata

Family: Holothuridae

Actinopyga echinites
Actinopyga mauritiana
Bohadshia marmorata
Holothuria atra
Holothuria scabra
Microthele nobilis
Stichopus variegates

Sea cucumber

Chondrichthyes (Elasmobranchii) Sharks

Family: Alopiidae

Alopias pelagicus
Alopias vaulpinus
Alopias superciliosus

Thresher sharks

Family: Carcharhinidae

Carcharhinus leucas
Carcharhinus albimarginatus
Carcharhinus altimus
Carcharhinus amblyrhynchoides
Carcharhinus amboinensis
Carcharhinus brevipinna
Carcharhinus obscurus
Carcharhinus dussumieri
Carcharhinus carcharias
Carcharhinus amblyrhynches (Wheeler)
Carcharhinus macloti
Carcharhinus falciformis
Carcharhinus leucas
Carcharhinus limbatus
Carcharhinus longimanus
Carcharhinus melanopterus
Carcharhinus plumbeus
Carcharhinus sorrah
Carcharhinus sealei

Requiem sharks

<i>Carcharhinus wheeleri</i>	
<i>Carcharias Taurus</i>	
<i>Deania calcea</i>	
<i>Galeocerdo cuvier</i>	
<i>Hemitriakis japonica</i>	
<i>Loxodon macrorhivus</i>	
<i>Negaprion acutidens</i>	
<i>Prionace glauca</i>	
<i>Rhincodon typus</i>	
<i>Rhizoprionodon acutus</i>	
<i>Scoliodon laticaudus</i>	
<i>Triaenodon obesus</i>	
<u>Family: Echinorhinidae</u>	Bramble shark
<i>Echinorhinus brucus</i>	
<u>Family: Ginglymotomatidae</u>	Nurse sharks
<i>Nebrius ferrugineus</i>	
<u>Family: Hemigaleidae</u>	Weasel sharks
<i>Hemipristis elongates</i>	
<i>Hemigaleus microstoma</i>	
<i>Paragaleus randalli</i>	
<u>Family: Hemiscyllidae</u>	Bamboo sharks
<i>Chioscyllium arabicum</i>	
<i>Chioscyllium griseum</i>	
<i>Chioscyllium indicum</i>	
<i>Chioscyllium plegiosum</i>	
<u>Family: Heterodontidae</u>	Bull head sharks
<i>Heterodontus ramalheira</i>	
<i>Negaprion acutidens</i>	
<u>Family: Hexanchidae</u>	Sixgill and sevendill sharks
<i>Heptranchias perlo</i>	
<u>Family: Lamnidae</u>	Mackerel sharks
<i>Carcharodon carcharias</i>	
<i>Isurus oxyrinchus</i>	
<u>Family: Pristiophoridae</u>	Saw sharks
<i>Pristiophorus japonicus</i>	
<u>Family: Proscylliidae</u>	Finback catsharks
<i>Ctenacis fehlmanni</i>	

Eridacnis radcliffei
Proscyllidae sp.

Family: Scyliorhinae

Casharks

Apristurus indicus
Atelomycterus marmoratus
Halaelurus boesemani
Halaelurus hispidus

Family: Sphyrnidae

Hammer head sharks

Eusphyra blochii
Sphyma lewini
Sphyma mokarran

Family: Centrophoridae

Dogfish sharks

Centrophorus granulosus
Centrophorus tessellates
Centrophoru atromarginatus
Deania profundorum

Family: Squatinidae

Angel sharks or sand devils

Squatina Africana
Squatina squatina

Family: Stegostomatidae

Zebra sharks

Stegostoma fasciatum

Family: Triakidae

Houndsharks, smooth hounds

Hypogaleus hyugaensis
Logo omanesis
Mustelus mosis
Mustelus mustelus
Mustelus punctulatus
Scylliogaleus quecketti

Family: Odontaspidae

Carcharias Taurus

Osteichthyes (BONY Fishes)

Family: Acanthuridae

Surgeonfishes

Acanthurus gahhm?
Acanthurus nigrofuscus
Acanthurus shoal
Ctenochaetus striatus
Naso hexacanthus
Naso lituratus
Naso unicornis

endemic

<i>Naso brevirostris</i>	
<i>Zebrasoma desjardini</i>	
<i>Zebrasoma xanthurum</i>	endemic
<u>Family: Apogonidae</u>	Cardinalfishes
<i>Apogon aureus</i>	
<u>Family: Balistidae</u>	Triggerfishes
<i>Balistapus undulates</i>	
<i>Balistoides viridescens</i>	
<i>Meiacanthus nigrolineatus</i>	
<i>Melichthys indicus</i>	
<i>Odonus niger</i>	
<i>Pseudobalistes fuscus</i>	
<i>Rhinecanthus assasi</i>	endemic
<i>Sufflamen albicaudatus</i>	
<i>Sufflamen chrysopterus</i>	
<i>Sufflamen fraenatus</i>	
<u>Family: Blenniidae</u>	Blennies
<i>Escenius gravieri</i>	
<u>Family: Chaetodontidae</u>	Butterflyfishes
<i>Chaetodon auriga</i>	
<i>Chaetodon auriga setifer?</i>	
<i>Chaetodon austriacus</i>	endemic
<i>Chaetodon larvatus</i>	endemic
<i>Chaetodon leucopleura</i>	
<i>Chaetodon lineolatus</i>	
<i>Chaetodon melannotus</i>	
<i>Chaetodon melapterus</i>	endemic
<i>Chaetodon mesoleucos</i>	endemic
<i>Chaetodon paucifasciatus</i>	endemic
<i>Chaetodon semilarvatus</i>	
<i>Chaetodon trifascialis</i>	
<i>Chaetodon fasciatus</i>	endemic
<i>Chaetodon vagabundus pictus</i>	
<i>Heniochus diphreutes</i>	
<i>Heniochus intermedius</i>	endemic
<u>Family: Cirrhitidae</u>	Hawkfishes
<i>Paracirrhites forsteri</i>	
<u>Family: Dasyatidae</u>	
<i>Taeniura lymma</i>	
<u>Family: Ephippidae</u>	Spadefishes

<i>Platax orbicularis</i>	
<i>Platax Pinnatus</i>	
<i>Platax tiera</i>	
<u>Family: Gobiidae</u>	Gobies
<i>Amblyeleotris steinitzi</i>	
<i>Amblygobius hectori</i>	
<i>Cryptocentrus caeruleopunctatus</i>	
<i>Cryptocentrus lutheri</i>	
<i>Valenciennea puellaris?</i>	
<i>Yongeivhthys criniger</i>	
<u>Family: Haemulidae</u>	Grunts & Sweetlips
<i>Plectorhinchus gaterinus</i>	
<u>Family: Holcentridae</u>	Squirrelfishes
<i>Myripristis murdjan</i>	
<i>Neoniphon samara</i>	
<i>Sargocentron caudimaculatum</i>	
<i>Sargocentron spiniferum</i>	
<u>Family: Labridae</u>	Wrasses
<i>Anampses caeruleopunctatus</i>	
<i>Anampses melanurus</i>	
<i>Anampses meleagrides</i>	
<i>Anampses twisit</i>	
<i>Bodianus anthioides</i>	
<i>Bodianus axillaries</i>	
<i>Bodianus Diana</i>	
<i>Cheilinus abudjubbe</i>	endemic
<i>Cheilinus fasciatus</i>	
<i>Cheilinus lunulatus</i>	
<i>Cheilinus undulates</i>	
<i>Cheilio inermis</i>	
<i>Coris aygula</i>	
<i>Coris africana</i>	
<i>Coris caudimacula</i>	
<i>Coris variegata</i>	
<i>Epibulus insidiator</i>	
<i>Gomphosus caeruleus</i>	
<i>Halichoeres hortulanus</i>	
<i>Halichoeres marginatus</i>	
<i>Halichoeres scapularis</i>	
<i>Hemigymnus fasciatus</i>	
<i>Labroides dimidiatus</i>	
<i>Larabicus quadrilineatus</i>	endemic

<i>Novaculichthys taeniourus</i>	
<i>Oxycheilinus digrammus</i>	
<i>Paracheilinus octotaenia</i>	
<i>Pseudodax moluccanus</i>	
<i>Stethojulis albovittata</i>	
<i>Stethojulis interrupta</i>	
<i>Thalassoma hardwickii</i>	
<i>Thalassoma klunzingeri</i>	endemic
<i>Thalassoma lunare</i>	
<i>Thalassoma purpureum</i>	
<u>Family: Lutjanidae</u>	Snappers
<i>Lutjanus kasmari</i>	
<u>Family: Monacanthidae</u>	Filefishes
<i>Cantherhines pardalis</i>	
<i>Thamnaconus modestoides erthraeensis</i>	
<u>Family: Monodactylidae</u>	Monos
<i>Monodactylus argenteus</i>	
<u>Family: Mullidae</u>	Goatfishes
<i>Parupeneus cyclostomus</i>	
<i>Parupeneus forsskali</i>	
<i>Parupeneus macronemus</i>	
<i>Parupeneus rubescens</i>	
<u>Family: Muraenidae</u>	Morays
<i>Gymnothorax undulates</i>	
<i>Siderea grisea</i>	
<u>Family: Ophichthidae</u>	
<i>Myrichthys colubrinus</i>	
<u>Family: Ostraciidae</u>	Trunkfishes
<i>Ostracion cyanurus</i>	
<i>Ostracion cubicus</i>	
<u>Family: Plotosidae</u>	Eel Catfishes
<i>Plotosus lineatus</i>	
<u>Family: Pomacanthidae</u>	Angelfishes
<i>Centropyge multispinnis</i>	
<i>Genicanthus caudovittatus</i>	
<i>Pomacanthus asfur</i>	endemic

Pomacanthus imperator
Pomacanthus maculosus
Pygoplites diacanthus

Family: Pomacentridae

Damselfishes

Abudefduf sexfasciatus
Abudefduf sordidus
Amphiprion bicinctus
Chromis xanthopterygia (.viridis)
Chrysiptera annulata
Dascyllus aruanus
Dascyllus marginatus
Dascyllus trimaculatus
Plectroglyphidodon melas
Pomacentrus caeruleus
Pomacentrus trilineatus
Pomacentrus sulfurous

Family: Pseudochromidae

Dottybacks

Pseudochromis flavivertex
Pseudochromis springeri
Pseudochromis frimani
Pseudochromis plivaceus

endemic
endemic
endemic
endemic

Family: Scaridae

Parrotfishes

Scarus arabicus
Scarus ferrugineus
Scarus fuscopurpureus
Scarus ghobban
Scarus gibbus
Scarus niger
Scarus psittacus

Family: Scorpaenidae

Scorpionfishes

Pterois miles
Pterois radiate
Scorpaenopsis barbatus
Synanceia verrucosa

Family: Serranidae

Groupers

Cephalopholis argus
Cephalopholis hemistikos
Cephalopholis miniata
Cephalopholis oligosticta
Cephalopholis sexmaculata
Diploprion drachi

Epinephelus summana
Plectropomus pessuliferus
Variola louti

Family: Tetraodontidae

Pufferfishes

Arothron diadematus
Arothron hispidus
Arothron immaculatus
Arothron meleagris
Arothron nigropunctatus
Arothron stellatus
Canthigaster solandri
Canthigaster valentine
Canthigaster margaritata
Canthigaster moronata

endemic

Family: Torpedinidae

Torpedo panthers

Cetaceans

Family: Odontocetes

Tursiops truncatus
Tursiops aduncus
Delphinus delphis
Delphinus cf. D. tropicalis (Van Bree, 1971),
Stenella longirostris
Stenella attenuata
Stenella coeruleoalba
Grampus griseus
Sousa chinensis
Sousa cf. S. plumbea (G. Cuvier, 1829),
Steno bredanensis
Pseudorca crassidens
Feresa attenuata
Orcinus orca
Peponocephala electra
Kogia simus
Physeter macrocephalus
Ziphius cavirostris

Bottlenose dolphin
Bottlenose dolphin
Common dolphin
Tropical dolphin
Spinner dolphin
Spotted dolphin
Striped dolphin
Risso's dolphin
Indo-Pacific humpback dolphin
Humpback dolphin
Rough-toothed dolphin
False killer whale
Pygmy killer whale
Killer whale
Melon-headed whale
Dwarf sperm whale
Sperm whale
Cuvier's beaked whale

Family: Mysticetes

Megaptera novaeangliae,
Balaenoptera edeni
Balaenoptera acutorostrata
Balaenoptera musculus
Balaenoptera physalus

Humpback whale
Bryde's whale
Minke whale
Blue whale
Fin whale

Turtles:- Marine turtles were among the endangered species which have great concern world widely. Five species of turtles were recorded from the Yemeni water. Their nesting and breeding ground extends along sandy shores of Yemen as indicated in table (2). These species are:-

- 1- *Chelonia mydas* (Green turtle)
- 2- *Eretmochelys imbricata* (Hawksbill turtle)
- 3- *Lepidochelys olivacea* (Olive ridley)
- 4- *Caretta caretta* (Loggerhead turtle)
- 5- *Dermochelys coriacea* (Leatherbacks turtle)

However, the logger head turtle was recorded from Socotra Archipelago only (MAE, 1996 b). Although, turtles are among the endangered species, which have great concern world wide, and protected under national legislation, they are under threat from human exploitation in Yemen. They are classified as endangered globally and any additional threats to population levels will decrease their numbers even further. Nesting beaches along the southern coast of Yemen are suggested to be some of the best remaining nesting ground in the world for green turtle (Hirth&Carr, 1977).

Marine mammals:- Two classes of marine mammals occur in the Red Sea of Yemen. These are the dugong *Dugong dugon* (Sirenia) and several species of dolphins and whales (Cetacean); Table, 12). The common dolphin *Delphinus delphis* and the sperm whale *Physeter macrocephalus* were the only marine mammals recorded from Socotra Archipelago (MAE, 1996 b). Table (12) lists the most likely marine mammals to be found in the Yemeni open waters. Dugong usually associated with seagrass beds of the Yemen Red Sea (Rushdi *etal*, 1994).

Table (12):- lists the Cetaceans species of the Yemeni open waters

Cetaceans	
<u>Family: Odontocetes</u>	
<i>Tursiops truncatus</i>	Bottlenose dolphin
<i>Tursiops aduncus</i>	Bottlenose dolphin
<i>Delphinus delphis</i>	Common dolphin
<i>Delphinus cf. D. tropicalis</i> (Van Bree, 1971),	Tropical dolphin
<i>Stenella longirostris</i>	Spinner dolphin
<i>Stenella attenuata</i>	Spotted dolphin
<i>Stenella coeruleoalba</i>	Striped dolphin
<i>Grampus griseus</i>	Risso's dolphin
<i>Sousa chinensis</i>	Indo-Pacific humpback dolphin
<i>Sousa cf. S. plumbea</i> (G. Cuvier, 1829),	Humpback dolphin
<i>Steno bredanensis</i>	Rough-toothed dolphin
<i>Pseudorca crassidens</i>	False killer whale
<i>Feresa attenuata</i>	Pygmy killer whale
<i>Orcinus orca</i>	Killer whale
<i>Peponocephala electra</i>	Melon-headed whale
<i>Kogia simus</i>	Dwarf sperm whale
<i>Physeter macrocephalus</i>	Sperm whale
<i>Ziphius cavirostris</i>	Cuvier's beaked whale
<u>Family: Mysticetes</u>	
<i>Megaptera novaeangliae</i> ,	Humpback whale
<i>Balaenoptera edeni</i>	Bryde's whale
<i>Balaenoptera acutorostrata</i>	Minke whale
<i>Balaenoptera musculus</i>	Blue whale
<i>Balaenoptera physalus</i>	Fin whale

Utilization of Marine Biodiversity:-

The utilization level of marine biodiversity is very limited to certain species and groups of organisms. Despite that some of these species could be threatened.

Fisheries:- The exploitation of the sea in Yemen is one of the most important natural resources for local consumption as well as export income. Fish is the main source of protein in the coastal region and islands. The fishery resources of the Yemen Red Sea are concentrated in the soft bottom areas of sea grass beds between Al-Salif and Midi, reefs and islands, throughout the near & offshore areas; and artisanal fishing area along the northern section. Such areas are considered to be rich and very diverse in species, due to the high productivity of sea grass beds and coral reefs.

The fishery resources of the southern region mainly depend upon the strong coastal upwelling process. The effect of this upwelling is to bring nutrients rich colder deeper water to the warm surface; which leads to an area of major primary productivity by phytoplankton. This in turn is being the basic food of the invertebrates and fish fauna in the region. Three distinct types of fishing methods are used:-

- 1- Trawlable soft bottom:- This method is found in the Red Sea and used for the commercially exploitation of shrimp. The catch is made up of more than 90% of *Penaeus semisulcatus* (table 13).
- 2- Artisanal fishing: - A variety of small scales methods are used in the Red Sea, A modern trawlers are used in southern region. A total of about 200 species are known to occur in the artisanal fishing ground along the Yemen Gulf of Aden/Arabian Sea and about 20 species of finfish are considered of commercial significance. Trawlers operating from Aden, Al-Mukala and Nishtun, were introduced in the early 1980s so that the demersal species could be exploited. Reported catch in 1984 was 40,000 tons of demersal fin fish. Exported commercial species are cuttle fish, deep and rock lobsters.
- 3- Pelagic fisheries: - In the Red Sea it forms a small scale commercial fisheries concentrated on a variety of pelagic species and conducted by local fishermen. In the Gulf of Aden / Arabian Sea, traditional fishing activities are also conducted from small fishing villages along the coastline. The boats are traditional wooden houris and sambuks operated from the shore.

Data available on fisheries of Yemen represent only the quantity of annual catch of fish that passes through the co-operations and does not include that caught by individual fishermen and non-licensed boats . No enough data which describe the fish stock, fishery effort, amount of fishing, fishing period, season, method of fishing and net size . Such lack of data is the main reason of difficulty to draw out the indications that control the utilization of fishery resources for sustainable use. The following table explains the catch-quantity of fishes and other marine organisms per tones for each kind during the years 1990-1995.

Type of catch	1990	1991	1992	1993	1994	1995
Pelagic fishes	59131	60508	76297	75585	80284	84298
Epipelagic fishes	15881	20118	362	3612	126	132
Other organisms	3325	1915	1707	2663	1475	1548
Total	78337	82541	78366	81860	81885	85978

The fisheries in Yemen are currently focused on every limited number of species. Essentially the pelagic sharks, King Fish and Tuna and epipelagic shrimps, lobsters and Sea Cucumber *A. mouritiana*, *M. atra*, *A. echinites*; and aquarium fish for ornamental trade.

Among the recorded marine invertebrate fauna, eight species were found to be potentially important for local fishermen and national fisheries industry. Also the molluscan clam (*Pitar sp.*, *Tivela sp.*, *Mactra sp.*) for fish bait. In Khor Umairah, fishermen collected the live Muricidae (*Chicoreus ramosus*) and strombidae (*S. tricornis*) for their opercula and bait use. *S. tricornis* opercula were reported to be used as a base for perfume manufacture (Sheppard *et al.*, 1992). The bivalve *Tivela ponderosa* was also collected for bait in Belhaf and Foua areas. In Socotra, fishing of mother of pearl *P. margaritifera* which start in April for pearl collection (table 12).

During monsoon season the highly productive freshwater runoff reached the coastal littoral zone create a suitable habitat for Penaeidae shrimp. *Penaeus semisulcutus* migrate from its normal deep water habitats to the coastal area adjacent to wadies ends along the coastal regions which extend from the east of Khalef to Al-Mahara boarder. *P. semisulcutus* is characterized by its large size, high price value (locally and international) and as any other Penaeidae shrimps it has a great potential for aquaculture industry. The swimming crab *Portunus pelagiacus* is a coastal marine species, which swim near the bottom of the sandy substrate in Sharma area. This species is also commercially important. The spiny lobster *Panulirus homarus* lives in the rocky crevices of the shallow coastal area to the west of Foua site and from east of Al-Mukalla to Al-Mahara. During the night *P. homarus* moves from shallow water into the surf zone to feed on mussels. This species spawns during October to November and heavily fished during the period between October to April. Fishing is ceased during the rest of the year. Lobster fisheries were used to be an important source of capital for Yemen; however it is declined recently due to the mismanagement fisheries industry. Another industry is recently declined or almost ceased is that of the sea cucumber. This important organism where used to be harvested dried and packed for export to the Far East.

Turtles are killed for their eggs and meat by locals when they come ashore to breed. They also caught accidentally by fishing nets. Dolphins fished for bait material for shark nets and lobster traps in Socotra. They also accidentally caught by fishing nets. Many species of fish are also fished and thrown away as bycatch.

Flora:- Marine and coastal flora are used and consumed by different sources. The Dom palm *H. thebaica* is used as a source of fire wood for cooking, making ropes and mattress in Al-Urj area. Grasses and Reeds are heavily grazed by domesticated livestock in Al-Urj, south Al-Hudeidah to Yakhtul, Ahwar and Al-Mahara. Mangroves are used in the

form of wood for fuel or construction and cooking. It is also grazed by camels and used as drugs (Figure 1).



Figure (1); shows the grazing and cutting pressure on mangrove forest in Luhayiah area.

Table (13) lists molluskan, crustacean, and echinoderms species that are heavily exploited by traditional and commercial fisheries in Yemen.

<i>Mollusca</i>	
Family: Strombidae	
1	<i>Tibia insulaechorab cuta</i>
2	<i>Lambis truncate sebae</i>
3	<i>Strumbus tricornis</i>
Family: Pteriidae	
4	<i>Pinctada margaritifera</i>
Family: Tro	
5	<i>Trochus virgatus</i>
6	<i>Tectus dentatus</i>
Family: Veneridae	
7	<i>Circenita callipyga</i>
Family: Argonautidae Argonauts	
4	<i>Argonauta argo</i>
Family: Enoploteuthidae Enope squids	
5	<i>Abralia steidachnei</i>
6	<i>Abralia sp</i>
7	<i>Ancistrocheirus lesueuri</i>
Family: Loliginidae Inshore squids	
8	<i>Loligo duvauceli</i>
9	<i>Loligo edulis</i>
10	<i>Sepioteuthis lessoniana</i>
11	<i>Sepioteuthis loliginiformis</i>
Family: Octopodidae Octopuses	
12	<i>Octopus aegina</i>
13	<i>Octopus cyaneus</i>
14	<i>Octopus defilippi</i>
15	<i>Octopus membranaceus</i>
16	<i>Octopus vulgaris</i>
17	<i>Citopus indicus</i>
Family: Ommastrephidae Flying squids	
18	<i>Nototodarus hawaiiensis</i>
19	<i>Nototodarus sp.</i>
20	<i>Sthenoteuthis oualaniensis</i>

Family: Onychoteuthidae		Hooked squids
21	<i>Moroteuthis lonnbergi</i>	
Family: Sepiidae		Cuttlefishes
22	<i>Sepia Arabica</i>	
23	<i>Sepia braggi</i>	
24	<i>Sepia brevimana</i>	
25	<i>Sepia kobiensis</i>	
26	<i>Sepia latimanus</i>	
27	<i>Sepia murrayi</i>	
28	<i>Sepia omani</i>	
29	<i>Sepia pharaonis</i>	
30	<i>Sepia prashadi</i>	
31	<i>Sepia recurvirostra</i>	
32	<i>Sepia trygonina</i>	
33	<i>Sepia inermis</i>	
Family: Sepiolidae		Bobtail squids
34	<i>Rossia sp</i>	
<i>Crustacea</i>		
Family: Aristeidae		Aristeid shrimps
1	<i>Aristeus mabahissae</i>	
2	<i>Aristeus semidentatus</i>	
Family: Oplophoridae		Cock shrimps
3	<i>Oplophorus spinosus</i>	
Family: Pandalidae		Pandalid shrimps
4	<i>Heterocarpus tricarinatus</i>	
5	<i>Parapandalus spinipes</i>	
6	<i>Parapandalus sp</i>	
7	<i>Plesionika martia</i>	
Family: Pasiphaeidae		Glass shrimps
8	<i>Pasiphaea sp</i>	
Family: Solenoceridae		Solenocerid shrimps
9	<i>Solenocera hextii</i>	
Family :Penaeidae		Penaeid shrimps & Prawns
10	<i>Metapenaeopsis coniger</i>	Deep Sea Shrimp

11	<i>Metapenaeus monoceros</i>	
12	<i>Parapenaeus investigatoris</i>	
13	<i>Penaeopsis balssi</i>	
14	<i>Penaeopsis jerryi</i>	
15	<i>Penaeus indicus</i>	
16	<i>Penaeus japonicus</i>	
17	<i>Penaeus monodon</i>	
18	<i>Penaeus semisulcatus</i>	
19	<i>Penaeu latisulactus</i>	
Family: Portunidae		Crabs
20	<i>Charybdis smithii</i>	
21	<i>Portunus pelagicus</i>	
22	<i>Scylla serrata</i>	
Family: Nephropidae		True lobster & lobsterettes
23	<i>Metanephrops andamanicus</i>	
24	<i>Nephropsis stewarti</i>	
Family: Palinuridae		Spiny lobsters
25	<i>Panulirus homarus</i>	Rock Lobster
26	<i>Panulirus longipes</i>	
27	<i>Panulirus ornatus</i>	
28	<i>Panulirus penicillatus</i>	R. Lobster
29	<i>Panulirus versicolor</i>	
30	<i>Puerulus angulatus</i>	
31	<i>Puerulus sewelli</i>	Deep Sea Lobster
Family: Scylliaridae		Slipper lobsters
32	<i>Thenus orintalis</i>	
<i>Echinodermata</i>		
Family: Holothuridae		Sea cucumber
1	<i>Actinopyga echinites</i>	
2	<i>Actinopyga mauritiana</i>	
3	<i>Bohadshia marmorata</i>	
4	<i>Holothuria atra</i>	
5	<i>Holothuria scabra</i>	
6	<i>Microthele nobilis</i>	
7	<i>Stichopus variegates</i>	

Threats to Marine Biodiversity

Threatening Processes:- Not surprisingly, rising human populations are the greatest threat to marine, and coastal organisms and their associated habitats. Most declines in marine and coastal species have been attributed to anthropogenic (or human induced) factors, namely over fishing, habitat degradation and the introduction (both deliberate and accidental) of aquatic pest species. Human overpopulation leads to increasing consumer demand for fishes as food and places pressures on the habitats occupied by them.

Shipping and aquaculture activities cause pest species to be transferred from place to place, further threatening the survival of native species populations. Some species have particular biological characteristics that render them more vulnerable to human induced pressures than others.

When a species becomes biologically extinct, and is therefore completely removed from an ecosystem, there are likely to be carry-over effects to other species (vertebrates and invertebrates alike) in that ecosystem. Predator and prey relationships in any particular area (without human interference) are naturally balanced towards sustaining the needs of species in an ecosystem, and the removal of species through extinction is likely to benefit some species, but adversely affect others. Extinctions of species that play a role in providing habitat, food or any advantage to another species can ultimately lead to a chain of extinctions effect.

Over fishing:- Targeted fisheries may collapse when stocks become so reduced that they are no longer profitable to pursue. However, the concept that a fish will reach economic extinction before biological extinction is uncertain in cases where the value of the product is so high that it is economical for fishers to pursue an extremely small surviving stock (Camhi *et al.*, 1998). Similarly, in a mixed-species fishery where all species are subject to the same fishing effort and similar levels of fishing mortality, less abundant species subjected to fishing activity throughout their range could be driven to extinction, while numerically dominant species continue to support the fishery (Camhi *et al.*, 1998). Many commercial fishing techniques thus have the potential to detrimentally affect fish populations by both direct exploitation of target species and indirect exploitation of bycatch species. Some fisheries are expanding rapidly into deeper parts of the Yemen Fishing Zone, even before the habitat within these areas is studied and understood. Average annual catches of sharks and rays from the Red Sea and Gulf of Aden by Yemeni artisanal fishermen in the 1990s had always exceeded the total annual landings of the countries in the region. In RSGA .The trend in total landings of shark and rays by artisanal fishermen in the Yemeni waters in the Red Sea demonstrates decline with increased effort. A minimum of 6,800 fishermen and 1,297 vessels of various sizes are directly involved in shark fishing in Yemen (Bonfil, 2003). It is essential that basic research on the potential impacts of fishing be carried out before new fisheries develop to accurately assess the implications of any such fishing operations on the environment.

Fisheries bycatch:- Bycatch is that portion of the catch, whether retained or discarded, that is taken while targeting other species. The extent of bycatch and discarded fish species, both in domestic fisheries and worldwide, is often poorly documented. However,

many fisheries still lack a basic description of the species composition of their bycatch (Stobutski *et al.*, 2000).

Although catches of non-target species can be difficult to manage, fisheries managers cannot address the effects of fishing on bycatch without first knowing what species are taken and the quantities of each species taken by each fishery. Monitoring of bycatch is vital for producing baseline information and also for determining whether changes in the catch rates of bycatch species occur (Stobutski et al., 2000).

Adopting a Policy on Fisheries Bycatch, which commits all major fisheries to complete a Bycatch Action Plan? To be developed in partnership with industry and other stakeholders and will focus on practical solutions and management measures to provide measurable statistical information on the total catch of quota species and other bycatch species through the use of observers. Providing identification guides to fishers will theoretically improve logbook recording and provide more information to fisheries managers for decision-making processes.

Elasmobranches are more vulnerable to over fishing than bony fishes because of their well-documented life history characteristics. Elasmobranches are caught incidentally, as bycatch, in most fisheries worldwide (Camhi et al., 1998). Mortality of incidentally caught sharks and rays is thought to be significant, especially in trawl nets, gillnets, purse seines and loglines, and may exceed mortality from directed fisheries (Camhi et al., 1998).

An increase in elasmobranches fin prices has encouraged the practice of ‘finning’ sharks that were previously discarded intact or released alive. Fins are easily air-dried and stored and do not require refrigeration, whereas retention of whole shark carcasses can compete for freezer space with more valuable species like tunas (Camhi *et al.*, 1998). The high prices paid for shark fins presumably increases the incentive for fishermen to retain the fins from sharks caught. Rare species of elasmobranches taken as bycatch and entering this trade (e.g. sawfishes) are of particular concern. There is a fishery endeavor for saw fishes (Pristidae) in the southern Red Sea coast of Yemen. Saw fishes are presently considered one of the most threatened elasmobranches groups globally because their populations worldwide have diminished to extremely small ranges of distribution due to fishing pressure. Saw fishes are believed to be one of the most fragile species because they seem to have very slow reproductive rates, thus their capacity to recover from fishing is extremely low (Hariri, 2002).

Batoid and small coastal shark populations are seriously affected as bycatch in bottom trawl fisheries. Local fishermen have widely unified their effort for shark finning practice all along the Yemeni coastal and open water leading the valuable resource to the brink of extinction. The last couple of years have led to the scarcity of catch due to the depletion of the shark stock in the Yemeni waters. Yemeni local fishers have extended their activities to the Somali and Sundaes waters hunting sharks for their fins.

Prawn trawling has long been documented as one of the worst offenders in terms of the proportion of bycatch to prawns caught. Alverson *et al.* (1994) estimated that 27 million tonnes of bycatch were discarded globally each year, a third of which was estimated to come from prawn trawls. The “sustainability” of a bycatch species is determined by the susceptibility of the species to capture and its mortality due to the fishing method (its vulnerability), and the capacity of the species to recover once depleted (its recovery). In terms of prawn trawling, species least likely to be “sustainable” due to their low recovery

capacity are soft-sediment associated benthic or demersal species, which often include prawns in their diet.

Bottom trawling and dredging: - Possibly the most threatening processes to the survival of Yemen marine fish species in terms of the effects of existing fishing methods are those of bottom trawling and dredging. Trawls or related fishing gear are now used on every kind of bottom type. This mobile fishing gear crushes, buries and exposes marine animals and structures on and in the substratum, sharply reducing structural diversity. Mobile fishing gear can have large and long-lasting effects on benthic communities, including young stages of commercially important fishes, although some species may benefit when structural complexity is reduced. These operations not only degrade benthic habitat and limit habitat diversity and available prey species for fishes, but also take considerable amounts of bycatch species. Seamount fauna is highly vulnerable to trawling and is likely to have limited resilience, as its slow growth and low natural mortality are adapted to an environment with little natural disturbance. Fishing-generated changes to the seabed differ in different areas according to the characteristics of the gear, the site and their interaction. Using a precautionary approach to management, modifying fishing methods, and creating refuges free from mobile fishing gear, are ways to reduce these effects on biodiversity and fish habitat (Watling and Norse, 1998).

Habitat degradation: - The IUCN has identified habitat loss or degradation as a major reason for the threatened status of 55 per cent of endangered fishes (Almada-Villela, 1998). Sensitive marine environments, valuable as fish habitat, have become degraded through a variety of polluting and extractive activities and coastal habitat is being destroyed at an alarming rate (Camhi *et al.*, 1998). Human activity threatens coastal habitats through coastal development, fisheries activities, chemical and nutrient pollution (such as agricultural runoff, freshwater diversion from inflowing wadies, ocean effluent outfalls), and the dumping of plastics and other man-made garbage.

Species introductions:- Exotic species can be introduced accidentally (e.g. from ballast water) or deliberately (e.g. for recreational purposes such as fishing, as has been the case for many freshwater species around the world, such as trout). Introduced or exotic marine pest species are perhaps one of the greatest threats to Yemen's fisheries in that these introduced species can do widespread damage not only to fisheries, but also to entire ecosystems.

Aquaculture:- Environmental problems associated with aquaculture derive from habitat degradation (e.g. wastes) and over fishing (e.g. removal of wild fish for brood stock, removing juveniles for grow-out, or removing other species to supply food). However, potentially, the major environmental side effect of aquaculture is the spread of pests associated with the aquaculture species into the wild, and the escapees of the aquaculture species themselves into the wild.

Problems involving aquaculture activities worldwide include the following:-

- The accidental release of marine organisms (i.e. escapees) into natural environments.

- The potential for the spread of disease or parasites from introduced or translocated populations to natural populations. New diseases (like new species in the wild) are continually being discovered in cultured species and may not only harm the species affected and the aquaculture operation, but also can be transmitted to wild stocks.
- The removal of fish from the wild to be used as breeding stock.
- Capture of fish from the wild for feeding aquaculture species, and of juveniles for grow-out into adults.
- Obtaining feed for cultured species can be damaging to the environment if live fishes are harvested from the wild to provide the diet of aquaculture species.
- Pollution of natural environments from the by-products and wastes of aquaculture activities. Increased nutrient output into the adjacent natural environment can detrimentally alter natural ecosystems and hence alter food chains.
- Additional habitat degradation, e.g. from converting wetlands into ponds for aquaculture.
- Altering the natural genetic diversity of wild stocks by mixing aquaculture stocks with the wild stocks, which may potentially decrease the viability and resistance of these wild stocks to parasites and diseases. Once the resistance of wild stocks is reduced, this not only endangers the species in the wild, but also endangers the species for use in future aquaculture operations.

Worldwide, more than 220 species of finfish and shellfish are farmed (Naylor *et al.*, 2000). Global aquaculture production has doubled over the last 15 years (Naylor *et al.*, 2000) and this rapid expansion means that the management, regulatory and monitoring bodies which control these industries have to be increasingly aware of the potential environmental problems associated with these activities and must address them accordingly. The biggest challenge faced by the aquaculture industry appears to be in controlling the spread of pest species into the wild.

Aquarium fish trade:- Whilst habitat destruction and over fishing for food are the main threats facing fish populations in the wild, the ornamental fish trade (or recreational fish-keeping in aquariums and ponds) may have adverse effects as a result of direct depletion of wild stocks. If exploitation for the aquarium trade is linked with other risk factors such as restricted range or fishing pressure, then species may be threatened.

The growing trade in tropical aquarium fishes has become an important source of income for local populations in many parts of the developing world (Almada-Villela, 1998). As many as 800 species are listed as ‘commonly available’ in the aquarium trade, and some individuals such as the Asian bonytongue can sell for up to US\$18,000 (Almada-Villela, 1998). Roughly 90% of the marine species in the trade are thought to be taken directly from the wild in countries such as the Philippines, Singapore and Indonesia (Almada-Villela, 1998). In the Philippines alone, at least 386 species of coral reef fishes belonging to 79 families are utilized in the aquarium trade, supplying up to 80% of the market (Almada-Villela, 1998).

Threats

Threats and impacts resulted from human may endanger the natural habitats and resources, which may also threaten the Biodiversity of species. Pollution, uncontrolled fishing desertification, over grazing are the main sources of threats for species diversity in Yemen.

Pollution

- a- Oil pollution caused by the discharge of dirty ballast/tank washing overboard at sea which form tar balls and oil droplets have been reported from most of the coastline of Yemen, e.g. Foua , Bir Ali , Ras Al Kalb, Gosair, Shugrah, Aden to Babel-Mandeb south of Mukha (Rushdi; etal 1994 , MAE 1996a,b, DouAbul & Abubakr 1996) . Such practices are widespread due to lack of surveillance (Figure2).

Poor maintenance of ports facilities may cause locally significant leaks which could endanger marine organisms.



Figure (2), Oil pollution from oil tankers reaches the coast line of Hadramout.

- b- Municipal wastes: Accumulation of human non degradable litter occur around the coastal population centers .This is reported from beaches of Hadramout , Shugra, Bir Ali , Aden , Al-Hudeidah (Figure, 3) (Rushdi; etal 1994 , MAE 1996a)



Figure (3) shows the humma litter accumulation on the coastal area of Bir Ali.

c- Domestic sewage:

Domestic sewage in all cities and towns along the coastal line is discharged directly to the sea without prior treatments. Al-Hudeidah is the only city along the coast with primary treatment facility of sewage effluent. Aden has no form of sewage treatment and raw organic matter is discharged directly into the littoral zone. A number of fish kills off during summer months have been associated with elevated sea temperature combined with a raised biological and chemical oxygen demand from discharged organic and inorganic matter (MAE 1996a) . This is also may endangered public health.

d- Industrial discharge:

Many small and medium size industrial establishment along the coastline discharge their effluent directly to the sea . Paint / Pattry manufactures, textile dye production all of which produce untreated effluents containing various toxic chemical compounds and heavy metals discharged directly to the sea. Moreover fish canning factories in Mukala and Shugra also discharge their effluent to the sea.

- e- Thermal pollution: The main source of thermal pollution along the coastline of Yemen comes from the cooling water of the power stations and oil refinery in Al-Hudeidah, Al-Mukha, Aden and Kalf. Communities may be sensitive to thermal pollution, since tropical marine life generally live at a temperature closer to maximum and any further rise cannot be tolerated.

Fishing

Economic fishing practices in Yemen is growing where a large number of private enterprise are moving toward the exploitation of marine resources. Such activities could be an important source of threats which endangered the fishes and its sustainability; especially in the absence of an adequate legal frame work and surveillance. Moreover, many foreign non-licensed fishing boats enter the Yemeni water for fishing using illegal fishing methods. Other potential impacts are:-

- 1- Over fishing
- 2- By-product is not used and discharged to nearby water.
- 3- Habitat destruction through trawling.
- 4- Industrial trawlers approaching within a kilometer of shore which may cause the slow recovery of the fishing grounds . (MAE, 1996a).

Despite the long marine area of Yemen and great richness of its fishing ground due to the high productivity created by the upwelling system, certain species could be threatened and endangered. These include (Shrimps, Lobster, Aquarium fish, Turtles).

- a- Shrimps:- Shrimps are heavily fished from the area between Al-Salif - Midi and south of Al-Hudeidah by private sectors compromise and individual . Unwise trawling used in this area results in the destruction of habitats and discarding a large amount of by-products back to the sea (≈80% - Personal observation) . This practice could endangered many species of shrimps which found in small numbers , such as *Penaeus monodon* , *P. indicus* .
- b- Spiny rock lobster *P. homarus*:- *P. homarus* is being fished heavily by a number of corporations (ex, Coastal fishing corporation; Brum Co.; Hadramout Enterprises, cooperatives and individual fishermen). Other potential impacts threatened this species, is the lost or abandoned of fishing gear in Al-Mahara region . Lost traps continue to capture until the wire netting disintegrates. Around 75% of lobster traps lost over a single three months season, where 196 boats each operating 30 traps; an estimated 4410 traps were lost / year in the region between Da'abut to Oman coast (MAE, 1996 a).
- c- Aquarium fishes:- Licenses have been issued for local and foreign enterprises to catch the colorful coral reef fishes for ornamental and aquarium trade. Many of reef fishes are either endemic or found in small numbers and such practice may indeed endanger their existence if it is done without monitoring; surveillance and stock assessment.

- d- Sharks:- Sharks are being fished heavily along the whole Yemeni waters by local fishermen; and coastal fishing corroborative in the southern coast due to the increased demand for their fins. The exceeded demand for shark fins, results in the discarding of trunks, especially by commercial vessels. A wide variety of species and sizes are caught. The main problem is that, shark populations display a loose relationship between adult stock and recruitment. This means that they have a low capacity to recover in the event of recruitment over-fishing. Moreover, the period between birth and recruitment to the fishery is often long, and consequently several years may be needed before the effects of recruitment occur. Accordingly, it seems that Yemen shark fisheries are heavily over exploited and if it continues unmanaged, will inevitably collapse, and rare species could be extinct.
- e- Turtles:- Sea turtles are considered to be endangered animals world-wide by the IUCN, since their nesting habitats have been reduced to a level where the species become in immediate danger. In Yemen sea turtle are killed for their meat and their eggs are collected for food. Damage to their nesting areas near Al-Khawkhah, north Dhubab, Ras Ba-Ghashwa, Mhifif, Ras Sharma and Socotra Island seems a common practice by humans. In Socotra a number of 15-30 turtles are killed/village/year. Socotran people kill turtles for their meat, carapace which used for various purpose (e.g. salt drying), fat boiled to produce oil for treatment from asthma. Another threat comes from the accidental catch of turtles and some times dolphins and dugond by fishing nets.

Desertification and Grazing of coastal flora

Grazing pressure in fragile areas with sparse vegetation (Sand dunes) could lead to the destabilization of the local ecology. However, the impacts which can affect halophytes, mangroves, palm and other vegetation growing along the coastline of Yemen and effect may reach and destroy the coralreef habitats (figure, 4). It includes direct destruction for land development, fuel or wood, and indirect destruction by lowering the water table. The effect may include:

- a- Soil surface compaction.
- b- Accelerated soil erosion.
- c- Prevention of natural regeneration of vegetative cover.
- d- Decrease diversity of habitats, number of species and individual.
- e- Impairment of resting places used by birds on long distance coastal migration.



Figure (4), Dust storm carrying sands from the coastal dried habitats to the marine fragile areas.

Threats, constraints and needs:-

As mentioned earlier, pressures on the natural environment in Yemen are varied including poverty, population pressure, unwise investments and ignorance the importance's of EIA. These factors can in turn lead to destruction and degradation of habitats, pollution and over-utilization of natural resources. The following are considered the major threats to the coastal and marine environment of Yemen:-

- Uncontrolled use of coastal zone because there is no specific authority takes the responsibility alone to control the using of coasts and prevents the destruction of coastal habitats and prevents the spatial conflicts among various users.
- Unplanned coastal reclamation and there is no Environmental Impact Assessment (EIA) before any coastal project which cause destruction of marine and coastal habitats and ecosystems.
- Land-based pollution due to the liquid and solid waste pollution from sewage, industrial plans, ports facilities as well as oil pollution from the industries and agrochemical flushed by floods.
- Mangrove ecosystem destruction by cutting of mangrove trees for wood and use of mangroves for feeding camels.
- Over fishing of several species which cause sharp decline of important resources especially lobster, cuttlefishes, shrimps and sharks. Also poaching of foreign vessels and uncontrolled gear and fishing effort as well as the lack of fish quality control.

- Destruction of living marine resources (LMR), for example, using bottom trawling cause destruction of benthic habitats such as coral reefs and the associated species like reef fishes. Also the destruction of endangered species due to non-selective gear.
- Sea-based pollution such as oil pollution from passing ships and waste dumped by these ships.

As habitat loss continues, species extinctions can be expected and Conservation measures are therefore a matter of urgency. This means that utilization should be based not only on economic consideration but also on ecological and environmental principles, and should be underpinned by the principle of sustainable use. However, there are many difficulties and needs to achieve such a sustainable use of resources, protecting and listing threatened species. The difficulties in developing threatened (protected) species lists in Yemen are:

- The country marine habitats are large dispersed.
- Human resources limitations (expertise, skills, education levels and opportunities for training and employment).
- Limited information (population, ecology).
- Limited funding for doing research, surveys and monitoring.

Important requirements for strengthening and developing threatened species listing in the future include:

- Developing national criteria for threatened species.
- Monitoring and evaluating the status of protected species.
- Training programs on species assessment and analysis, and research methodology.
- Increasing human resources capacity.
- Enforcement of legislation and regulations those are relevant to biodiversity conservation.

**Annex (1): Phytoplankton from the Red Sea Neritic zone of the Yemeni Waters
(After Halim 1969, EH&A 1989 & Rushdi; etal 1994)**

<u>Diatoms :</u>	
<i>Achnanthes manifera</i>	<i>Diploneis cf. notabilis</i>
<i>Achnanthes wellsiae</i>	<i>Diploneis cf. oculata</i>
<i>Achnanthes sp.</i>	<i>Diploneis smithii</i>
<i>Actinoptychus undulatus</i>	<i>Epithemia argus</i>
<i>Amphiprora sp.</i>	<i>Fragillaria pinnata</i>
<i>Amphora cf. arcus</i>	<i>Grammatophora sp.</i>
<i>Amphora biggiba</i>	<i>Guinardia flaccida</i>
<i>Amphora coffeaeformis</i>	<i>Hemiaulus sinensis</i>
<i>Amphora crassa</i>	<i>Hyalodiscus sp.</i>
<i>Amphora graeffi</i>	<i>Mastogloia cf. braunii</i>
<i>Amphora ocellata</i>	<i>Mastogloia lineata</i>
<i>Amphora ovalis</i>	<i>Mastogloia quinquecostata</i>
<i>Amphora spectabilis</i>	<i>Mastogloia smithii</i>
<i>Amphora sp.</i>	<i>Melosira sulcata</i>
<i>Asteromphalus flabellatus</i>	<i>Melosira cf. moniliformis</i>
<i>Bacillaria paradoxa</i>	<i>Navicula cancellata</i>
<i>Bacterastrum deliculatum</i>	<i>Navicula hennedyi</i>
<i>Biddulphia aurita</i>	<i>Navicula humerosa</i>
<i>Biddulphia mobiliensis</i>	<i>Navicula lyra</i>
<i>Biddulphia regina</i>	<i>Navicula musca</i>
<i>Brachysira vitrea</i>	<i>Navicula cf. tenera</i>
<i>Campylodiscus clypeus</i>	<i>Navicula distans</i>
<i>Chaetoceros cf. affinis</i>	<i>Navicula longissima</i>
<i>Chaetoceros atlanticus</i>	<i>Navicula cf. microcephala</i>
<i>Chaetoceros curvisetus</i>	<i>Navicula panduriformis</i>
<i>Chaetoceros danicus</i>	<i>Navicula punctata</i>
<i>Chaetoceros lorenzianus</i>	<i>Navicula cf. seriata</i>
<i>Chaetoceros gracilis</i>	<i>Navicula sigmoidea</i>
<i>Cocconeis sp.</i>	<i>Navicula tropica</i>
<i>Cosinodiscus centralis</i>	<i>Navicula cf. vidovicii</i>
<i>Cosinodiscus nitidus</i>	<i>Planktoniella sol</i>
<i>Cyclotella meneghiniana</i>	<i>Pleurosigma sp.</i>
<i>Cyclotella striata</i>	<i>Rhizosolenia alata</i>
<i>Cymbella cf. lunata</i>	<i>Rhizosolenia setigera</i>
<i>Cymbella microcephala</i>	<i>Surirella fastuosa</i>
<i>Cymbella norvegica</i>	<i>Synedra formosa</i>
<i>Denticula elegans</i>	<i>Thalassionema nitzschioides</i>

<p><i>Thalassiosira excentrica</i> <i>Thalassiosira lineata</i> <i>Thalassiothrix mediterranea</i> <i>Trachyneis aspera</i> <i>Biddulphia sinensis</i> <i>Chaetoceros neapolitanum</i> <i>Chaetoceros robustum</i> <i>Chaetoceros schmidti</i> <i>Chaetoceros tetrastichon</i> <i>Lauderia annulata</i> <i>Stephanophyxis turris</i> <i>Streptotheca thamesis</i> <i>Striatella delicatula</i> <i>Thalassiosira monile</i> <i>Thalassiothrix longissima</i></p> <p><u>Dinoflagellates</u> <i>Amphisolenia bifurcata</i> <i>Ceratium cf. schroteri</i> <i>Ceratium furca</i> <i>Ceratium carriense</i> <i>Ceratium contortum</i> <i>Ceratium fusus</i> <i>Ceratium tripos</i> <i>Ceratium breve</i> <i>Ceratium deflexum</i> <i>Ceratium egyntiacum</i> <i>Ceratium reflexum</i> <i>Ceratium dens</i> <i>Ceratium vultur</i> <i>Ceratium schmidri?</i> <i>Ceratium longipes</i> <i>Ceratium macroceros</i> <i>Ceratium setaceum</i> <i>Ceratium karsteni</i> <i>Ceratium trichoceros</i> <i>Peridinium africanoides</i> <i>Peridinium elegans</i> <i>Peridinium orientale</i> <i>Peridinium matzenaueri</i></p>	<p><i>Peridinium nipponicum</i> <i>Ceratocorys bipes</i> <i>Dinophysis miles</i> <i>Dinophysis caudata f. maris rubri</i> <i>Dinophysis miles f. maris rubri</i> <i>Dinophysis miles f. triposoides</i> <i>Dinophysis caudata</i> <i>Dinophysis acuta</i> <i>Dinophysis spp.</i> <i>Noctiluca sp.</i> <i>Podolampas sp.</i> <i>Prorocentrum cf. micans</i> <i>Prorocentrum sp.</i> <i>Ornithocercus orbiculatus</i> <i>Parahistioneis crateriformis</i> <i>Pyrodinium schilleri</i> <i>Gymnodinium galeaeformis?</i> <i>Asterionella japonica</i> <i>Bacterastrum curbisetus</i> <i>Bacterastrum affinis</i> <i>Bacterastrum mobiliensis</i> <i>Cosinodiscus ferforatus</i> <i>Cosinodiscus radiatus</i> <i>Cosinodiscus lineatus</i> <i>Gonyaulax digitale</i> <i>Gonyaulax spinifera</i> <i>Gonyaulax polygramma</i> <i>Navicula diatoms</i> <i>Nitzschia paradoxa</i> <i>Noctiluca spp.</i> <i>Peridinium depressum</i> <i>Peridinium granii</i> <i>Pyrophacus horologium</i> <i>Thalassiosira excentrica</i></p> <p><u>Chrysophyta</u> <i>Dectyocha perlaevis</i></p>
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Annex (2): Zooplankton species lists from the Yemen Red Sea water
 (s) = Restricted to the southern part of the Red Sea only (Halim 1969)

<p><u>Tintinnids</u> <i>Amphorella quadrilineata</i> <i>Amphorella amphora</i> (s) <i>Codorella galea</i> <i>Codorella morchella</i> <i>Codorella orthocoras</i> <i>Codorella ostenfeldi</i> <i>Codonellopsis erythraensis</i> (s) <i>Codonellopsis bulbulus</i> <i>Codonellopsis indica</i> (s) <i>Codonellopsis ostenfeldi</i> (s) <i>Codonellopsis schabi</i> (s) <i>Craterella obscura</i> <i>Craterella urceolata</i> <i>Craterella striata</i> <i>Cryttarocylis annulifera</i> (s) <i>Dictyocysta duplex</i> (s) <i>Dictyocysta reticulata</i> (s) <i>Epicanella nervosa</i> <i>Epicanella brandti</i> (s) <i>Epicanella reticulata</i> (s) <i>Epiorella curta</i> <i>Euthintinnus fraknoi</i> <i>Euthintinnus lusus-undae</i> <i>Euthintinnus erythraensis</i> (s) <i>Euthintinnus macilentus</i> <i>Favella azorica</i> <i>Favella serrats</i> <i>Favella ehrmbergii</i> <i>Favella campanula</i> (s) <i>Favella panamensis</i> (s) <i>Helicostomella subulata</i> (s) <i>Metacylis jorgonseni</i> (s) <i>Petalotricha ampulla</i> <i>Protorhabdonella simplex</i> <i>Protorhabdonella curia</i> (s) <i>Rhabdonella amor</i> <i>Rhabdonella elegans</i> (s)</p>	<p><i>Rhabdonella poculum</i> <i>Rhabdonella valdestriata</i> <i>Salpingella acuminata</i> <i>Tintinnopsis annulata</i> (s) <i>Tintinnopsis butschli</i> v. <i>Mortenseni</i> (s) <i>Tintinnopsis campanula</i> (s) <i>Tintinnopsis compressa</i> (s) <i>Tintinnopsis cyathus</i> (s) <i>Tintinnopsis beroidea</i> <i>Tintinnopsis angulata</i> (s) <i>Tintinnopsis lobiancoi</i> (s) <i>Tintinnopsis platensis</i> (s) <i>Tintinnopsis radix</i> (s) <i>Tintinnopsis tocaninensis</i> (s) <i>Tintinnopsis tubulosa</i> (s) <i>Tintinnopsis beroidea</i> v. <i>rotundata</i> <i>Undella claparedei</i> <i>Xistonella treforti</i> <i>Xistonella longicauda</i> (s) <i>Xistonella scandens</i> (s) <u>Chondrophores & Siphonophores</u> <u>(Southern Red Sea)</u> <i>Forskalia</i> sp. <i>Nanomia bijuga</i> <i>Agalma okeni</i> <i>Sulcaleolaria churi</i> <i>Sulcaleolaria quadri-valvis</i> <i>Diphyes dispar</i> <i>Diphyes chamissoris</i> <i>Abylopsis tetragna</i> <i>Enneagonum hyalinum</i> <i>Lensia subtibides</i> <i>Chelophyes contorta</i> <i>Sphaeronectes</i> sp. <u>Scyphomedusan (Southern Red Sea)</u> <i>Charybdea alata</i> <i>Cephea cephea</i></p>
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<p><i>Cephea octostyla</i> <i>Cotylorhiza erythrea</i> <i>Mastigias gracile</i> <i>Lorifera lorifera</i> <i>Crabionella orsini</i> <i>Rhopilema hispidum</i> <i>Cyarea sp.</i> <i>Aurelia aurita</i></p> <p><u>Ostracods & Cladocerans (Southern Red Sea&Gulf of Aden)</u></p> <p><i>Pyrocypris amphiacantha</i> <i>Pyrocypris chierchiaie</i> <i>Pyrocypris rivilli</i> <i>Pyrocypris sinuosa</i> <i>Philomedes gibbosa</i> <i>Euconchoecia chierchiaie</i> <i>Penilia avirostris</i></p> <p><u>Copepod (Restricted t. (Southern Red Sea)</u></p> <p><i>Candacia acthiopica</i> <i>Candacia bispinosa</i> <i>Candacia longimana</i> <i>Candacia simplex</i> <i>Eucalanus crassus</i> <i>Eucalanus subtenuis</i> <i>Phaenna spinifera</i> <i>Pontella fera</i> <i>Rhincalanus cornutus</i> <i>Sapphirina gastrica</i> <i>Sapphirina maculosa</i> <i>Sapphirina scarlata</i> <i>Sapphirina vorax</i> <i>Scolecithrix auropecten</i> <i>Scolecithrix tenuipes</i> <i>Xanthocalanus gigas</i></p> <p><u>Cheatoznatha (Red Sea&Gulf of Aden)</u></p> <p><i>Sagitta ferox</i> <i>Sagitta bipunctata</i> <i>Sagitta hexaptera</i> <i>Sagitta inflata</i></p>	<p><i>Sagitta neglecta</i> <i>Sagitta regularis</i> <i>Sagitta robusta</i> <i>Sagitta serratodentata</i> <i>Sagitta sibogae</i> <i>Krohnitta pacifica</i> <i>Pterosagitta draco</i></p> <p><u>Tunicates (Southern Red Sea)</u></p> <p><i>Fritllaria borealis f. sargassi</i> <i>Fritllaria formica f. digitata</i> <i>Fritllaria tenella</i> <i>Oikopleura albicans</i> <i>Oikopleura parva</i> <i>Oikopleura rufescens</i> <i>Stegosoma magnum</i></p>
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Annex (3): Invertebrates species lists of Yemen fauna,
Where numbers indicates: (1) Red Sea, (2) Gulf of Aden, (3) Socotra Archipelago
(After IUCN 1987, EH&A 1989, Rushdi; etal 1994 & MAE, 1996a, b)

<u>Porifera</u>		<i>Acropora reticulata</i>	1
<i>Ircinia sp.</i>	3	<i>Porites solida</i>	
<i>Cliona sp.</i>	3	<i>Porites nodifera</i>	1
<i>Hymedesmia sp.</i>	3	<i>Porites spp.</i>	2
<i>Siphonochalina sp.</i>	3	<i>Porites (?)lutea</i>	1/3
<i>Chondrillastra sp.</i>	3	<i>Porites lutea</i>	1
<i>Heteronema erecta</i>	1	<i>Goniopora sp.</i>	2
<i>Bajulus laxus</i>	1	<i>Siderastrea sp.</i>	2
<i>Biemna fortis</i>	1	<i>Gardineroseris sp.</i>	2
		<i>Galaxea sp.</i>	2
<u>Non scleractinian anthozoa</u>		<i>Montipora (?)tuberculosa</i>	
<i>Gorgonia spp.</i>	2	<i>Pocillopora verrucosa</i>	1/3
<i>Zooanthids</i>	2	<i>Pocillopora spp.</i>	2/3
<i>Zeniidae</i>	2	<i>Stylophora spp.</i>	2/3
<i>Pyrasoma sp.</i>	2	<i>Goniopora sp.</i>	
<i>Alcyonaria sp.</i>	1/3	<i>Pseudosiderastrea tayami</i>	
<i>Sinularia sp.</i>	3	<i>Siderastrea sp.</i>	
<i>Sacrophyton sp.</i>	3	<i>Siderastrea savignyana</i>	
<i>Millepora sp.</i>	3	<i>Psammocora contigua</i>	1/3
<i>Dendonephthya sp.</i>	1/3	<i>Coscinaraea sp.</i>	2/3
<i>Anthelia glauca</i>	3	<i>Coscinaraea monile</i>	
<i>Xenia sp.</i>	1/3	<i>Leptoseris (?)mycetoseroides</i>	
<i>Stoichactis sp.</i>	3	<i>Pavona sp.</i>	2/3
		<i>Galaxea fascecularis</i>	1/3
<u>Scleractinia (Stoney corals)</u>		<i>Acanthastrea sp.</i>	2/3
<i>Monitpora spp.</i>	2	<i>Echinophyllia sp.</i>	2/3
<i>Acropora spp.</i>	2	<i>Lobopyllia hemprichii</i>	3
<i>Acropora hemprichii</i>		<i>Lobophyllia corymbosa</i>	1/3
<i>Acropora humilis</i>		<i>Hydnophora sp.</i>	2/3
<i>Acropora (?)digitifera</i>		<i>Favia pallida</i>	1/3
<i>Acropora cf. danai</i>		<i>Favia favius</i>	3
<i>Acropora valenciennesi</i>		<i>Favia sp.</i>	2/3
<i>Acropora cathrata</i>		<i>Echinopora lamellosa</i>	1/3
<i>Acropora reticulata</i>	1	<i>Echinopora gemmacea</i>	
<i>Acropora hyacinthus</i>	1	<i>Leptastrea sp.</i>	2/3
<i>Acropora palifera</i>	1	<i>Cyphastrea serailia</i>	
<i>Acropora nasuta</i>	1	<i>Plesiastrea sp.</i>	2/3
<i>Acropora capillaris</i>	1	<i>Diploastrea sp.</i>	

<i>Leptoria phrygia</i>	1/3	<i>Goniastrea australensis</i>	1
<i>Platygyra daedalea</i>	1/3	<i>Goniastrea palauensis</i>	1
<i>Platygyra sp.</i>	2	<i>Turbinaria mesenterina</i>	1
<i>Goniastrea (?)retiformis</i>	1/2/3	<i>Hydnophora rigida</i>	1
<i>Tubastrea micracanthus</i>		<i>Oxypora lacera</i>	1
<i>Tubastrea coccinea</i>		<i>Oxypora glabra</i>	1
<i>Turbinaria misenterina</i>	1/2/3	<i>Lobophyllia costata</i>	1
<i>Cycloseris sp.</i>	1/3	<i>Montipora danae</i>	1
<i>Pachycerianthus mana</i>	1	<i>Montipora verrucosa</i>	1
<i>Tubipora musica</i>	1	<i>Pectinia lactuca</i>	1
<i>Sarcophyton trocheliophorum</i>	1	<i>Echinophophyllia spp.</i>	1
<i>Stoichactis gigas</i>	1	<i>Stylophora wellsii</i>	1
<i>Palythosa tuberculosa</i>	1	<i>Stylophora mammillata</i>	1
<i>Pocillopora sp.</i>	1	<i>Dendrophyllia minusaula</i>	1
<i>Pavona frondifora</i>	1	<i>Pavona varians</i>	1
<i>Pachyseris sp.</i>	1	<i>Favites pentagona</i>	1
<i>Ctenactis echinata</i>	1	<i>Cyphastrea serailis</i>	1
<i>Faviates abdita</i>	1	<i>Cyphastrea spp.</i>	1
<i>Goniastrea retiformis</i>	1	<i>Millepora exaesa</i>	1
<i>Hydnophora rigida</i>	1	<i>Psammocora haimeana</i>	1
<i>Lobophyllia sp.</i>	1		
<i>Fungia (Ctenactis) echinata</i>	1		
<i>Fungia (Ctenactis) simplex</i>	1		
<i>Fungia (Fungia) fungites</i>	1		
<i>Fungia repanda</i>	1		
<i>Fungia sp.</i>	1/2/3		
<i>Platygyra lamellina</i>	1		
<i>Stylophora pistillata</i>	1		
<i>Stylophora danae</i>	1		
<i>Stylophora suberiata</i>	1		
<i>Stylophora duehlmanni</i>	1		
<i>Pocillopora damicornis</i>	1		
<i>Pavona decussata</i>	1		
<i>Pavona cactus</i>	1		
<i>Porites cylindrica</i>	1		
<i>Porites vigrescens</i>	1		
<i>Plerogyra sinuosa</i>	1		
<i>Pavona clavus</i>	1		
<i>Platygyra lamellina</i>	1		

Annex (4): Mollusks (Yemen - Red Sea)

<p><u>Bivalvia</u> <u>Nuculidae</u> <i>Nucula (Nucula) aff. tamatavica</i> <u>Arcidae</u> <i>Arca (Arca) avellana</i> <i>Arca (Arca) navicularis</i> <i>Trisidos tortuosa</i> <i>Barbatia (Barbatia) setigera</i> <i>Barbatia (Barbatia) amygdaluntostum</i> <i>Barbatia (Barbatia) parva</i> <i>Barbatia (Barbatia) decussata</i> <i>Barbatia (Barbatia) foliata</i> <i>Barbatia (Barbarca) tenella</i> <i>Barbatia (Hawaiarca) reticulata</i> <i>Acar plicata</i> <i>Anadara (Anadara) ehrenbergi</i> <i>Anadara (Anadara) erythraeonense</i> <i>Anadara (Anadara) uropigimelana</i> <i>Anadara (Anadara) antiquata</i> <i>Anadara (Scapharca) natalensis</i> <i>Arca auriculata P. var. lives</i> <u>Noetiidae</u> <i>Striarca erythraea</i> <i>Sheldonella lateralis</i> <u>Glycymerididae</u> <i>Glycymeris (Veletuceta) arabicus</i> <i>Tucetona (Tucetona) audouini</i> <u>Limposidae</u> <i>Limposis (Pectunculina) elachista</i> <u>Mytilidae</u> <i>Brachydontes (Hormomya) pharaonis</i> <i>Brachydontes ?pulex</i> <i>Perna picta</i> <i>Septifer (Septifer) forskali</i> <i>Modiolus (Modiolus) auriculatus</i> <i>Modiolus (Modiolus) aurantius</i> <i>Modiolus philippinarum</i> <i>Modiolus (Fulgida) ligneus</i></p>	<p><i>Gregariella sp.</i> <i>Botula cinnamomea</i> <i>Lithophaga robusta</i> <i>Leiosolenus hanleyanus</i> <i>Leiosolenus lima</i> <i>Leiosolenus tripartita</i> <i>Solamen decussata</i> <i>Rhomboidella vaillanti</i> <i>Musculus (Ryenella) coenobita</i> <i>Musculus (Ryenella) cumingianus</i> <i>Musculus (Musculus) viridulus</i> <i>Arcuatula arcuatula</i> <u>Petriidae</u> <i>Pteria aegyptiaca</i> <i>Pteria macroptera</i> <i>Pteria tortirostris</i> <i>Electroma (Electroma) alacorvi</i> <i>Electroma (Electroma) vexillum</i> <i>Electroma (Pterelectroma) zebra</i> <i>Pinctada margaritifera</i> <i>Pinctada vulgaris</i> <u>Malleidae</u> <i>Malleus (Malleus) savignyi</i> <i>Malleus (Malvufundus) regula</i> <i>Vulsella fornicata</i> <i>Vulsella vulsella</i> <u>Isognomonidae</u> <i>Isognomon (Isogonum) isognomon</i> <i>Crenatula picta</i> <u>Pinnidae</u> <i>Pinna (Pinna) bicolor</i> <i>Pinna (Pinna) muricata</i> <u>Limidae</u> <i>Lima paucicostata</i></p>
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<p><u>Ostreidae</u> <i>Alectryonella crenulifera</i> <i>Saccostrea cucullata</i> <i>Lopha cristagalli</i> <i>Dendrostrea frons</i> <i>Nanostrea exigua</i></p> <p><u>Grypheidae</u> <i>Hytissa hyotis</i> <i>Parahytissa (Numismoida) numisma</i></p> <p><u>Plicatulidae</u> <i>Plicatula australis</i> <i>Plicatula plicata</i></p> <p><u>Pectinidae</u> <i>Chlamys (Mimachlamys) senatoria</i> <i>Chlamys (Chlamys) rubromaculata</i> <i>Chlamys (Chlamys) superficialis</i> <i>Decatopecten amiculum</i> <i>Decatopecten plica</i> <i>Gloriopallium maculosa</i></p> <p><u>Spondylidae</u> <i>Spondylus spinosus</i> <i>Spondylus nicobaricus</i> <i>Spondylus cf. coccineus</i> <i>Spondylus cf. linguafelis</i> <i>Spondylus cf. zonalis</i></p> <p><u>Anomiidae</u> <i>Anomia achaeus</i></p> <p><u>Lucinidae</u> <i>Lucina fieldingi</i> <i>Codakia minuata</i> <i>Codakia tigerina</i> <i>Ctena (Ctena) divergens</i> <i>Linga (Bellucina) semperiana</i> <i>Loripes (Pillucina) cypselis</i> <i>Loripes (Pillucina) fischerianus</i> <i>Loripes (Wallucina) erythraeus</i></p>	<p><i>Anodontia (Anodontia) edentula</i> <i>Divaricella macandreae</i></p> <p><u>Ungulinidae</u> <i>Diplodonta subrotundata</i> <i>Diplodonta ravayensis</i> <i>Diplodonta sp.</i></p> <p><u>Galeommatidae</u> <i>Amphilepida faba</i> <i>Amphilepida peilei</i> <i>Scintilla sp.</i></p> <p><u>Kelliidae</u> <i>Kellia sp.</i> <i>Scintillula scintillula jousseaume</i> <i>Scintillula sp.</i> <i>Lionelita denticulata</i> <i>Kellidae ?sp.</i></p> <p><u>Montacutidae</u> <i>Curvimysella paula</i></p> <p><u>Sportellidae</u> <i>Basterotia (Basterotia) borbonica</i> <i>Basterotia (Basterotia) djiboutiensis</i> <i>Anisodonta sp.</i></p> <p><u>Carditidae</u> <i>Cardita (Cardita) variegata</i> <i>Cardites rufa</i> <i>Beguina gubernaculum</i> <i>Beguina semiorbiculata</i></p> <p><u>Chamidae</u> <i>Chama asperella</i> <i>Chama brassica</i> <i>Chama pacifica</i> <i>Chama yaroni</i> <i>Pseudochama corbierei</i> <i>Pseudochama rianae</i></p>
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<u>Crassatellidae</u>	<i>Tellina (Pinguitellina) pinguis</i>
<i>Bathytormus jousseaumei</i>	<i>Tellina (Obtellina) sericata</i>
<u>Cardiidae</u>	<i>Tellina (Quidnipagus) palatum</i>
<i>Parvicardium sueziense</i>	<i>Tellina (Scutarcopagia) scobinata</i>
<i>Afrocardium richardi</i>	<i>Tellina (Serratina) capsoides</i>
<i>Maoricardium pseudolima</i>	<i>Tellina (Tellinella) adamsi</i>
<i>Acrosterigma flava</i>	<i>Tellina (Tellinella) staurella</i>
<i>Acrosterigma maculosa</i>	<i>Tellina (Tellinella) sulcata</i>
<i>Acrosterigma marerubra</i>	<i>Tellina bertini</i>
<i>Acrosterigma lacunosa</i>	<i>Tellina valtonis</i>
<i>fragum nivale</i>	<i>Tellina (Loxoglypta) rhomboides</i>
<i>Lunulicardia auricula</i>	<i>Tellina (Loxoglypta) secunda</i>
<i>Ctenocardia fornicata</i>	<i>Tellina (Loxoglypta) subpallida</i>
<i>Fulvia australe</i>	<i>Florimetis coarctata</i>
<u>Tridacnidae</u>	<i>Psammotreta (Pseudometis) praerupta</i>
<i>Tridacna (Chametrachea) maxima</i>	<i>Psammotreta (Tellinimacra) edentula</i>
<i>Tridacna (Chametrachea) squamosa</i>	<u>Semelidae</u>
<u>Mactridae</u>	<i>Semele carnicolor</i>
<i>Mactra (Mactra) achatina</i>	<i>Semele fragillima</i>
<i>Mactra (Mactra) lilacea</i>	<i>Semele sinensis</i>
<i>Meropesta nicobarica</i>	<i>Iacra kallima</i>
<i>Meropesta solanderi</i>	<i>Iacra seychellarum</i>
<i>Raeta pellicula</i>	<i>Ervilia bisculpta</i>
<i>Lutraria australis</i>	<i>Ervilia purpurea</i>
<u>Mesodesmatidae</u>	<i>Leptomya (Leptomya) subrostrata</i>
<i>Paphies (Atactodea) striata</i>	<i>Cumingia striata</i>
<i>Caecella cf. zebuensis</i>	<u>Psammobiidae</u>
<u>Cultellidae</u>	<i>Gari (Gari) pallida</i>
<i>Siliqua radiata</i>	<i>Gari (Dysmea) occidens</i>
<u>Solenidae</u>	<i>Gari (Psammobia) insignis</i>
<i>Solen ceylonensis</i>	<i>Asaphis violascens</i>
<i>Solen cylindraceus</i>	<i>Heteroglypta contraria</i>
<i>Solen digitalis</i>	<i>Soletellina ruppelliana</i>
<u>Tellinidae</u>	<u>Solecurtidae</u>
<i>Tellina (Angulus) arsinoensis</i>	<i>Azorinus coarctatus</i>
<i>Tellina (Arcopaginula) inflata</i>	

<p><u>Donacidae</u> <i>Donax (Latona) biradiatus</i> <i>Donax (Machaerodonax) scalpellum</i> <i>Donax clathratus</i> <i>Donax erythraeensis</i></p> <p><u>Veneridae</u> <i>Venus (Antigona) lamellaris</i> <i>Periglypta aff. reticulata</i> <i>Circenita callipyga</i> <i>Circe (Circe) scripta</i> <i>Circe (Parmulophora) corrugata</i> <i>Circe (Parmulophora) crocea</i> <i>Gafrarium pectinatum</i> <i>Sunetta (Sunetta) effosa</i> <i>Tivela ponderosa</i> <i>Timoclea marica</i> <i>Timoclea roemeriana</i> <i>Pitar (Pitarina) hebraea</i> <i>Pitar (Pitarina) spoori</i> <i>Callista (Costacallista) florida</i> <i>Lioconcha (Lioconcha) castrensis</i> <i>Lioconcha (Lioconcha) ornata</i> <i>Tapes (Tapes) deshayesii</i> <i>Tapes (Tapes) sulcarius</i> <i>Venerupis cf. rugosa</i> <i>Paphia undulata</i> <i>Marcia opima</i> <i>Bassina foliacea</i> <i>Irus (Irus) macrophyllus</i> <i>Dosinia (Kereia) histrio</i> <i>Dosinia (Pectunculus) erythraea</i> <i>Dosinia (Dosinella) hepatica</i> <i>Dosinia alta</i> <i>Dosinia pubescens</i></p> <p><u>Petricolidae</u> <i>Petricola (Petricola) divergens</i></p>	<p><i>Petricola (Claudiconcha) madreporarica</i> <i>Petricola (Ruppellaria) hemprichii</i> <i>Petricola (Velargilla) cf. ponsonbyi</i></p> <p><u>Corbulidae</u> <i>Corbula (Anisocorbula) taitensis</i> <i>Corbula (Varicorbula) erythraeensis</i></p> <p><u>Myidae</u> <i>Tugonia (Tugonia) nobilis</i> <i>Tugonia (Tugonella) decurtata</i> <i>Cryptomya (Venatomya) elliptica</i> <i>Sphenia rueppellii</i></p> <p><u>Gastrochaenidae</u> <i>Gastrochaena dentifera</i> <i>Gastrochaena gigantea</i> <i>Gastrochaena ruppellii</i></p> <p><u>Pholadidae</u> <i>Barnea (Anchomassa) erythraea</i> <i>Martesia striata</i></p> <p><u>Teredinidae</u> <i>Teredo furcifera</i> <i>Lyrodes pedicellatus</i> <i>Teredo navalis</i></p> <p><u>Laternulidae</u> <i>Laternula anatina</i></p> <p><u>Clavagellidae</u> <i>Clavagella (Dacosta) lata</i> <i>Brechites (Warnea) attrahens</i></p> <p><u>Pandoridae</u> <i>Pandora flexuosa</i></p>
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<p><u>Gastropoda</u></p> <p><u>Scissurellidae</u> <i>Scissurella dohrniana</i> <i>Scissurella reticulata</i> <i>Scissurella rota</i> <i>Sukashitrochus dorbignii</i></p> <p><u>Haliotidae</u> <i>Haliotis (pustulata) cruenta</i> <i>Haliotis (Sulculus) unilateralis</i></p> <p><u>Fissurellidae</u> <i>Diodora imbricata</i> <i>Diodora ruppellii</i></p> <p><u>Emarginulidae</u> <i>Emarginella cf. cuvieri</i> <i>Subemarginula arabica</i> <i>Subemarginula panhi</i> <i>Subemarginula subrugosa</i></p> <p><u>Patellidae</u> <i>Patella flexuosa</i></p> <p><u>Lottiidae</u> <i>Patelloida profunda</i> <i>Patelloida maraisi</i> <i>Patelloida aff. rolandi</i></p> <p><u>Nacellidae</u> <i>Cellana rota</i></p> <p><u>Trochidae</u> <i>Trochus (Trochus) maculatus</i> <i>Trochus (Infundibulops) erithreus</i> <i>Trochus (Infundibulops) firmus</i> <i>Trochus (Infundibulops) submorum</i> <i>Trochus virgatus</i> <i>Tectus dentatus</i> <i>Clanculus gennesi</i> <i>Clanculus pharaonius</i> <i>Gibbula (Forskalea) declivis</i> <i>Agagus agagus</i> <i>Agagus stellamaris</i></p>	<p><i>Priotrochus obscurus</i> <i>Pagodatrochus variabilis</i> <i>Ethminolia doriae</i> <i>Isanda hornungi</i> <i>Ethalia meneghinii</i> <i>Ethminolia degregorii</i> <i>Pseudominolia gradata</i> <i>Minolia nedyma</i> <i>Euchelus asper</i> <i>Vaceuchelus clathratus</i> <i>Stomatella varia</i> <i>Stomatella cf. arabica</i> <i>Microtis duplicata</i></p> <p><u>Turbinidae</u> <i>Turbo (Turbo) petholathus</i> <i>Turbo (Marmarostoma) chemnitzianus</i> <i>Turbo (Marmarostoma) radiatus</i> <i>Turbo (Lunella) coronatus</i> <i>Turbo (Lunella) viridicallus</i> <i>Turbo pustulatus</i> <i>Homalopoma arsinoensis</i> <i>Bothropoma munda</i> <i>Cyclostrema sp.</i> <i>Liotia atomus</i> <i>Phasianella solida</i> <i>Tricolia ios</i> <i>Tricolia varibailis</i></p> <p><u>Neritidae</u> <i>Nerita (Linnerita) polita</i> <i>Nerita adenensis</i> <i>Nerita (Ritena) longii</i> <i>Nerita (Ritena) neritopsoides</i> <i>Nerita (Cymostyla) quadricolor</i> <i>Nerita (Ritena) sp.</i></p>
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<p><i>Nerita (Theliostyla) albicilla</i> <i>Nerita (Theliostyla) sanguinolenta</i> <i>Smaragdia (Smaragdella) souverbiana</i> <i>Smaragdia (Smaragdista) rangiana</i></p> <p><u>Phenacolepadidae</u> <i>Plesiothyreus arabica</i> <i>Plesiothyreus cosmani</i> <i>Plesiothyreus elongata</i> <i>Plesiothyreus galathea</i> <i>Plesiothyreus cf. laevicostalis</i> <i>Plesiothyreus omanensis</i> <i>Plesiothyreus pararabica</i> <i>Plesiothyreus scobinata</i></p> <p><u>Littorinidae</u> <i>Littoraria (Littoraria) glabrata</i> <i>Littoraria (Littorinopsis) intermedia</i> <i>Nodilittorina (Nodilittorina) arabica</i> <i>Nodilittorina (Granulilittorina) millegrana</i></p> <p><u>Cingulopsidae</u> <i>Eatonina sp.</i></p> <p><u>Rissoidae</u> <i>?Alvania sp.</i> <i>Lucidestea pallaryi</i> <i>Voorwindia tiberiana</i> <i>Rissoidae sp.</i> <i>Rissoina (Rissoina) ambigua</i> <i>Rissoina (Rissoina) spirata</i> <i>Rissoina (Rissoina) dimidiata</i> <i>Rissoina (Phosinella) seguenziana</i> <i>Rissoina (Phosinella) clathrata</i> <i>Rissoina (Rissolina) bertholleti</i> <i>Rissoina (Rissolina) sp.</i> <i>Rissoina (Apataxia) miltozona</i> <i>Zebina (Zebina) tridentate</i></p>	<p><u>Truncatellidae</u> <i>Truncatella pellucida</i> <i>Truncatella sp.</i></p> <p><u>Iravadiidae</u> <i>Iravadia (Pseudonoba) ictriella</i> <i>Iravadia (Pseudonoba) sp.</i></p> <p><u>Barleeidae</u> <i>Amphitalamus saldadinensis</i></p> <p><u>Assimineidae</u> <i>Paludinella sp.</i></p> <p><u>Caecidae</u> <i>Caecum sp.</i> <i>Brochina arabica</i></p> <p><u>Vitrinellidae</u> <i>Vitrinella sp.</i> <i>Pseudoliotia henjamense</i> <i>Teinostoma sp.</i> <i>Teinostoma diotrepes</i> <i>Parviturboides alfredensis</i> <i>Vitrinellidae sp.</i> <i>Cyclostrema biporcata</i> <i>Cyclostrema micans</i></p> <p><u>Cerithiidae</u> <i>Cerithium caeruleum</i> <i>Cerithium columna</i> <i>Cerithium egenum</i> <i>Cerithium nesioticum</i> <i>Cerithium adansonii</i> <i>Cerithium rostratum</i> <i>Cerithium rueppelli</i> <i>Cerithium scabridum</i> <i>Bittium chrysomallum</i> <i>Bittium proteum</i></p>
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<p><i>Clypeomorus bifasciata</i> <i>Clypeomorus purpurastoma</i> <i>Colina pinguis</i> <i>Rhinoclavis (Rhinoclavis) aspera</i> <i>Rhinoclavis (Rhinoclavis) fasciata</i> <i>Rhinoclavis (Rhinoclavis) sinensis</i> <i>Rhinoclavis (Proclava) kochi</i></p> <p><u>Planaxidae</u> <i>Planaxis griseus</i></p> <p><u>Modulidae</u> <i>Modulus tectum</i></p> <p><u>Dialidae</u> <i>Diala sulcifera martensi</i> <i>Diala semistriata</i></p> <p><u>Litiopidae</u> <i>Litiopa melanostoma</i> <i>Styliferina goniochila</i> <i>Alaba virgata</i></p> <p><u>Scaliolidae</u> <i>Scaliola bella</i></p> <p><u>Obtortionidae</u> <i>Obtortio pupoides</i> <i>Clathrofenella cerithina</i></p> <p><u>Potamididae</u> <i>Potamides conicus</i> <i>Terebralia palustris</i></p> <p><u>Turritellidae</u> <i>Turritella cochlea</i> <i>Turritella maculata</i></p> <p><u>Vermetidae</u> <i>Serpulorbis sp.</i></p> <p><u>Strombidae</u> <i>Strombus (Canarium) erythrinus</i> <i>Strombus (Canarium) mutabilis</i> <i>Strombus (Gibberulus) gibberulus</i> <i>Strombus (Conomurex) fasciatus</i> <i>Strombus (Tricornis) tricornis</i></p>	<p><i>Lambis (Lambis) truncata sebae</i> <i>Tibia insulaechorab insulaechorab</i> <i>Tibia insulaechorab cuta</i></p> <p><u>Hippoycidae</u> <i>Cheilea cicatricosa</i> <i>Hipponyx (Malluvium) lissus</i></p> <p><u>Calyptraeidae</u> <i>Calyptraea edgariana</i> <i>Calyptraea pellucida</i> <i>Crepidula excisa</i></p> <p><u>Xenophoridae</u> <i>Xenophora (Xenophora) chinensis</i> <i>chinensis</i> <i>Xenophora (Stellaria) solaris</i> <i>paucispinosa</i></p> <p><u>Cypraeidae</u> <i>Cypraea (Cypraea) pantherina</i> <i>Cypraea (Bistolida) erythraeensis</i> <i>Cypraea (Erosaria) nebrites</i> <i>Cypraea (Erosaria) turdus</i> <i>Cypraea (Erronea) caurica</i> <i>Cypraea (Luria) pulchra</i> <i>Cypraea (Lyncina) camelopardalis</i> <i>Cypraea (Lyncina) carneola crassa</i> <i>Cypraea (Lyncina) lynx</i> <i>Cypraea (Lyncina) vitellus</i> <i>Cypraea (Mauritia) grayana</i> <i>Cypraea (Monetaria) annulus</i> <i>Cypraea (Monetaria) moneta</i> <i>Cypraea (Palmadusta) lentiginosa</i> <i>Cypraea (Palmadusta) ziczac</i> <i>Cypraea (Purpuradusta) fimabriata</i> <i>Cypraea (Purpuradusta) gracilis</i></p> <p><u>Triviidae</u> <i>Trivia (Trivirostra) oryza</i></p> <p><u>Naticidae</u> <i>Natica (Natica) vitellus</i> <i>Natica (Natica) gualteriana</i></p>
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<p><i>Natica (Naticarius) onca</i> <i>Natica pseutes</i> <i>Polinices (Polinices) tumidus</i> <i>Polinices (Polinices) peselephanti</i> <i>Polinices (Mammilla) melanostomus</i> <i>Polinices (Mammilla) simiae</i> <i>Eunaticina papilla</i> <u>Cassidae</u> <i>Semicassis faurotis</i> <i>Phalium glaucum</i> <u>Ficidae</u> <i>Ficus variegata</i> <i>Ficus subintermedia</i> <u>Ranellidae</u> <i>Cymatium (Guttarium) muricinum</i> <i>Cymatium (Ranularia) trilineatum</i> <i>Cymatium (Monoplex) aquatile</i> <i>Cymatium (Monoplex) pileare</i> <i>Gyrineum (Gyrineum) concinnum</i> <u>Personidae</u> <i>Distorsio reticularis</i> <u>Bursidae</u> <i>Bursa (Colubrellina) granularis</i> <i>Bufonaria (Bufonaria) echinata</i> <u>Cerithiopsidae</u> <i>Cerithiopasis sp.</i> <i>Joculator sp.</i> <u>Triphoridae</u> <i>Euthymella pyramidalis</i> <i>Mastonia rubra</i> <i>Mastonia sp.</i> <i>Viriola corrugata</i> <i>Viriola incisa</i> <i>Triphoridae sp.</i> <u>Epitoniidae</u> <i>Epitonium cf. vallatum</i> <i>Epitonium (Gyroscala) lamellosum</i> <i>Epitonium (Parviscala) amicum</i> <i>Epitonium (Parviscala) crispatum</i> <i>Epitonium (Laeviscalia) fucatum</i> <i>Epitonium (Laeviscalia) vaillanti</i></p>	<p><i>Epitonium (Papyriscala) robillardi</i> <u>Janthinidae</u> <i>Janthina (Janthina) janthina</i> <i>Janthina (Jodina) umbilicata</i> <i>Recluzia cf. erythraea</i> <u>Aclididae</u> <i>?Bermudaclis sp.</i> <i>?Graphis sp.</i> <u>Eulimidae</u> <i>Microstilifer auricula</i> <i>Pyramidelloides angusta</i> <i>Pyramidelloides miranda</i> <i>Sticteulima sp.</i> <u>Muricidae</u> <i>Murex (Murex) carbonnieri</i> <i>Murex (Murex) scolopax</i> <i>Haustellum longicaudus</i> <i>Chicoreus (Chicoreus) ramosus</i> <i>Chicoreus (Chicoreus) virgineus</i> <i>Chicoreus (Triplex) corrugatus ethiopi</i> <i>Hexaplex kuesterianus</i> <i>Favartia cyclostoma</i> <i>Homalocantha digitata</i> <i>Aspella cf. mauritiana</i> <i>Cronia martensi</i> <i>Ergalatax contracta</i> <i>Muricodrupa fiscella</i> <i>Muricodrupa fenestrata</i> <i>Thais (Thais) savignyi</i> <i>Thais rugosa</i> <i>Thais tissoti</i> <i>Drupa ricinus</i> <i>Drupella concatenata</i> <i>Drupella eburnea</i> <i>Morula (Morula)anaxeres</i> <i>Morula (Morula) chrysostoma</i> <i>Nassa situla</i> <i>Vitularia miliaris</i> <i>Rapana rapiformis</i> <u>Coralliophilidae</u> <i>Coralliophila sp.</i></p>
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<i>Magilus striatus</i>	<u>Margneliidae</u>
<u>Buccinidae</u>	<i>Prunum terverianum</i>
<i>Babylonia spirata valentiana</i>	<i>Gibberula savignyi</i>
<i>Cantharus (Polliia) rufina</i>	<i>Gibberula sueziensis</i>
<i>Engina sp.</i>	<i>Gibberula sp.</i>
<i>Engina mendicaria</i>	<i>Granulina isseli</i>
<u>Nassariidae</u>	<u>Mitridae</u>
<i>Nassarius (Nassarius) arcularius plicatus</i>	<i>Mitra (Nebularia) fraga</i>
<i>Nassarius (Nassarius) coronatus</i>	<i>Mitra (Nebularia) rueppellii</i>
<i>Nassarius (Alectrion) glans glans</i>	<i>Pterygia crenulata</i>
<i>Nassarius (Hima) pauperus</i>	<i>Ziba cf. flammea</i>
<i>Nassarius (Niotha) albescens</i>	<u>Costellariidae</u>
<i>Nassarius deshayesianus gemmuliferus</i>	<i>Vexillum (Costellaria) semiticum</i>
<i>Nassarius (Plicarcularia) fissilabris</i>	<i>Vexillum (Costellaria) virgo</i>
<i>Nassarius (Zeuxis) castus</i>	<i>Thala malvacea</i>
<i>Nassarius (Zeuxis) isseli</i>	<u>Cancellariidae</u>
<u>Melongenidae</u>	<i>Merica melanostoma</i>
<i>Volema paradisiaca nodosa</i>	<i>Scalptia hystrix</i>
<u>Fasciolaridae</u>	<i>Scalptia scalarina</i>
<i>Pleuroploca filamentosa</i>	<u>Conidae</u>
<i>Pleuroploca trapezium</i>	<i>Conus (Cylinder) aulicus</i>
<i>Peristernia forskalii</i>	<i>Conus (Cylinder) textile</i>
<i>Latirus polygonus</i>	<i>Conus (Darioconus) magnificus</i>
<u>Columbellidae</u>	<i>Conus (Gastridium) cuvieri</i>
<i>Pyrene flava</i>	<i>Conus (Gastridium) fragilissimus</i>
<i>Pyrene testudinaria</i>	<i>Conus (Graphiconus) inscriptus</i>
<i>Columbella reticulata</i>	<i>Conus (Graphiconus) erythraeensis</i>
<i>Zafra minuscula</i>	<i>Conus (Puncticulis) arenatus</i>
<i>Zafra sp.</i>	<i>aequipunctatus</i>
<i>Anachis fauroti</i>	<i>Conus (Rhizoconus) fumigatus</i>
<i>Mitrella nympha</i>	<i>Conus (Rhizoconus) namocanus badius</i>
<i>Mitrella loyalty</i>	<i>Conus (Strioconus) striatus</i>
<i>Euplica varians</i>	<i>Conus (Virgiconus) flavidus</i>
<u>Turbinellidae</u>	<i>Conus (Virroconus) coronatus</i>
<i>Vasum (Vasum) turbinellus</i>	<i>Conus (Virroconus) taeniatus</i>
<u>Olividae</u>	<i>Conus acuminatus</i>
<i>Oliva (Carmione) bulbosa</i>	<i>Conus lineatus</i>
<i>Ancilla (Sparellina) albisulcata</i>	<i>Conus milneedwardsi</i>
<i>Ancilla (Sparellina) ventricosa ventricosa</i>	<u>Turridae</u>
<i>Ancilla (Sperellina) ventricosa fulva</i>	<i>Turricula catena</i>
<i>Ancilla ovalis</i>	<i>Lophiotoma (Xenoturris) cingulifera</i>
	<i>Lophiotoma (Xenoturris) erythraea</i>

<p><i>Clathurella</i> sp. <i>Mangelia iodolabiata</i> <i>Eucithara celebensis</i> <i>Eucithara</i> sp. <i>Lienardia</i> (<i>Hemilienardia</i>) <i>rubicunda</i> <i>Daphnella</i> (<i>Hemidaphne</i>) <i>cyclophora</i> <i>Turridae</i> sp. <u>Terebridae</u> <i>Terebra consobrina</i> <i>Terebra tessellata</i> <i>Terebra nassoides</i> <i>Duplicaria duplicata</i> <u>Architectonicidae</u> <i>Architectonica perspectiva</i> <i>Heliacus</i> (<i>Heliacus</i>) <i>areola areola</i> <i>Heliacus</i> (<i>Heliacus</i>) <i>variegatus</i> <u>Rissoellidae</u> <i>Rissoella</i> sp. <u>Pyramidellidae</u> <i>Pyramidella</i> (<i>Voluspa</i>) <i>tesselata</i> <i>Otopleura mitralis</i> <i>Cingulina isseli</i> <i>Odostomia doliaris</i> <i>Pyramidellidae</i> sp. <u>Acteonidae</u> <i>Pupa affinis</i> <u>Ringiculidae</u> <i>Ringicula</i> (<i>Ringicula</i>) <i>acuta</i> <u>Scaphandridae</u> <i>Cylichna villirsii</i> ? <i>Cylichna</i> sp. <i>Tornatina simplex</i> <u>Philinidae</u> <i>Philine</i> sp. <u>Bullidae</u> <i>Bulla</i> (<i>Bulla</i>) <i>ampulla</i> <u>Haminoeidae</u> <i>Haminoea pemphis</i> <i>Atys</i> (<i>Aliculastrum</i>) <i>cylindricus</i> <i>Diniatys dentiferus</i> <i>Liloa curta</i></p>	<p><u>Smaragdinellidae</u> <i>Smaragdinella sieboldi</i> <i>Phanerophthalmus smaragdinus</i> <u>Retusidae</u> <i>Retusa desgenetti</i> <i>Retusa fourierii</i> <i>Retusa tarutana</i> <u>Cavoliniidae</u> <i>Cavolinia longirostris</i> <i>Creseis acicula</i> <u>Dendrodorididae</u> <i>Dendrodoris cuprea</i> <u>Ellobiidae</u> <i>Cassidula labrella</i> <i>Cassidula nucleus</i> <i>Allochroa bronniei</i> <i>Laemodonta monilifera</i> <i>Melampus ehrenbergianus</i> <i>Melampus lividus</i> <i>Melampus massauensis</i> <i>Melampus striatus</i> <i>Pedipes</i> sp. <i>Pedipes granum</i> <i>Pedipes oblongus</i> <u>Trimusculidae</u> <i>Trimusculus mammillaris</i> <u>Siphonariidae</u> <i>Siphonaria savignyi</i> <i>Siphonaria</i> sp. <u>Polyplacophora</u> <i>Ischnochiton</i> (<i>Ischnochiton</i>) <i>yerburyi</i> <i>Chiton</i> (<i>Chiton</i>) <i>peregrinus</i> <i>Chiton</i> (<i>Rhyssoplax</i>) <i>affinis</i> <i>Acanthopleura testudo</i> <i>Acanthopleura vaillantii</i> <i>Chaetopleura chelazziana</i> <i>Acanthochitona penicillata</i></p>
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<p><u>Cephalopoda</u> <i>Sepia pharaonis</i> <i>Sepia prashadi</i> <i>Sepia savignyi</i> <i>Sepia trygonina</i> <i>Sepiella inermis</i></p> <p><u>Scaphopoda</u> <i>Dentalium cookei</i> <i>Dentalium octangulatum</i> <i>Dentalium reevei</i> <i>Laevidentalium sp.</i> <i>Omniglypta subtorquata</i> <i>Dischides minutus</i></p>	
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Cont. annex (5) Mollusks (Yemen - Gulf of Aden / Arabian Sea)

<u>Polyplacophora</u>		<i>Stomatella elegans</i>	3
<i>Ischnochiton yemenensis</i>	2	<i>Turbo coronatus</i>	2
<i>Ischnochiton yerburyi</i>	2	<i>Turbo petholatus</i>	2
<i>Schizochiton jousseaumei</i>	2/3	<i>Turbo radiatus</i>	2/3
<i>Chiton hululensis</i>	2	<i>Nerita albicilla</i>	2/3
<i>Chiton peregrinus</i>	2/3	<i>Nerita polita</i>	2
<i>Chiton fosteri</i>	3	<i>Nerita textilis</i>	2/3
<i>Chiton affinis</i>	2	<i>Nerita undata</i>	2
<i>Chiton maldivensis</i>	2	<i>Littorina scabra</i>	1/2
<i>Acanthopleura vaillantii</i>	1/2/3	<i>Nodilittorina millegrana</i>	1/2
<i>Tonicia sueziensis</i>	1/2	<i>Nodilittorina subnodosa</i>	1/2
<i>Onithochiton erythraeus</i>	2/3	<i>Peasiella isseli</i>	2
<i>Cryptoconchus burrowi</i>	2	<i>Architectonica perspectiva</i>	2
<i>Acanthochitona penicillata</i>	2	<i>Heliacus variegatus</i>	2
<u>Gastropoda</u>		<i>Rhinoclavis kochi</i>	1/2/3
<i>Diodora funiculata</i>	2/3	<i>Rhinoclavis aspera</i>	1/2
<i>Diodora imbricata</i>	2/3	<i>Rhinoclavis sinensis</i>	1/2/3
<i>Diodora rueppelli</i>	2/3	<i>Cerithium rueppelli</i>	1/2
<i>Medusafissurella salebrosa</i>	2/3	<i>Cerithium caeruleum</i>	1/2/3
<i>Medusafissurella melvilli</i>	2	<i>Cerithium nodulosum</i>	1/2
<i>Fissurella nubecula</i>	2	<i>Cerithium scabridum</i>	2
<i>Scutus unguis</i>	2/3	<i>Cerithium echinatum</i>	3
<i>Hemitoma subrugosa</i>	2	<i>Cerithium columna</i>	1/2/3
<i>Hemitoma panhi</i>	1/2/3	<i>Clypeomorus bifasciata</i>	1/2/3
<i>Amblychilepas dubia</i>	2/3	<i>Clypeomorus petrosa</i>	1/2
<i>Cellana rota</i>	1/2/3	<i>Janthina janthina</i>	2
<i>Cellana cylindrica</i>	2/3	<i>Janthina globosa</i>	2
<i>Cellana radiata</i>	2	<i>Planaxis sulcatus</i>	2
<i>Patella flexuosa</i>	2/3	<i>Cerithidea cingulata</i>	1/2
<i>Patella stellaeformis</i>	2	<i>Terebralia palustris</i>	1/2
<i>Patellioda profunda</i>	2/3	<i>Hipponix conicus</i>	1/2/3
<i>Euchelus atratus</i>	2	<i>Strombus plicatus</i>	2
<i>Trochus erythraeus</i>	1/2/3	<i>Strombus gibberulus</i>	2/3
<i>Trochus kochi</i>	3	<i>Strombus mutabilis</i>	2/3
<i>Trochus dentatus</i>	1/2/3	<i>Strombus fusiformis</i>	2
<i>Clanculus pharaonis</i>	2/3	<i>Strombus erythrinus</i>	2
<i>Gibbula declivis</i>	2	<i>Strombus tricornis</i>	2
<i>Monilea obscura</i>	2	<i>Strombus decorus</i>	2/3
<i>Monodonta vermiculata</i>	1/2		

<i>Strombus japonicus</i>	2	<i>Murex scolopax</i>	2
<i>Tibia insulaechorab</i>	2	<i>Haustellum dolichourus</i>	2
<i>Lambis truncata sebae</i>	3	<i>Haustellum haustellum</i>	2
<i>Cypraea arabica</i>	2/3	<i>Chicoreus ramosus</i>	2/3
<i>Cypraea mauritiana</i>	3	<i>Chicoreus virgineus</i>	2
<i>Cypraea talpa</i>	2	<i>Pterynotus albobrunneus</i>	2
<i>Cypraea pantherina</i>	2	<i>Typhis bengalensis</i>	2
<i>Cypraea tigris</i>	2/3	<i>Pygmaepterys adenensis</i>	2
<i>Cypraea caputserpentis</i>	3	<i>Pygmaepterys yemenensis</i>	2
<i>Cypraea isabella</i>	2/3	<i>Rapana rapiformis</i>	2
<i>Cypraea pulchra</i>	2	<i>Vexilla vexillum</i>	3
<i>Cypraea lynx</i>	3	<i>Nassa francolina</i>	2/3
<i>Cypraea vitellus</i>	3	<i>Cronia martensi</i>	1/2
<i>Cypraea carneola</i>	2/3	<i>Cronia konkanensis</i>	2/3
<i>Cypraea felina fabula</i>	2/3	<i>Drupa morum</i>	1/3
<i>Cypraea caurica</i>	2/3	<i>Drupa lobata</i>	2
<i>Cypraea erythraeensis</i>	2/3	<i>Drupella ricinus</i>	1/3
<i>Cypraea clandestina</i>	2/3	<i>Drupella cornus</i>	1/2/3
<i>Cypraea gracilis notata</i>	2/3	<i>Morula granulata</i>	2/3
<i>Cypraea erosa nebrites</i>	2/3	<i>Morula chrysostoma</i>	1/2/3
<i>Cypraea turdus</i>	2/3	<i>Morula uva</i>	1/3
<i>Cypraea helveola</i>	2/3	<i>Thais mancinella</i>	1/2/3
<i>Cypraea marginalis</i>	2/3	<i>Thais tissoti</i>	2/3
<i>Cypraea moneta</i>	3	<i>Thais bufo</i>	2
<i>Cypraea annulus</i>	2/3	<i>Thais bimaculatus</i>	2/3
<i>Cypraea lentiginosa</i>	2	<i>Thais hippocastanum</i>	2
<i>Cypraea ziczag</i>	2	<i>Babylonia spirata valentiana</i>	2
<i>Cypraea staphylea</i>	2	<i>Pleuroploca trapezium</i>	1/2
<i>Cypraea ocellata</i>	3	<i>Harpa ventricosa</i>	3
<i>Cypraea gangranosa</i>	2	<i>Merica melanostoma</i>	2
<i>Cypraea pulchella</i>	2	<i>Merica oblonga</i>	2
<i>Cypraea grayana</i>	2/3	<i>Nipponaphera paucicostata</i>	2
<i>Murex carbonnieri</i>	1/2	<i>Scalptia hystrix</i>	3
<i>Murex pecten</i>	3	<i>Scalptia cf. scalarina</i>	2
		<i>Conus vexillum sumatrensis</i>	1/2/3
		<i>Conus arenatus aequipunctatus</i>	1/2

<i>Conus striatus</i>	1/2/3	<i>Duplicaria baileyi</i>	2
<i>Conus acuminatus</i>	1/2	? <i>Doris</i> sp.	2
<i>Conus ebraeus</i>	1/3	<i>Cellana karachiensis</i>	2
<i>Conus generalis maldivus</i>	2/3	<i>Patella exusta pica</i>	2
<i>Conus taeniatus</i>	2/3	<i>Acmaea profunda</i>	2
<i>Conus nigropunctatus</i>	1/2/3	<i>Nerita adenesi</i>	2/3
<i>Conus tessulatus</i>	2/3	<i>Planaxis sulcatus</i>	2/3
<i>Conus betulinus</i>	1/2	<i>Turritella</i> sp.	2
<i>Conus virgo</i>	1/3	<i>Polinices tumidus</i>	2
<i>Conus terebra</i>	1/2/3	<i>Cymatium ranzanii</i>	2
<i>Conus flavidus</i>	1/2/3	<i>Purpura radolphi</i>	2
<i>Conus milneedwardsi</i>	2	<i>Thais savingnyi</i>	2/3
<i>Conus textile</i>	1/2/3	<i>Nassarius albescens</i>	2
<i>Conus pennaceus</i>	2/3	<i>Bullia mauritiana</i>	2/3
<i>Conus rattus</i>	1/3	<i>Oliva bulbosa</i>	2/3
<i>Conus striatellus</i>	2	<i>Terebra</i> sp.	2/3
<i>Conus miles</i>	3	<i>Fasciolaria trapezium</i>	2
<i>Conus cuvieri</i>	2	<i>Ficus subintermedia</i>	2
<i>Conus quercinus</i>	2	<i>Tonna</i> sp.	2
<i>Conus namocanus badius</i>	2	<i>Pyrena</i> sp.	2/3
<i>Conus nussatella</i>	2	<i>Anachis</i> sp.	2
<i>Conus lividus</i>	3	<i>Cassis</i> sp.	2
<i>Conus obscurus</i>	3	<i>Siphonaria</i> sp.	2/3
<i>Conus fumigatus</i>	1/2	<i>Emarginula</i> sp.	3
<i>Conus traversianus</i>	2	<i>Submarginula</i> sp.	3
<i>Conus inscriptus adenensis</i>	2	<i>Euchelus asper</i>	3
<i>Conus erythraeensis</i>	1/2	<i>Granata sulcifera</i>	3
<i>Conus parvatus sharmiensis</i>	1/2/3	<i>Monodonta nebulosa</i>	3
<i>Conus coronatus</i>	2/3	<i>Trochus firmus</i>	3
<i>Terebra adamsi</i>	2	<i>Priotrochus</i> sp.	3
<i>Terebra babylonica</i>	2	<i>Umbonium</i> sp.	3
<i>Terebra connelli</i>	2	<i>Stomatella</i> sp.	3
<i>Terebra insalli</i>	2	<i>Stomatia</i> sp.	3
<i>Terebra nassoides</i>	2	<i>Lunella coronata</i>	3
<i>Terebra tessellata</i>	2	<i>Turbo jonathani</i>	3
<i>Terebra textilis</i>	2	<i>Turbo bruneus</i>	3
<i>Terebra duplicata</i>	2	(?) <i>Phasianella</i> sp.	3
<i>Hastula cuspidata</i>	2	<i>Nerita debilis</i>	3
<i>Hastula hectica</i>	2	<i>Nerita polita orbignyana</i>	3
		<i>Smaragdia souverbiana</i>	3

<i>Littoraria intermedia</i>	3	<i>Chromodoris (?)annulata</i>	3
<i>Littoraria glabrata</i>	3	<i>Dendrodis ruba</i>	3
<i>Nodolittorina natalensis</i>	3	<i>Phyllidia bourguini</i>	3
<i>Rhinoclavis fasciata</i>	3		
<i>Potamides conicus</i>	3	<u>Bivalvia</u>	
<i>Turritella maculata</i>	3	<i>Trisidos semitorta</i>	2
<i>Turritella cochlea</i>	3	<i>Arca ventricosa</i>	1/2
<i>Serpulorbis sp.</i>	3	<i>Arca navicularis</i>	1/2
<i>Strombus (Tricornis) oldi</i>	3	<i>Arca avellana</i>	1/2
<i>Ovula ovum</i>	3	<i>Arca plicata</i>	1/2/3
<i>Mammilla melanostoma</i>	3	<i>Barbatia foliata</i>	1/2
<i>Natica sp.</i>	3	<i>Barbatia setigera</i>	2/3
<i>Cypraecassis rufa</i>	3	<i>Barbatia obliquata</i>	2
<i>Gyrineum natator</i>	3	<i>Anadara cf. birleyana</i>	2
<i>Cymatium parthenopeum</i>	3	<i>Anadara uropigmelana</i>	1/2
<i>Cymatium sp.</i>	3	<i>Anadara antiquata</i>	1/2
<i>Bufonoria sp.</i>	3	<i>Anadara ehrenbergi</i>	1/2
<i>Bursa sp.</i>	3	<i>Limopsis multistriata</i>	2
<i>Tutafa sp.</i>	3	<i>Glycymeris arabicus</i>	1/2
<i>Chicoreus banksii</i>	3	<i>Glycymeris pectunculus</i>	2
<i>Hexaplex kuesterianus</i>	3	<i>Glycymeris maskatensis</i>	2
<i>Homalocanthus anatomica</i>	3	<i>Modiolus lignea</i>	2
<i>Favartia sp.</i>	3	<i>Modoilus auriculatus</i>	2
<i>Thais sp.</i>	3	<i>Brachydontes variabilis</i>	2
<i>Morula sp.</i>	3	<i>Septifer bilocularis</i>	2
<i>Purpura panama</i>	3	<i>Lithophaga cumingiana</i>	2
<i>(?)Nassa situla</i>	3	<i>Botula cinnamomina</i>	2
<i>Cantharus sp.</i>	3	<i>Chama asperella</i>	1/2/3
<i>Engina sp.</i>	3	<i>Chama brassica</i>	2/3
<i>Mitrella sp.</i>	3	<i>Chama pacifica</i>	2/3
<i>Nassarius marmoreus</i>	3	<i>Chama limbula</i>	2/3
<i>Fusinus sp.</i>	3	<i>Mimachlamys senatoria</i>	2/3
<i>Harba sp.</i>	3	<i>Scaechlamys superficialis</i>	
<i>Vasum turbinellus</i>	3	<i>ruschenbergerii</i>	2/3
<i>Ancilla sp.</i>	3	<i>Chlamys rubromaculata</i>	2
<i>Conus chaldeus</i>	3	<i>Chlamys andamanica</i>	2/3
<i>Terebra consobrina</i>	3	<i>Volachlamys fultoni</i>	2
<i>Terebra maculata</i>	3	<i>Nodipecten noduliferus</i>	3
<i>Impages hectica</i>	3		
<i>Hastula nana</i>	3		

<i>Pecten dorotheae</i>	2/3	<i>Malvifundus sp.</i>	3
<i>Decatopecten amiculum</i>	1/2	<i>Isognomon sp.</i>	3
<i>Cryptopecten nux</i>	2	<i>Saccostrea cucullata</i>	3
<i>Haumea inaequalis</i>	2	<i>Lopha cristagali</i>	3
<i>Parvamussium cf. formosum</i>	2	<i>Plicata imbricata</i>	3
<i>Solen roseomaculatus</i>	2	<i>Chlamys livida</i>	3
<i>Solen cylindaceus</i>	2	<i>Chlamys townendi</i>	3
<i>Solen digitalis</i>	2	<i>Spondylus marisrubri</i>	3
<i>Solen ceylonensis</i>	2	<i>Codakia tigerina</i>	3
<i>Siliqua radiata</i>	2/3	<i>Ctena divergens</i>	3
<i>Phaxas cultellus</i>	2	<i>Anodontia edentula</i>	3
<i>Donax scalpellum</i>	2	<i>Diplodonta sp.</i>	3
<i>Anadara sp.</i>	2/3	<i>Beguina gubernaculum</i>	3
<i>Perna sp.</i>	2	<i>Chama reflexa</i>	3
<i>Mytilus pictus</i>		<i>Plagiocardium pseudolima</i>	3
<i>Lithophaga sp.</i>	2/3	<i>Fragum hemicardium</i>	3
<i>Pinctada margaritifera</i>	2	<i>Acrostergima lacunosa</i>	3
<i>Pinna sp.</i>	2	<i>Acrostergima assimile</i>	3
<i>Atrina sp.</i>	2	<i>Mactra sp.</i>	3
<i>Saccostrea cucullata</i>	2	<i>Periglypta sp.</i>	3
<i>Saccostrea crestagalli</i>	2	<i>Circa sp.</i>	3
<i>Cardita sp.</i>	2	<i>Callista sp.</i>	3
<i>Cardium sp.</i>	2	<i>Pitar sp.</i>	3
<i>Trachycardium lacunoum</i>	2	<i>Tridacna squamosa</i>	3
<i>Tivela pondrosa</i>	2	<i>Tridacna gigas</i>	3
<i>Circenita callipyga</i>	2/3	<u>Cephalopoda</u>	
<i>Donsinia sp.</i>	2/3	<i>Argonauta argo</i>	
<i>Calista sp.</i>	2	<i>Abralia steidachnei</i>	
<i>Pitar sp.</i>	2	<i>Abralia sp.</i>	
<i>Siliqua japonica</i>	2	<i>Ancistrocheirus lesueuri</i>	
<i>Tridacna maxima</i>	2/3	<i>Loligo duvauceli</i>	
<i>Solen sp.</i>	2	<i>Loligo edulis</i>	
<i>Sanguinolaria sp.</i>	2	<i>Sepioteuthis lessoniana</i>	
<i>Mactra glabrata eilacea</i>	2	<i>Sepioteuthis loliginiformis</i>	
<i>Brachidontes variabilis</i>	3	<i>Octopus aegina</i>	
<i>Perna picta</i>	3	<i>Octopus cyaneus</i>	
<i>Musculus sp.</i>	3	<i>Octopus defilippi</i>	
<i>Leiosolenus sp.</i>	3	<i>Octopus membranaceus</i>	
<i>Pteria sp.</i>	3	<i>Octopus vulgaris</i>	
<i>Pinctada radiata</i>	3	<i>Citopus indicus</i>	
<i>Pinctada margaritifera</i>	3	<i>Nototodarus hawaiiensis</i>	
<i>Pinctada cf. nigra</i>	3	<i>Nototodarus sp.</i>	
		<i>Sthenoteuthis oualaniensis</i>	
		<i>Moroteuthis lonnbergi</i>	
		<i>Sepia Arabica</i>	

	<i>Sepia braggi</i> <i>Sepia brevimana</i> <i>Sepia kobiensis</i> <i>Sepia latimanus</i> <i>Sepia murrayi</i> <i>Sepia omani</i> <i>Sepia pharaonis</i> <i>Sepia prashadi</i> <i>Sepia recurvirostra</i> <i>Sepia trygonina</i> <i>Sepia inermis</i> <i>Rossia sp</i>
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Annex (5): Mollusks species lists of Aden Harbor (Shopland 1902)

<u>Cephalopoda</u>	<i>Pleurotoma pouloensis</i>
<i>Argonauta tuberculosa</i>	<i>Pleurotoma tigrina</i>
<u>Gastropoda</u>	<i>Pleurotoma tuberculata</i>
<i>Ianthina fragilis</i>	<i>Pleurotoma unifasciata</i>
<i>Murex anguliferus</i>	<i>Pleurotoma variabilis</i>
<i>Murex carboneri</i>	<i>Pleurotoma ridua</i>
<i>Murex clavus</i>	<i>Pleurotoma violacca</i>
<i>Murex cyclostomus</i>	<i>Defrancia carinulata</i>
<i>Murex fenestratus</i>	<i>Defrancia foraminata</i>
<i>Murex haustellum</i>	<i>Defrancia horneana</i>
<i>Murex pinnatus</i>	<i>Defrancia nexa</i>
<i>Murex ramosus</i>	<i>Defrancia philippinensis</i>
<i>Murex rota</i>	<i>Defrancia rubicunda</i>
<i>Murex secundus</i>	<i>Daphnella boholensis</i>
<i>Murex ternispina</i>	<i>Daphnella citharella</i>
<i>Murex varicosus</i>	<i>Daphnella crebriplicata</i>
<i>Pyrula paradisiaca</i>	<i>Daphnella cumingi</i>
<i>Pisania crosseana</i>	<i>Daphnella cylindrica</i>
<i>Pisania ignea</i>	<i>Daphnella fenestrata</i>
<i>Pisania picta</i>	<i>Daphnella rissoides</i>
<i>Pisania situla</i>	<i>Triton antiquatus</i>
<i>Pollia contracta</i>	<i>Triton aquatilis</i>
<i>Pollia marmorata</i>	<i>Triton bracteatus</i>
<i>Pollia rubiginosa</i>	<i>Triton cancellatus</i>
<i>Pollia undosa</i>	<i>Triton cancellatus v. deeipiens</i>
<i>Fusus forceps</i>	<i>Triton clandestinus</i>
<i>Pleurotoma albifuniculata</i>	<i>Triton conrolutus</i>
<i>Pleurotoma amicta</i>	<i>Triton labiosus</i>
<i>Pleurotoma baynhami</i>	<i>Triton maculosus</i>
<i>Pleurotoma catena</i>	<i>Triton pilearis</i>
<i>Pleurotoma cecchi</i>	<i>Triton ranzani</i>
<i>Pleurotoma cingulifera</i>	<i>Triton retusus</i>
<i>Pleurotoma crenularis</i>	<i>Triton rubecula</i>
<i>Pleurotoma jousseaumi</i>	<i>Triton trilineatus</i>
<i>Pleurotoma latisinuata</i>	<i>Triton vespaeus</i>
<i>Pleurotoma makimonos</i>	<i>Persona adicus</i>
<i>Pleurotoma obtusicostata</i>	<i>Persona shoplandi</i>
<i>Pleurotoma olitoma</i>	<i>Ranella aneeps</i>
	<i>Ranella concinna</i>

<i>Ranella granifera</i>	<i>Ricinula indigoferum</i>
<i>Ranella livida</i>	<i>Ricinula lobata</i>
<i>Ranella spinosa</i>	<i>Ricinula marginatum</i>
<i>Ranella tubereulata</i>	<i>Ricinula nodulosa</i>
<i>Bullia mauritiana</i>	<i>Ricinula ricinus</i>
<i>Bullia tahitensis</i>	<i>Ricinula tuberculata</i>
<i>Phos roseatus</i>	<i>Ricinula undata</i>
<i>Cyllene grayi</i>	<i>Rapana bulbosa</i>
<i>Nassa albesecons</i>	<i>Coralliophila arabica</i>
<i>Nassa arcularia</i>	<i>Coralliophila costularis</i>
<i>Nassa calata</i>	<i>Coralliophila squamulosa</i>
<i>Nassa concinna</i>	<i>Coralliophila violacea</i>
<i>Nassa coronata</i>	<i>Magilus antiquus</i>
<i>Nassa dermestina</i>	<i>Oliva bulbosa</i>
<i>Nassa erythrea</i>	<i>Oliva bera</i>
<i>Nassa fissilabris</i>	<i>Oliva inflata</i>
<i>Nassa gemmulata</i>	<i>Ancillaria acuminata</i>
<i>Nassa lentiginosa</i>	<i>Ancillaria albisulcata</i>
<i>Nassa marrati</i>	<i>Ancillaria castanea</i>
<i>Nassa nodifera</i>	<i>Ancillaria exigua</i>
<i>Nassa papillosa</i>	<i>Ancillaria fulva</i>
<i>Nassa persica</i>	<i>Ancillaria ovalis</i>
<i>Nassa polychroma</i>	<i>Ancillaria striolata</i>
<i>Nassa pulla</i>	<i>Fasciolaria trapizium</i>
<i>Nassa variegata</i>	<i>Latirus forskali</i>
<i>Nassa verrucosa</i>	<i>Latirus pauluccia</i>
<i>Nassa zailzensis</i>	<i>Latirus polygonus</i>
<i>Eburna borneensis</i>	<i>Latirus smaragdulus</i>
<i>Eburna valentiana</i>	<i>Latirus turritus</i>
<i>Purpura echinata</i>	<i>Vasum cornigerum</i>
<i>Purpura fasciata</i>	<i>Mitra affinis</i>
<i>Purpura hippocastanum</i>	<i>Mitra amabilis</i>
<i>Purpura mancinella</i>	<i>Mitra armillata</i>
<i>Purpura persica</i>	<i>Mitra aurantia</i>
<i>Purpura rudolphi</i>	<i>Mitra aureolata</i>
<i>Purpura sacellum</i>	<i>Mitra bella</i>
<i>Ricinula chrysostoma</i>	<i>Mitra bovei</i>
<i>Ricinula concatenata</i>	<i>Mitra caligena</i>
<i>Ricinula elata</i>	<i>Mitra carnicolor</i>
<i>Ricinula fiscellum</i>	<i>Mitra circulate</i>

<i>Mitra clathrata</i>	<i>Marginella clandestina</i>
<i>Mitra concentrica</i>	<i>Marginella gibbosa</i>
<i>Mitra coriacea</i>	<i>Marginella mazagonica</i>
<i>Mitra crenifera</i>	<i>Marginella obtusa</i>
<i>Mitra crenulata</i>	<i>Marginella scripta</i>
<i>Mitra cucumerina</i>	<i>Marginella terveriana</i>
<i>Mitra dermestina</i>	<i>Marginella verdensis</i>
<i>Mitra episcopalis</i>	<i>Columbella albina</i>
<i>Mitra ericea</i>	<i>Columbella albinodulosa</i>
<i>Mitra ferruginea</i>	<i>Columbella alveolata</i>
<i>Mitra fissurata</i>	<i>Columbella aspersa</i>
<i>Mitra foveolata</i>	<i>Columbella astricta</i>
<i>Mitra fulvescens</i>	<i>Columbella concinna</i>
<i>Mitra innesi</i>	<i>Columbella conspersa</i>
<i>Mitra insculpta</i>	<i>Columbella cribraria</i>
<i>Mitra interlirata</i>	<i>Columbella fabula</i>
<i>Mitra literata</i>	<i>Columbella flava</i>
<i>Mitra lubens</i>	<i>Columbella hanleyi</i>
<i>Mitra marginata</i>	<i>Columbella ligula</i>
<i>Mitra militaris</i>	<i>Columbella lyrata</i>
<i>Mitra mucronata</i>	<i>Columbella mendicaria</i>
<i>Mitra nebrias</i>	<i>Columbella mercatoria</i>
<i>Mitra obeliscus</i>	<i>Columbella miser</i>
<i>Mitra pacifica</i>	<i>Columbella propinqua</i>
<i>Mitra pharaonis</i>	<i>Columbella regulus</i>
<i>Mitra pretiosa</i>	<i>Columbella terpsichore</i>
<i>Mitra procissa</i>	<i>Columbella zea</i>
<i>Mitra rotundilirata</i>	<i>Columbella zonata</i>
<i>Mitra rufescens</i>	<i>Harba minor</i>
<i>Mitra ruppelli</i>	<i>Harba ventricosa</i>
<i>Mitra scabriuscula</i>	<i>Cassis exarata</i>
<i>Mitra semifasciata</i>	<i>Cassis fouroti</i>
<i>Mitra shoplandi</i>	<i>Cassis glauca</i>
<i>Mitra tabanula</i>	<i>Cassis pile</i>
<i>Mitra turgida</i>	<i>Cassis rufa</i>
<i>Mitra ustulata</i>	<i>Cassis torquata</i>
<i>Mitra variegata</i>	<i>Cassis vibex</i>
<i>Mitra vexillum</i>	<i>Dolium quemanju</i>
<i>Mitra vulpecula</i>	<i>Sycotypus ficoides</i>
<i>Mitra xerampelina</i>	<i>Sycotypus ficus</i>

<i>Lamellaria perspicua</i>	<i>Pyramidella variegata</i>
<i>Natica cernica</i>	<i>Obeliscus dolabratus</i>
<i>Natica chinensis</i>	<i>Obeliscus sulcatus</i>
<i>Natica colliei</i>	<i>Obeliscus terebelloides</i>
<i>Natica didyma</i>	<i>Ringicula acuta</i>
<i>Natica forskali</i>	<i>Ringicula propinquans</i>
<i>Natica maculosa</i>	<i>Elusa bruneomaculata</i>
<i>Natica mamilla</i>	<i>Aclis exareta</i>
<i>Natica marochiensis</i>	<i>Eulima acuta</i>
<i>Natica melanostoma</i>	<i>Eulima brevis</i>
<i>Natica plicatula</i>	<i>Eulima martini</i>
<i>Natica powisiana</i>	<i>Eulima shoplanti</i>
<i>Natica pulicaris</i>	<i>Eulima solidula</i>
<i>Natica simia</i>	<i>Leiostraca constellata</i>
<i>Natica taniata</i>	<i>Stylifer exaratus</i>
<i>Natica tela-aranea</i>	<i>Stylifer fastigiatus</i>
<i>Naticina papilla</i>	<i>Stylifer solidulus</i>
<i>Sigaretus cuvierianus</i>	<i>Solarium cylindraceum</i>
<i>Sigaretus planulatus</i>	<i>Solarium dorsuosum</i>
<i>Scalaria clathrus</i>	<i>Solarium hybridum</i>
<i>Scalaria decussata</i>	<i>Solarium infundibulifrome</i>
<i>Acrilla gracilis</i>	<i>Solarium lavigatum</i>
<i>Terebra albomarginata</i>	<i>Solarium perspectiviunculum</i>
<i>Terebra babylonica</i>	<i>Solarium perspectivum</i>
<i>Terebra carulescens</i>	<i>Solarium regium</i>
<i>Terebra consobrina</i>	<i>Solarium variegatum</i>
<i>Terebra corrugata</i>	<i>Conus acuminatus</i>
<i>Terebra gottoensis</i>	<i>Conus adansoni</i>
<i>Terebra lamarcki</i>	<i>Conus adenensis</i>
<i>Terebra ligata</i>	<i>Conus arenatus</i>
<i>Terebra nassoides</i>	<i>Conus betulinus</i>
<i>Terebra pellyi</i>	<i>Conus bullatus</i>
<i>Terebra souleyeti</i>	<i>Conus capitaneus</i>
<i>Terebra straminea</i>	<i>Conus catus</i>
<i>Terebra straminea v. serotina</i>	<i>Conus ceylonensis</i>
<i>Terebra tessellata</i>	<i>Conus clytospira</i>
<i>Terebra textilis</i>	<i>Conus cuvieri</i>
<i>Pyramidella mitralis</i>	<i>Conus erythraensis</i>
<i>Pyramidella paeteli</i>	<i>Conus erythraensis v. adustus</i>
<i>Pyramidella prpinqua</i>	<i>Conus flavidus</i>

<i>Conus fumigatus</i>	<i>Strombus variabilis</i>
<i>Conus gemmulatus</i>	<i>Pterocera bryonia</i>
<i>Conus generalis</i>	<i>Pterocera scorpio</i>
<i>Conus geographus</i>	<i>Rostellaria curta</i>
<i>Conus inscriptus</i>	<i>Rostellaria curvirostris</i>
<i>Conus inscriptus v. keati</i>	<i>Cypraea clandestina</i>
<i>Conus lineatus</i>	<i>Cypraea crucnta v. coloba</i>
<i>Conus lividus</i>	<i>Cypraea erosa v. nebutes</i>
<i>Conus luctificus</i>	<i>Cypraea erythraensis</i>
<i>Conus miles</i>	<i>Cypraea exusta</i>
<i>Conus minimus</i>	<i>Cypraea fabula</i>
<i>Conus mitratus</i>	<i>Cypraea felina</i>
<i>Conus nemocanus</i>	<i>Cypraea fimbriata</i>
<i>Conus nussatella</i>	<i>Cypraea fimbriata v. mecula</i>
<i>Conus pusillus</i>	<i>Cypraea gngrenosa</i>
<i>Conus quadratomaculatus</i>	<i>Cypraea helvola</i>
<i>Conus quercinus</i>	<i>Cypraea histrio</i>
<i>Conus splendidulus</i>	<i>Cypraea isabella</i>
<i>Conus striatus</i>	<i>Cypraea lentiginosa</i>
<i>Conus sulphuratus</i>	<i>Cypraea lienardi</i>
<i>Conus sumatrensis</i>	<i>Cypraea listeri</i>
<i>Conus taniatus</i>	<i>Cypraea lynx</i>
<i>Conus tessellatus</i>	<i>Cypraea mauritiana</i>
<i>Conus textile</i>	<i>Cypraea microdon</i>
<i>Conus thomasi</i>	<i>Cypraea moneta</i>
<i>Conus traversianus</i>	<i>Cypraea nucleus</i>
<i>Strombus belutschiensis</i>	<i>Cypraea ocellata</i>
<i>Strombus columba</i>	<i>Cypraea pantherina</i>
<i>Strombus cylindricus</i>	<i>Cypraea pulchra</i>
<i>Strombus dentatus</i>	<i>Cypraea quadrimaculata</i>
<i>Strombus floridus</i>	<i>Cypraea talpa</i>
<i>Strombus fusiformis</i>	<i>Cypraea tigris</i>
<i>Strombus gibberulus</i>	<i>Cypraea tudus</i>
<i>Strombus lineatus</i>	<i>Cypraea turneri</i>
<i>Strombus mauritianus</i>	<i>Cypraea undata</i>
<i>Strombus plicatus</i>	<i>Cypraea vitellus</i>
<i>Strombus ruppelli</i>	<i>Cypraea zigzac</i>
<i>Strombus terebellatus</i>	<i>Trivia staphylea</i>
<i>Strombus tricornis</i>	<i>Trivia staphylea v. limacina</i>
<i>Strombus urceus</i>	<i>Ovula lacteal</i>

<i>Ovula ovum</i>	<i>Modulus tectum</i>
<i>Birostra spelta</i>	<i>Planaxis breviculus</i>
<i>Cancellaria elegans</i>	<i>Planaxis sarignyi</i>
<i>Cancellaria hystrix</i>	<i>Planaxis sulcatus</i>
<i>Cancellaria melanostoma</i>	<i>Rissoina bertheloti</i>
<i>Cancellaria scalarina</i>	<i>Rissoina clathrata</i>
<i>Cerithium albovaricosum</i>	<i>Rissoina concinna</i>
<i>Cerithium asperum</i>	<i>Rissoina insculpta</i>
<i>Cerithium bifasciatum</i>	<i>Rissoina insignis</i>
<i>Cerithium caeruleum</i>	<i>Rissoina pachystoma</i>
<i>Cerithium clypeomorus</i>	<i>Rissoina sequenziana</i>
<i>Cerithium columna</i>	<i>Rissoina sidmondiana</i>
<i>Cerithium contractum</i>	<i>Rissoina spirata</i>
<i>Cerithium echinatum</i>	<i>Rissoina tridentata</i>
<i>Cerithium erythraense</i>	<i>Onoba delicata</i>
<i>Cerithium fasciatum</i>	<i>Turritella columnaris</i>
<i>Cerithium fluviatile</i>	<i>Turritella maculata</i>
<i>Cerithium kochi</i>	<i>Calyptrae cicatricosa</i>
<i>Cerithium lacteum</i>	<i>Calyptrae edgariana</i>
<i>Cerithium pingue</i>	<i>Calyptrae equestris</i>
<i>Cerithium recurvum</i>	<i>Calyptrae walshi</i>
<i>Cerithium rostratum</i>	<i>Narica cancellata</i>
<i>Cerithium ruppelli</i>	<i>Narica ligata</i>
<i>Cerithium scabridum</i>	<i>Nerita chrysostoma</i>
<i>Cerithium shoplandi</i>	<i>Nerita plexa</i>
<i>Cerithium tuberculatum</i>	<i>Nerita polita</i>
<i>Cerithium tuberosum</i>	<i>Nerita rumphi</i>
<i>Cerithium yerburyi</i>	<i>Neritina feuilletti</i>
<i>Vertagus cedo-nulli</i>	<i>Phasianella lineolata</i>
<i>Vertagus fasciatus</i>	<i>Phasianella nivosa</i>
<i>Vertagus obeliscus</i>	<i>Turbo cornatus</i>
<i>Bittium chrysomallum</i>	<i>Turbo elegans</i>
<i>Triforis cingulatus</i>	<i>Turbo petholatus</i>
<i>Triforis collaris</i>	<i>Turbo pustulatus</i>
<i>Triforis corrugatus</i>	<i>Turbo radiatus</i>
<i>Littorina ahenea</i>	<i>Leptothyra lata</i>
<i>Littorina grano-costata</i>	<i>Leptothyra pilula</i>
<i>Littorina natalensis</i>	<i>Leptothyra yemenensis</i>
<i>Littorina scabra</i>	<i>Rotella carneolata</i>
<i>Modulus candidus</i>	<i>Delphinula diplocostira</i>

<i>Cardinalia virgata</i>	<i>Solen brevis</i>
<i>Trochus dentatus</i>	<i>Solen corneus</i>
<i>Trochus infundibulum</i>	<i>Solen cultelus</i>
<i>Clanculus pharaonis</i>	<i>Solen dactylus</i>
<i>Monodonta dama</i>	<i>Solen gouldi</i>
<i>Monodonta obscura</i>	<i>Solen truncatus</i>
<i>Euchelus bicinctus</i>	<i>Machaera japonica</i>
<i>Euchelus delpretei</i>	<i>Novaculina xyreces</i>
<i>Euchelus proximus</i>	<i>Tugonia nobilis</i>
<i>Thalotia torresi</i>	<i>Corbula tahitensis</i>
<i>Zizyphinus scobinatus</i>	<i>Anatina hixpidula</i>
<i>Agagus agagus</i>	<i>Anatina labiata</i>
<i>Gibbula doria</i>	<i>Anatina subrostrata</i>
<i>Minolia caifassii</i>	<i>Thracia adenensis</i>
<i>Minolia rotellaformis</i>	<i>Thracia australica</i>
<i>Margarita variabilis</i>	<i>Mactra achatina</i>
<i>Vitrinella menegherii</i>	<i>Mactra crista</i>
<i>Haliotis multiperforata</i>	<i>Mactra decora</i>
<i>Haliotis varia</i>	<i>Mactra fauroti</i>
<i>Fissurella ruppelli</i>	<i>Mactra fauroti v. alba</i>
<i>Parmophorus unguis</i>	<i>Lutraria curta</i>
<i>Patella plumbea</i>	<i>Lutraria intermedia</i>
<i>Patella radians</i>	<i>Standella aegyptiaca</i>
<i>Buccinulus solidulus</i>	<i>Standella capollacea</i>
<i>Hydatina physis</i>	<i>Standella solanderi</i>
<i>Hydatina velum</i>	<i>Raeta abererombiei</i>
<i>Bulla ampulla</i>	<i>Carella zebuensis</i>
<i>Atys cylindracea</i>	<i>Asaphis deflorata</i>
<i>Atys ferruginea</i>	<i>Pammobia amianta</i>
<i>Atys naucum</i>	<i>Pammobia contraria</i>
<u>Scaphopoda</u>	<i>Pammobia elegans</i>
<i>Dentalium octagonum</i>	<i>Pammobia marmorea</i>
<i>Dentalium shoplandi</i>	<i>Pammobia occidens</i>
<u>Bivalvia</u>	<i>Pammobia pallida</i>
<i>Umbrella indica</i>	<i>Pammobia rubicunda</i>
<i>Pholadidea fouroti</i>	<i>Pammobia weinkauffi</i>
<i>Parapholas quadrizonalis</i>	<i>Soletellina adamsi</i>
<i>Martesia striata</i>	<i>Tellina adenensis</i>
<i>Gastrochana ruppelli</i>	<i>Tellina caseus</i>
<i>Aspergillum vagniferum</i>	<i>Tellina concentrica</i>

<i>Tellina coxa</i>	<i>Callista erycina</i>
<i>Tellina crueigera</i>	<i>Callista florida</i>
<i>Tellina deshayesii</i>	<i>Callista lilacina</i>
<i>Tellina edentula</i>	<i>Callista umbonella</i>
<i>Tellina foliacea</i>	<i>Caryatis hebraea</i>
<i>Tellina holabana</i>	<i>Caryatis pura</i>
<i>Tellina inflata</i>	<i>Caryatis varians</i>
<i>Tellina lacunosa</i>	<i>Lioconcha leutiginosa</i>
<i>Tellina manumissa</i>	<i>Liocoucha tigrina</i>
<i>Tellina methoria</i>	<i>Crista pectinata</i>
<i>Tellina micans</i>	<i>Circe Arabica</i>
<i>Tellina obliqua</i>	<i>Circe callipyga</i>
<i>Tellina ostracea</i>	<i>Circe corrugata</i>
<i>Tellina perplexa</i>	<i>Circe intermedia</i>
<i>Tellina pharaonis</i>	<i>Circe scripta</i>
<i>Tellina rastellum</i>	<i>Circe scripta v. fulgurata</i>
<i>Tellina rubella</i>	<i>Sunetta contempta</i>
<i>Tellina rugosa</i>	<i>Sunetta effossa</i>
<i>Tellina scobinata</i>	<i>Tapes deshayesi</i>
<i>Tellina staurella</i>	<i>Tapes disruptus</i>
<i>Tellina subpallida</i>	<i>Tapes floridus</i>
<i>Tellina sulcata</i>	<i>Tapes geographicus</i>
<i>Tellina virgata</i>	<i>Tapes litteratus</i>
<i>Tellina virgata</i>	<i>Tapes malabaricus</i>
<i>Tellina yemenensis</i>	<i>Tapes obscuratus</i>
<i>Donax clathratus</i>	<i>Tapes obscuratus v. quadriradiata</i>
<i>Donax epularis</i>	<i>Tapes pinguis</i>
<i>Donax erythraeus</i>	<i>Tapes radiatus</i>
<i>Donax scalpellum</i>	<i>Tapes sulcosus</i>
<i>Serobicularia vaillanti</i>	<i>Tapes tatrix</i>
<i>Amphidesma chinense</i>	<i>Anaitis foliacea</i>
<i>Amphidesma crenatum</i>	<i>Chione crispata</i>
<i>Amphidesma lamellosum</i>	<i>Chione djiboutiensis</i>
<i>Amphidesma shoplandi</i>	<i>Chione flammea</i>
<i>Cumingia occatilla</i>	<i>Chione lamarcki</i>
<i>Paphia glabrata</i>	<i>Chione lamellosa</i>
<i>Mesodesma obtusum</i>	<i>Dosinia alta</i>
<i>Tirela ponderosa</i>	<i>Dosinia hepatica</i>
<i>Meretrix lusoria</i>	<i>Dosinia histrio</i>
<i>Callista costata</i>	<i>Dosinia pubescens</i>

<i>Dosinia radiata</i>	<i>Mytilus pictus</i>
<i>Venerupis (Claudiconitra) madreporica</i>	<i>Crenella cumingiana</i>
<i>Venerupis macrophylla</i>	<i>Modiola auriculata</i>
<i>Coralliophaga arabica</i>	<i>Modiola lignea</i>
<i>Coralliophaga coralliophaga</i>	<i>Modiola siraeensis</i>
<i>Coralliophaga decussata</i>	<i>Lithodomus cinnamomina</i>
<i>Petricola hemprichi</i>	<i>Lithodomus erythraensis</i>
<i>Petricola lyra</i>	<i>Lithodomus lithophagus</i>
<i>Choristodon lapicidum</i>	<i>Septifer excisus</i>
<i>Cardium assimile</i>	<i>Avicula marmorata</i>
<i>Cardium australe</i>	<i>Meleagrina margaritifera</i>
<i>Cardium lacunosum</i>	<i>Malleus albus</i>
<i>Cardium latum</i>	<i>Crenatula picta</i>
<i>Cardium psendolima</i>	<i>Pinna alta</i>
<i>Cardium rubicundum</i>	<i>Pinna bicolor</i>
<i>Cardium rugosum</i>	<i>Pinna nigra</i>
<i>Chama fragum</i>	<i>Arca navicularis</i>
<i>Chama gryphoides</i>	<i>Arca scapha</i>
<i>Tridacna crocea</i>	<i>Arca tortuosa</i>
<i>Tridacna cumingi</i>	<i>Arca zebra</i>
<i>Lucina concinna</i>	<i>Barbatia domingensis</i>
<i>Lucina dentifera</i>	<i>Barbatia helblingi</i>
<i>Lucina exasperata</i>	<i>Barbatia imbricata</i>
<i>Lucina fischeriana</i>	<i>Barbatia nivea</i>
<i>Lucina gemma</i>	<i>Barbatia obliquata</i>
<i>Lucina semperiana</i>	<i>Anomalocardia clathrata</i>
<i>Loripes clausa</i>	<i>Scapharca natalensis</i>
<i>Diplodonta rotundata</i>	<i>Cucullea concamerata</i>
<i>Pythina paula</i>	<i>Pectunculus pecteniformis</i>
<i>Scintilla faba</i>	<i>Pectunculus tegulicius</i>
<i>Scintilla obockensis</i>	<i>Pectunculina multistriata</i>
<i>Scintilla ovulina</i>	<i>Leda sculpta</i>
<i>Scintilla pisum</i>	<i>Pecten flabelloides</i>
<i>Crassatella radiata</i>	<i>Pecten layardi</i>
<i>Cardita antiquata</i>	<i>Pecten luculentus</i>
<i>Cardita semiorbiculata</i>	<i>Pecten plica</i>
<i>Cardita sulcata</i>	<i>Pecten sanguinolentus</i>
<i>Cardita variegata</i>	<i>Pecten senatorius</i>
<i>Mytilocardia gubernaculum</i>	<i>Pecten singaporinus</i>
<i>Mytilus ater</i>	<i>Pecten squamosus</i>

<i>Pecten subplicatus</i> <i>Pecten townsendi</i> <i>Pecten tranquebaricus</i> <i>Lima pancicostata</i> <i>Lima scabra</i> <i>Lima tenera</i> <i>Lima tenuis</i> <i>Plicatula imbricata</i> <i>Pedum spondyloideum</i> <i>Anomia achaeus</i> <i>Placuna placenta</i> <i>Vulsella lingua</i> <i>Ostrea crista-galli</i> <i>Ostrea cucullata</i> <i>Ostrea hyotis</i>	
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**Annex (6): Echinoderms fauna from
The Red Sea (1) and Gulf of Aden (2) waters (Price, 1982)**

<u>Asteroidea</u>		<i>Ophiactis hexacantha</i>	1
<i>Luidia maculata</i>	1/2	<i>Ophiactis parva</i>	1/2
<i>Luidia savignyi</i>	1	<i>Ophiactis savignyi</i>	1/2
<i>Astropecten bonnieri</i>	1	<i>Ophiactis versicolor</i>	1
<i>Astropecten hemprichi</i>	1/2	<i>Macrophiothrix demessa</i>	1/2
<i>Astropecten monacanthus</i>	1/2	<i>Macrophiothrix galataeae</i>	1
<i>Astropecten orsinii</i>	1	<i>Macrophiothrix hirsuta</i>	1/2
<i>Astropecten polyacanthus</i>	1/2	<i>Ophiomaza cacaotica</i>	1
<i>Ogmaster capella</i>	1	<i>Ophiopsammium semperi</i>	1/2
<i>Stellaster equesteris</i>	1/2	<i>Ophiothrix (Acanthophiothrix) proteus</i>	1/2
<i>Stellaster fouadi</i>	1	<i>Ophiothrix (Acanthophiothrix) purpurea</i>	1/2
<i>Culcita coreacea</i>	1	<i>Ophiothrix (Keystonia) propinqua</i>	1/2
<i>Pentaceraster mammillatus</i>	1/2	<i>Ophiothrix (Ophiothrix) savignyi</i>	1/2
<i>Pentaceraster tuberculatus</i>	1/2	<i>Ophiocoma erinaceus</i>	1/2
<i>Fromia ghardaqana</i>	1	<i>Ophiocoma pica</i>	1/2
<i>Gomophia egyptiaca</i>	1	<i>Ophiocoma pusilla</i>	1
<i>Leiaster leachi</i>	1	<i>Ophiocoma scolopendrina</i>	1/2
<i>Linckia multifora</i>	1/2	<i>Ophiocoma valenciae</i>	1
<i>Ophidiaster hemprichi</i>	1	<i>Ophiomastix variabilis</i>	1
<i>Asteropsis carinifera</i>	1/2	<i>Ophiosila pantherina</i>	1
<i>Asteropsis burtoni</i>	1/2	<i>Ophionereis dubia</i>	1
<i>Acanthaster planci</i>	1/2	<i>Ophioconis cupida</i>	1/2
<i>Euretaster cribrosus</i>	1	<i>Ophiopeza fallax</i>	1
<i>Mithrodia clavigera</i>	1	<i>Ophiolepis cincta</i>	1/2
<i>Echinaster purpureus</i>	1	<i>Ophiolepis superba</i>	1/2
<u>Ophiuroidea</u>		<i>Ophiura (Ophiura) kinbergi</i>	1/2
<i>Astroboa clavata</i>	1/2	<i>Ophiocirce mabahithae</i>	1
<i>Astroboa nuba</i>	1	<u>Echinoidea</u>	
<i>Amphilycus scripta</i>	1	<i>Eucidaris metularia</i>	1
<i>Amphiodia (Amphisphina) microplax</i>	1	<i>Phyllacanthus imperialis</i>	1
<i>Amphioplus (Amphioplus) personatus</i>	1	<i>Priononcidaris baculosa</i>	1/2
<i>Amphioplus (Amphioplus) timsae</i>	1/2	<i>Athenosoma varium</i>	1/2
<i>Amphioplus (Lymanella) hastatus</i>	1	<i>Chaetodiadema granulatum</i>	
<i>Amphioplus (Lymanella) integer</i>	1	<i>Diadema setosum</i>	1/2
<i>Amphioplus (Lymanella) laevis</i>	1/2	<i>Echinothrix clamaris</i>	1/2
<i>Amphipholis squamata</i>	1/2	<i>Echinothrix diadema</i>	1/2
<i>Amphiura (Amphiura) dejectoides</i>	1	<i>Microcyphus rousseaui</i>	1/2
		<i>Salmaciella dussumieri</i>	1/2

<i>Salmacis bicolor</i>	1	<i>Holothuria (Lessonothuria) insignis</i>	1
<i>Nudechinus gravieri</i>	1/2	<i>Holothuria (Lessonothuria) pardalis</i>	1/2
<i>Nudechinus scotiopremnus</i>	1	<i>Holothuria (Mertensiothuria) fuscocinerea</i>	1
<i>Tripneustes gratilla</i>	1/2	<i>Holothuria (Mertensiothuria) leucospilota</i>	1/2
<i>Parasalenia poehli</i>	1	<i>Holothuria (Mertensiothuria) papillifera</i>	1
<i>Echinometra mathaei</i>	1/2	<i>Holothuria (Mertensiothuria) pervicax</i>	1/2
<i>Echinostrephus molaris</i>	1	<i>Holothuria (Metriatyla) albiventer</i>	1
<i>Heterocentrotus mammillatus</i>	1/2	<i>Holothuria (Metriatyla) ocellata</i>	1
<i>Heterocentrotus trigonarius</i>	1	<i>Holothuria (Metriatyla) scabra</i>	1/2
<i>Clypeaster amplificatus</i>	1	<i>Holothuria (Metriatyla) tortonesei</i>	1
<i>Clypeaster humilis</i>	1/2	<i>Holothuria (Microthele) nobilis</i>	1
<i>Clypeaster rarispinus</i>	1/2	<i>Holothuria (Platyperona) difficilis</i>	1
<i>Clypeaster reticulatus</i>	1/2	<i>Holothuria (Slenkothuria) parva</i>	1/2
<i>Echinocyamus crispus</i>	1/2	<i>Holothuria (Semperothuria) cinerascens</i>	1/2
<i>Echinocyamus elegans</i>	1/2	<i>Holothuria (Semperothuria) flavomaculata</i>	1
<i>Fibularia ovulum</i>	1	<i>Holothuria (Stauropora) fuscoolivacea</i>	1
<i>Fibularia volva</i>	1/2	<i>Holothuria (Theelothuria) kurti</i>	1
<i>Laganum depressum</i>	1	<i>Holothuria (Theelothuria) spinifera</i>	1
<i>Laganum joubini</i>	1	<i>Holothuria (Thymiosycia) aphanes</i>	1/2
<i>Echinodiscus auritus</i>	1/2	<i>Holothuria (Thymiosycia) arenicola</i>	1
<i>Echinodiscus bisperforatus</i>	1/2	<i>Holothuria (Thymiosycia) hilla</i>	1/2
<i>Echinolampas alexandri</i>	1/2	<i>Holothuria (Thymiosycia) impatiens</i>	1/2
<i>Maretia planulata</i>	1/2	<i>Holothuria (Thymiosycia) remollescens</i>	1
<i>Lovenia elongata</i>	1	<i>Holothuria (Thymiosycia) strigosa</i>	1
<i>Schizaster lacunosus</i>	1	<i>Microthele nobilis</i>	1
<i>Paraster gibberulus</i>	1	<i>Stichopus chloronotus</i>	1
<u>Holothurioidea</u>		<i>Stichopus montotuberbulatus</i>	1/2
<i>Actinopyga mauritiana</i>	1	<i>Stichopus variegatus</i>	1/2
<i>Actinopyga bannwarthi</i>	2	<i>Pseudocnus echinatus</i>	1
<i>Actinopyga echinites</i>	1/2	<i>Stolus buccalis</i>	1/2
<i>Actinopyga miliaris</i>	1	<i>Trachythone crucifera</i>	1/2
<i>Actinopyga plebeja</i>	1	<i>Trachythone dollfusi</i>	1
<i>Actinopyga serratidens</i>	1	<i>Ohshimella ehrenbergi</i>	1/2
<i>Bahadschia cousteaui</i>	1	<i>Semperiella tenera</i>	1
<i>Bahadschia drachi</i>	1	<i>Euapta godeffroyi</i>	1
<i>Bahadschia graefferi</i>	1	<i>Leptosynapta steinitzi</i>	1
<i>Bahadschia marmorata</i>	1	<i>Opheodesoma grisea</i>	1/2
<i>Holothuria (Cystipus) rigida</i>	1/2	<i>Opheodesoma kamaranensis</i>	1
<i>Holothuria (Halodeima) atra</i>	1/2	<i>Patinapta crosslandi</i>	1
<i>Holothuria (Halodeima) edulis</i>	1/2	<i>Patinapta dumasi</i>	1
		<i>Polyplectana kefersteini</i>	1
		<i>Synapta maculata</i>	1/2
		<i>Synaptula reciprocans</i>	1/2
		<i>Synaptula recta</i>	1

<p><u>Crinoidea</u></p> <p><i>Capillaster multiradiatus</i> 1</p> <p><i>Heterometra savignii</i> 1/2</p> <p><i>Lamprometra klunzingeri</i> 1/2</p> <p><i>Stephanometra indica</i> 1</p>	<p><i>Stephanometra spicata</i> 1</p> <p><i>Oligometra serripina</i> 1/2</p> <p><i>Colobometra arabica</i> 1</p> <p><i>Tropiometra carinata</i> 1/2</p> <p><i>Dorometra parvicirra</i> 1</p>
<p><u>Asciacea</u></p> <p><i>Botrylloides sp.</i></p> <p><i>Didemnum moseleyi</i></p>	

*Annex (7), List the main Chondrichthyes
(Elasmobranchii) species found in the Yemen Seaes
(MFW, 2001 & Bonfil, 2003)*

(Sharks)



Family: Alopiidae		Thresher sharks
1	<i>Alopias pelagicus</i>	
2	<i>Alopias vaulpinus</i>	
3	<i>Alopias superciliosus</i>	
Family: Carcharhinidae		Requiem sharks
4	<i>Carcharhinus leucas</i>	
5	<i>Carcharhinus albimarginatus</i>	
6	<i>Carcharhinus altimus</i>	
7	<i>Carcharhinus amblyrhynchoides</i>	
8	<i>Carcharhinus amboinensis</i>	
9	<i>Carcharhinus brevipinna</i>	
10	<i>Carcharhinus obscurus</i>	
11	<i>Carcharhinus dussumieri</i>	
12	<i>Carcharhinus carcharias</i>	
13	<i>Carcharhinus amblyrhynches (Wheeler)</i>	
14	<i>Carcharhinus macloti</i>	
15	<i>Carcharhinus falciformis</i>	
16	<i>Carcharhinus leucas</i>	

17	<i>Carcharhinus limbatus</i>
18	<i>Carcharhinus longimanus</i>
19	<i>Carcharhinus melanopterus</i>
20	<i>Carcharhinus plumbeus</i>
21	<i>Carcharhinus sorrah</i>
22	<i>Carcharhinus sealei</i>
23	<i>Carcharhinus wheeleri</i>
24	<i>Carcharias Taurus</i>
25	<i>Deania calcea</i>
26	<i>Galeocerdo cuvier</i>
27	<i>Hemitriakis japonica</i>
28	<i>Loxodon macrorhivus</i>
29	<i>Negaprion acutidens</i>
30	<i>Prionace glauca</i>
31	<i>Rhincodon typus</i>
32	<i>Rhizoprionodon acutus</i>
33	<i>Scoliodon laticaudus</i>
34	<i>Triaenodon obesus</i>
Family: Echinorhinidae Bramble shark	
35	<i>Echinorhinus brucus</i>
Family: Ginglymotomatidae Nurse sharks	
36	<i>Nebrius ferrugineus</i>
Family: Hemigaleidae Weasel sharks	
37	<i>Hemipristis elongates</i>
38	<i>Hemigaleus microstoma</i>
39	<i>Paragaleus randalli</i>
Family: Hemiscyllidae Bamboo sharks	
40	<i>Chioscyllium arabicum</i>
41	<i>Chioscyllium griseum</i>
42	<i>Chioscyllium indicum</i>
43	<i>Chioscyllium plegiosum</i>
Family: Heterodontidae Bull head sharks	
44	<i>Heterodontus ramalheira</i>
45	<i>Negaprion acutidens</i>
Family: Hexanchidae Sixgill an sevendgill sharks	
46	<i>Heptranchias perlo</i>

Family: Lamnidae		Mackerel sharks
47	<i>Carcharodon carcharias</i>	
43	<i>Isurus oxyrinchus</i>	
Family: Pristiophoridae		Saw sharks
44	<i>Pristiophorus japonicus</i>	
Family: Proscylliidae		Finback catsharks
45	<i>Ctenacis fehlmanni</i>	
46	<i>Eridacnis radcliffei</i>	
47	<i>Proscyllidae sp.</i>	
Family: Scyliorhinae		Casharks
48	<i>Apristurus indicus</i>	
49	<i>Atelomycterus marmoratus</i>	
50	<i>Halaelurus boesemani</i>	
51	<i>Halaelurus hispidus</i>	
Family: Sphyrnidae		Hammer head sharks
52	<i>Eusphyra blochii</i>	
53	<i>Sphyma lewini</i>	
54	<i>Sphyma mokarran</i>	
Family: Centrophoridae		Dogfish sharks
55	<i>Centrophorus granulosus</i>	
56	<i>Centrophorus tessellates</i>	
57	<i>Centrophoru atromarginatus</i>	
58	<i>Deania profundorum</i>	
Family: Squatinidae		Angel sharks or sand devils
59	<i>Squatina Africana</i>	
60	<i>Squatina squatina</i>	
Family: Stegostomatidae		Zebra sharks
61	<i>Stegostoma fasciatum</i>	
Family: Triakidae		Houndsharks, smooth hounds
62	<i>Hypogaleus hyugaensis</i>	
63	<i>Logo omanesis</i>	
64	<i>Mustelus mosis</i>	
65	<i>Mustelus mustelus</i>	
66	<i>Mustelus punctulatus</i>	

67	<i>Scylliogaleus queckettii</i>
Family: Odontaspidae	
68	<i>Carcharias Taurus</i>

(Rays- Batoidei)

Family: Dasyatidae		Stingrays
1	<i>Dasyatis pastinata</i>	
2	<i>Dasyatis kuhlii</i>	
3	<i>Dasyatis zugei</i>	
4	<i>Himantur fai</i>	
5	<i>Himantur gerrardi</i>	
6	<i>Himantur jenkinsii</i>	
7	<i>Himantur imbricate</i>	
8	<i>Himantur uarank</i>	
9	<i>Pastinachus sephen</i>	
10	<i>Taeniura lymma</i>	
11	<i>Taeniura grabata</i>	
12	<i>Taeniura meyeri (melanospilos)</i>	
13	<i>Urogymnus asperrimus</i>	
Family: Mobulidae		Devil rays
14	<i>Manta birostris (ehrenbergii?)</i>	
15	<i>Mobula diabolus</i>	
16	<i>Mobula tarapacana</i>	
17	<i>Mobula kuhlii</i>	
18	<i>Mobula japonica</i>	
19	<i>Mobula eregoodootenkee (=diabola?)</i>	
Family: Myliobatidae		Eagle rays
20	<i>Aetobatus maculates</i>	
21	<i>Aetobatus narinari</i>	
22	<i>Aetobatu flagellum</i>	
23	<i>Aetobatu ocellatus</i>	
24	<i>Aetomylaeus milvus</i>	
25	<i>Aetomylaeus vespertilio</i>	
27	<i>Rhinoptera javanica</i>	
Family: Gymnuridae		Butterfly rays
28	<i>Aetoplatea tentaculata</i>	
29	<i>Gymnura poecilura</i>	

Family: Pristidae		Sawfishes
22	<i>Anoxypristis cuspidate</i>	
23	<i>Pristis zijsron</i>	
24	<i>Pristis pectinata</i>	
Family: Rhinopteridae		
25	<i>Rhinoptera javanica</i>	
26	<i>Rhinoptera jayakari?</i>	
Family: Rhinobatidae		Cuitarfishes
27	<i>Rhinobatos cemiculus</i>	
28	<i>Rhinobatos halavi</i>	
29	<i>Rhinobatos granulatus</i>	
30	<i>Rhinobatos obtusus</i>	
31	<i>Rhinobatos punctifer</i>	
32	<i>Rhinobatos salalah</i>	
33	<i>Rhinobatos schlegelii</i>	
34	<i>Rhinobatos thouin</i>	
Family: Rhynchobatidae		
35	<i>Rhina ancylostoma</i>	
36	<i>Rhynchobatus australiae?</i>	
37	<i>Rhynchobatus djiddensis</i>	
Family: Narctidae		Numfishes
38	<i>Narcine oculifera</i>	
39	<i>Narcine timplei</i>	
40	<i>Narke dipterygia</i>	
Family: Torpedinidae		
41	<i>Torpedo Panthera</i>	
42	<i>Torpedo sinuspersici</i>	
Family: Narkidae		
43	<i>Heteronarce bentuvial</i>	
44	<i>Heteronarce mollis</i>	

Annex (8), Osteichthyes (Bony Fishes)
 (EH&A, 1987; MAE, 1996; Fara & Abubakr 1998; MFW, 2001)



Family: Acanthuridae		Surgeonfishes
1	<i>Acanthurus bleekeri</i>	
2	<i>Acanthurus dussumieri</i>	
3	<i>Acanthurus gahhm?</i>	
4	<i>Acanthurus lineatus</i>	
5	<i>Acanthurus leucosternon</i>	
6	<i>Acanthurus mata</i>	
7	<i>Acanthurus nigrofuscus</i>	
8	<i>Acanthurus shoal</i>	<i>endemic</i>
9	<i>Acanthurus tennentii</i>	
10	<i>Acanthurus triostegus</i>	
11	<i>Ctenochaetus striatus</i>	
12	<i>Naso annulatus</i>	
13	<i>Naso hexacanthus</i>	
14	<i>Naso lituratus</i>	
15	<i>Naso unicornis</i>	
16	<i>Naso xanthopterus</i>	
18	<i>Naso brevirostris</i>	
18	<i>Zebrasoma desjardinii</i>	
19	<i>Zebrasoma veliferum</i>	
20	<i>Zebrasoma xanthurum</i>	<i>endemic</i>

Family: Acropomatidae		Blowbellies
21	<i>Acropoma japonicum</i>	
Family: Albulidae		Bonefishes
22	<i>Albula glossodonta</i>	
Family: Alepocephalidae		Slick headss
23	<i>Alepocephalus agassizii</i>	
24	<i>Xenedermichthys copei</i>	
Family: Anguillidae		Freshwater eels
25	<i>Anguilla bengalensis</i>	
Family: Antennariidae		Frogfishes
26	<i>Antennarius nummifer</i>	
27	<i>Antennarius pelyophthalmus</i>	
Family: Apogonidae		Cardinalfishes
28	<i>Apogon annularis</i>	
29	<i>Apogon aureus</i>	
30	<i>Apogon blochii</i>	
31	<i>Apogon coccineus</i>	
32	<i>Apogon cyanosoma</i>	
33	<i>Apogon endekataenia</i>	
34	<i>Apogon fraenatus</i>	
35	<i>Apogon kallopterus</i>	
36	<i>Apogon pseudotaeniatus</i>	
37	<i>Apogon semiornatus</i>	
38	<i>Archamia fucata</i>	
39	<i>Cheilodipterus lineatus</i>	
40	<i>Cheilodipterus macrodon</i>	
41	<i>Cheilodipterus quinquelineatus</i>	
42	<i>Fowleria variegata</i>	
43	<i>Sphaeramia orbicularis</i>	
Family: Atherinidae		Silversides
44	<i>Atherinomorus lacunosus</i>	
45	<i>Atherinomorus temminckii</i>	
Family: Argentinidae		Aregting
46	<i>Arganta sphyraena</i>	

Family: Ariidae		Sea catfishes
47	<i>Arius dussumieri</i>	
48	<i>Arius tenuispinis</i>	
49	<i>Arius thalassinus</i>	
Family: Ariommatidae		Ariommas
50	<i>Ariomma evermanni</i>	
Family: Astronesthidae		Snaggletooths
51	<i>Astronesthes</i> Lucifer	
52	<i>Astronesthes richardsani</i>	
Family: Balistidae		Triggerfishes
53	<i>Abalistes stellatus</i>	
54	<i>Balistapus undulates</i>	
55	<i>Balistoides conspic</i>	
56	<i>Balistoides conspicillum</i>	
57	<i>Balistoides viridescens</i>	
58	<i>Meiacanthus nigrolineatus</i>	
59	<i>Melichthys indicus</i>	
60	<i>Odonus niger</i>	
61	<i>Pseudobalistes flavimarginatus</i>	
62	<i>Pseudobalistes fuscus</i>	
63	<i>Rhinecanthus assasi</i>	<i>endemic</i>
64	<i>Sufflamen albicaudatus</i>	
65	<i>Sufflamente chrysopterus</i>	
66	<i>Sufflamen fraenatus</i>	
67	<i>Xanthichthys raegens</i>	
Family: Bathyclupeidae		Bathyclupeids
68	<i>Bathyclupea hoskinii</i>	
Family: Batrachoididae		Toadfishes
69	<i>Austreobatrachus dussumieri</i>	
Family: Belonidae		Needlefishes
70	<i>Ablennes hians</i>	
71	<i>Platybelone argalus platyura</i>	
72	<i>Strongylura leiura</i>	
73	<i>Strongylura strongylura</i>	
74	<i>Tylosurus crocodiles</i>	

Family: Berycidae		Alfonsinos
75	<i>Baryx splendens</i>	
Family: Blenniidae		Blennies
76	<i>Alloblennius pictus</i>	
77	<i>Alticus kirkii</i>	
78	<i>Antennablennius edenensis</i>	
79	<i>Antennablennius vaipunctatus</i>	
80	<i>Cirripectes castaneus</i>	
81	<i>Escenius gravieri</i>	
82	<i>Escenius nalolo</i>	
83	<i>Escenius pulcher</i>	
84	<i>Istiblennius edentulous</i>	
85	<i>Istiblennius lineatus</i>	
86	<i>Meiacanthus nigrolineatus</i>	
87	<i>Plagiotermus rhinorynchos</i>	
88	<i>Plagiotermus townsendi</i>	
89	<i>Salarias sp</i>	
90	<i>Salarias fasciatus</i>	
Family: Bothidae		Left-eye flounders
91	<i>Arnoglossus arabieus</i>	
92	<i>Arnoglossus tapeinosoma</i>	
93	<i>Bothus myriaster</i>	
94	<i>Bothus pantherinus</i>	
95	<i>Chascanopsetta lugubris</i>	
96	<i>Crossorhombus azureus</i>	
97	<i>Crossorhombus valderostratus</i>	
98	<i>Grammatobothus polyophthalmus</i>	
99	<i>Laeops guentheri</i>	
100	<i>Laeops pecteralis</i>	
Family: Bramidae		Pomfrette
101	<i>Brama japonica</i>	
Family: Bregmacerotidae		Codlets
102	<i>Bregmaceros nectabamus</i>	
Family: Caesionidae		Fusiliers
103	<i>Caesio caeruleus</i>	
104	<i>Caesio lunaris</i>	
105	<i>Caesio striattus</i>	
106	<i>Caesio suevica</i>	

107	<i>Caesio varilineata</i>
108	<i>Caesio xanthonota</i>
109	<i>Pterocaesio chrysozona</i>
Family: Callionymidae	
Dragonets	
110	<i>Callionymus hindsic</i>
111	<i>Callionymus margaretae</i>
112	<i>Callionymus marleyi</i>
113	<i>Callionymus persicus</i>
114	<i>Carebarecallionymus sp</i>
115	<i>Diplogramaeus pypmaeus</i>
116	<i>Erthraeuscallionymus sp</i>
117	<i>Filamentosuscallionymus sp</i>
118	<i>Pterocasio chrysozona</i>
Family: Carangidae	
Jacks	
119	<i>Alectis ciliaris</i>
120	<i>Alectis indicus</i>
121	<i>Alepes djedaba</i>
122	<i>Alepes melanoptera</i>
123	<i>Atule mate</i>
124	<i>Carangoides armatus</i>
125	<i>Carangoides bajad</i>
126	<i>Carangoides chrysophrys</i>
127	<i>Carangoides equula</i>
128	<i>Carangoides ferdau</i>
129	<i>Carangoides fulvoguttatus</i>
130	<i>Carangoides gymnostethus</i>
131	<i>Carangoides hedlandensis</i>
132	<i>Carangoides malabaricus</i>
133	<i>Carangoides orthogrammus</i>
134	<i>Caranx heberi</i>
135	<i>Caranx ignobilis</i>
136	<i>Caranx lugubris</i>
137	<i>Caranx melampygus</i>
138	<i>Caranx sexfasciatus</i>
139	<i>Decapterus kurroides</i>
140	<i>Decapterus macarellus</i>
141	<i>Decapterus macrosoma</i>
142	<i>Decapterus russelli</i>
143	<i>Elagatis bipinnulata</i>
144	<i>Gnathanodon speciosus</i>
145	<i>Megalaspis cordyla</i>
146	<i>Naucrates doctor</i>

147	<i>Parastromateus niger</i>	
148	<i>Scomberoides commersonianus</i>	
149	<i>Scomberoides lysan</i>	
150	<i>Scomberoides tol</i>	
151	<i>Selar crumenophthalmus</i>	
152	<i>Seriola dumerili</i>	
153	<i>Seriola lalandi</i>	
154	<i>Seriola rivoliana</i>	
155	<i>Seriolina nigrofasciata</i>	
156	<i>Trachurus africanus</i>	
157	<i>Trachurus baillonii</i>	
158	<i>Trachurus blochii</i>	
159	<i>Trachurus mookalee</i>	
160	<i>Trachurus indicus</i>	
161	<i>Uraspis helvola</i>	
Family: Centriscidae		Razorfish
162	<i>Centriscus scutatus</i>	
Family: Centrolophidae		Ruffs
163	<i>Psenopsis cyanes</i>	
Family: Cepolidae		Bandfishes
164	<i>Acanthocephala inica</i>	
165	<i>Owstonia weberi</i>	
Family: Chaetodontidae		Butterflyfishes
166	<i>Chaetodon auriga</i>	
167	<i>Chaetodon auriga setifer?</i>	
168	<i>Chaetodon austriacus</i>	<i>endemic</i>
169	<i>Chaetodon collare</i>	
170	<i>Chaetodon gardneri</i>	
171	<i>Chaetodon kleinii</i>	
172	<i>Chaetodon larvatus</i>	<i>endemic</i>
173	<i>Chaetodon leucopleura</i>	
174	<i>Chaetodon lineolatus</i>	
175	<i>Chaetodon lunula</i>	
176	<i>Chaetodon melannotus</i>	
177	<i>Chaetodon melapterus</i>	<i>endemic</i>
178	<i>Chaetodon mesoleucos</i>	<i>endemic</i>
179	<i>Chaetodon modestus</i>	
180	<i>Chaetodon paucifasciatus</i>	<i>endemic</i>
181	<i>Chaetodon semilarvatus</i>	
182	<i>Chaetodon trifascialis</i>	

183	<i>Chaetodon unimaculatus</i>	
184	<i>Chaetodon fasciatus</i>	<i>endemic</i>
185	<i>Chaetodon vagabundus pictus</i>	
186	<i>Forcipiger flavissimus</i>	
187	<i>Heniochus acuminatus</i>	
188	<i>Heniochus diphreutes</i>	
189	<i>Heniochus intermedius</i>	<i>endemic</i>
190	<i>Heniochus lacuminatus</i>	
191	<i>Megaprotodon trifascialis</i>	
Family: Chamsodontidae		Gapers
192	<i>Champsodon amanansis</i>	
Family: Chanidae		Milkfishes
193	<i>Chanos chanos</i>	
Family: Chauliodontidae		Viperfishes
194	<i>Chauliodus danae</i>	
195	<i>Chauliodus sloani</i>	
Family: Chirocentridae		Wolf-herrings
196	<i>Chirocentrus durab</i>	
197	<i>Chirocentrus nudus</i>	
Family: Chlorophthalmidae		Greeneyes
198	<i>Chlorophthalmus agassizi</i>	
199	<i>Chlorophthalmus bicornis</i>	
Family: Cirrhitidae		Hawkfishes
200	<i>Cirrhitichthys oxycephalus</i>	
201	<i>Paracirrhites forsteri</i>	
Family: Clupeidae		Herrings & Sardines
202	<i>Amblygaster sirm</i>	
203	<i>Anodontostoma chacunda</i>	
204	<i>Dussumieria acuta</i>	
205	<i>Dussumieria elopsides</i>	
206	<i>Etrumeus teres</i>	
207	<i>Herklotsichthys lossei</i>	
208	<i>Herklotsichthys quadrimaculatus</i>	
209	<i>Hilsa kellee</i>	
210	<i>Nematalosa nasus</i>	
211	<i>Nematalosa persara</i>	

212	<i>Nematalosa resticularia</i>
213	<i>Sardinella albella</i>
214	<i>Sardinella gibbosa</i>
215	<i>Sardinella jussieui</i>
216	<i>Sardinella longiceps</i>
217	<i>Sardinella melanura</i>
218	<i>Sardinella sindensis</i>
219	<i>Sardinella melanestictus</i>
220	<i>Tennalosa ilisha</i>
Family: Congridae Conger eels	
221	<i>Ariosoma anago</i>
222	<i>Cengrisepa meldinenasis</i>
223	<i>Conger cinereus</i>
224	<i>Gnathophis heterolineatus</i>
225	<i>Heteroconger hassi</i>
226	<i>Lamnestema orientalis</i>
227	<i>Uroconger lepturus</i>
Family: Coryphaenidae Dolphinfishes	
228	<i>Coryphaena equiselis</i>
229	<i>Coryphaena hippurus</i>
Family: Cynoglossidae Tonguesoles	
230	<i>Cynoglossus acutirostris</i>
231	<i>Cynoglossus arel</i>
232	<i>Cynoglossus attenuatus</i>
233	<i>Cynoglossus bilineatus</i>
234	<i>Cynoglossus capensis</i>
235	<i>Cynoglossus puncticeps</i>
236	<i>Paraplagusia bilineata</i>
237	<i>Symphurus septemstriatus</i>
Family: Dactylopteridae Flying gurrards	
238	<i>Dactyloptena orientalis</i>
Family: Dasyatidae	
239	<i>Taeniura lymma</i>
Family: Diodontidae Burrfishes	
240	<i>Chilomycterus affinis</i>
241	<i>Chilomycterus orbicularis</i>
242	<i>Chilomycterus reticulatus</i>
243	<i>Cylichthys spilostylus</i>
244	<i>Diodon holocanthus</i>

245	<i>Diodon hystrix</i>	
Family: Drepanidae		Sicklefishes
246	<i>Drepane longimana</i>	
247	<i>Drepane punctata</i>	
Family: Echeneidae		Remoras
248	<i>Echeneis naucrates</i>	
Family: Engraulidae		Anchovies
249	<i>Encrasicholina devisi</i>	
250	<i>Encrasicholina heterolobus</i>	
251	<i>Encrasicholina puncifer</i>	
252	<i>Engraulis japonicus</i>	
253	<i>Stolephorus baclama</i>	
254	<i>Stolephorus dussumieri</i>	
255	<i>Stolephorus hamiltonii</i>	
256	<i>Stolephorus heterolobus</i>	
257	<i>Stolephorus indicus</i>	
258	<i>Stolephorus insularis</i>	
259	<i>Stolephorus punctifer</i>	
260	<i>Stolephorus whiteheadi</i>	
261	<i>Stolephorus setirostris</i>	
262	<i>Thryssa setirostris</i>	
263	<i>Thryssa vitirostris</i>	
Family: Ehippidae		Spadefishes
264	<i>Platax orbicularis</i>	
265	<i>Platax Pinnatus</i>	
266	<i>Platax tiera</i>	
Family: Exocoetidae		Flyingfishes
267	<i>Cheilopogon atrisignis</i>	
268	<i>Cheilopogon cyanopterus</i>	
269	<i>Cheilopogon nigricans</i>	
Family: Fistulariidae		Cornetfishes
270	<i>Fistularia commersonii</i>	
271	<i>Fistularia petimba</i>	
Family :Gempylidae		Snake-mackerels
272	<i>Gempylus serpens</i>	
273	<i>Lepidocybium flavobrunneum</i>	

Family: Gerreidae		Silver-biddier
274	<i>Gerres filamentosus</i>	
275	<i>Gerres poieti</i>	
Family: Gobiidae		Gobies
276	<i>Amblyeleotris steinitzi</i>	
277	<i>Amblygobius hectori</i>	
278	<i>Asterropteryx semipunctatus</i>	
279	<i>Bathygobius fuscus</i>	
280	<i>Bathygobiops maculosus</i>	
281	<i>Cryptocentrus caeruleopunctatus</i>	
282	<i>Cryptocentrus lutheri</i>	
283	<i>Eviota guttata</i>	
284	<i>Istigobius decoratus</i>	
285	<i>Periophthalmus cantonensis</i>	
286	<i>Preiolepis semidoliatus</i>	
287	<i>Valenciennea puellaris?</i>	
288	<i>Yongeivhthys criniger</i>	
Family: Gonostomatida		Bristle mouths
289	<i>Cyclothone microdon</i>	
290	<i>Vinoiguerria nimbaria</i>	
Family: Grammistida		Soapfishes
291	<i>Pogonoperea punctata</i>	
Family: Haemulidae		Grunts & Sweetlips
292	<i>Plectorhinchus gaterinus</i>	
293	<i>Plectorhinchus gibbosus</i>	
294	<i>Plectorhinchus playfairi</i>	
295	<i>Plectorhinchus pictus</i>	
296	<i>Plectorhinchus schotaf</i>	
297	<i>Diagramma pictum</i>	
298	<i>Plectorhynchus flavomaculatus</i>	
299	<i>Pomadasys argenteus</i>	
300	<i>Pomadasys commersonni</i>	
301	<i>Pomadasys kaakan</i>	
302	<i>Pomadasys maculatum</i>	
303	<i>Pomadasys multimaculatum</i>	
304	<i>Pomadasys stridens</i>	
Family: Harpadontidae		Bombay-ducks
305	<i>Harpadon nehereus</i>	

Family: Hemiramphidae		Halfbeaks
306	<i>Hemiramphus far</i>	
307	<i>Hemiramphus lutkei</i>	
308	<i>Hemiramphus marginatus</i>	
309	<i>Hemiramphus unicuspis</i>	
310	<i>Heptanchias perlo</i>	
311	<i>Hyporhamphus limbatus</i>	
312	<i>Hyporhamphus quoyi</i>	
313	<i>Rhynchorhamphus georgii</i>	
Family: Holcentridae		Squirrelfishes
314	<i>Canthigaster coronata</i>	
315	<i>Canthigaster solandri</i>	
316	<i>Canthigaster valentine</i>	
317	<i>Myripristis melanostictus</i>	
318	<i>Myripristis murdjan</i>	
319	<i>Neoniphon samara</i>	
320	<i>Ostichthys acanthorhinus</i>	
321	<i>Sargocentron caudimaculatum</i>	
322	<i>Sargocentron diadema</i>	
323	<i>Sargocentron rubrum</i>	
324	<i>Sargocentron spiniferum</i>	
Family: Istiophoridae		Sailfishes
325	<i>Istiophorus platypterus</i>	
326	<i>Makaira indica</i>	
327	<i>Tetrapturus audax</i>	
Family: Kyphosidae		Sea Chubs
328	<i>Kyphosus cinerascens</i>	
329	<i>Kyphosus igibbus</i>	
330	<i>Kyphosus vaigiensis</i>	
Family: Labridae		Wrasses
331	<i>Anampses caeruleopunctatus</i>	
332	<i>Anampses melanurus</i>	
333	<i>Anampses meleagrides</i>	
334	<i>Anampses twisit</i>	
335	<i>Bodianus anthioides</i>	
336	<i>Bodianus axillaries</i>	
337	<i>Bodianus bilunulatus</i>	
338	<i>Bodianus Diana</i>	
339	<i>Bodianus macrognathos</i>	

340	<i>Bodianus perdition</i>	
341	<i>Bodianus trilineatus</i>	
342	<i>Cheilinus abudjubbe</i>	endemic
343	<i>Cheilinus diagrammus</i>	
344	<i>Cheilinus fasciatus</i>	
345	<i>Cheilinus jasciatus</i>	
346	<i>Cheilinus lunulatus</i>	
347	<i>Cheilinus triblobatus</i>	
348	<i>Cheilinus undulates</i>	
349	<i>Cheilio inermis</i>	
350	<i>Choerodon robustus</i>	
351	<i>Coris aygula</i>	
352	<i>Coris Africana</i>	
353	<i>Coris caudimacula</i>	
354	<i>Coris frerei</i>	
355	<i>Coris gaimard</i>	
356	<i>Coris gaimard cuvieri</i>	
357	<i>Coris variegata</i>	
358	<i>Epibulus insidiator</i>	
359	<i>Gomphosus caeruleus</i>	
360	<i>Gomphosus varius</i>	
361	<i>Halichoeres hortulanus</i>	
362	<i>Halichoeres miniatus</i>	
363	<i>Halichoeres marginatus</i>	
364	<i>Halichoeres ornatissimus</i>	
365	<i>Halichoeres scapularis</i>	
366	<i>Hemigymnus fasciatus</i>	
367	<i>Hemigymnus melapterus</i>	
368	<i>Hologymnosus doliatus</i>	
369	<i>Labroides dimidiatus</i>	
370	<i>Labroides bicolor</i>	
371	<i>Larabicus quadrilineatus</i>	endemic
372	<i>Novaculichthys taeniourus</i>	
373	<i>Oxycheilinus digrammus</i>	
374	<i>Paracheilinus octotaenia</i>	
375	<i>Pseudocheilinus hexataenia</i>	
376	<i>Pseudodax moluccanus</i>	
377	<i>Stethojulis albovittata</i>	
378	<i>Stethojulis interrupta</i>	
379	<i>Thalassoma hardwickii</i>	
380	<i>Thalassoma klunzingeri</i>	endemic
381	<i>Thalassoma lunare</i>	
382	<i>Thalassoma purpureum</i>	

Family: Leiognathidae		Ponyfishes
383	<i>Gazza minuta</i>	
384	<i>Leiognathus bindus</i>	
385	<i>Leiognathus elongates</i>	
386	<i>Leiognathus equulus</i>	
387	<i>Leiognathus fasciatus</i>	
388	<i>Leiognathus leuciscus</i>	
389	<i>Secutor insidiator</i>	
Family: Lethrinidae		Emperors
390	<i>Gymnocranius griseus</i>	
391	<i>Gymnocranius robinsoni</i>	
392	<i>Lethrinus crocineus</i>	
393	<i>Lethrinus harak</i>	
394	<i>Lethrinus lentjan</i>	
395	<i>Lethrinus mahsena</i>	
396	<i>Lethrinus mahsenoides</i>	
397	<i>Lethrinus microdon</i>	
398	<i>Lethrinus nebulosus</i>	
399	<i>Lethrinus olivaceus</i>	
400	<i>Lethrinus ornatus</i>	
401	<i>Lethrinus variegates</i>	
402	<i>Lethrinus xanthochilus</i>	
403	<i>Monotaxis grandoculis</i>	
Family: Lophiidae		Anglerfishes
404	<i>Lophius upsicephalus</i>	
405	<i>Lophoimus lophius</i>	
406	<i>Lophiodes inaidiaterius</i>	
407	<i>Lophiodes mutilus</i>	
408	<i>Lophiodes piscotorius</i>	
409	<i>Lophiodes setigerus</i>	
Family: Lutjanidae		Snappers
410	<i>Aphareus furca</i>	
411	<i>Aphareus rutilans</i>	
412	<i>Aprion virescens</i>	
413	<i>Etelis carbunculus</i>	
414	<i>Lutjanus argentimaculatus</i>	
415	<i>Lutjanus bengalensis</i>	
416	<i>Lutjanus bohar</i>	
417	<i>Lutjanus coeruleolineatus</i>	
418	<i>Lutjanus ehrenbergii</i>	

419	<i>Lutjanus fulviflamma</i>
420	<i>Lutjanus fulvus</i>
421	<i>Lutjanus gibbus</i>
422	<i>Lutjanus johnii</i>
423	<i>Lutjanus kasmari</i>
424	<i>Lutjanus lineolatus</i>
425	<i>Lutjanus ltjanus</i>
426	<i>Lutjanus malabaricus</i>
427	<i>Lutjanus monostigma</i>
428	<i>Lutjanus quinquelineatus</i>
429	<i>Lutjanus rivulatus</i>
430	<i>Lutjanus russelli</i>
431	<i>Lutjanus sanguineus</i>
432	<i>Lutjanus sebae</i>
433	<i>Lutjanus vitta</i>
434	<i>Macolor niger</i>
435	<i>Paracaesio xanthurus</i>
436	<i>Pinjalo pinjalo</i>
437	<i>Pristipomoides filamentosus</i>
438	<i>Pristipomoides multidens</i>
439	<i>Pristipomoides typus</i>
Family: Malacanthidae	
Tilefishes	
440	<i>Malacanthus latovittatus</i>
Family: Macrouridae	
Grenadiers	
441	<i>Bathygadus furvescens</i>
442	<i>Coelorhynchus acanthiger</i>
443	<i>Coelorhynchus argentatus</i>
444	<i>Coelorhynchus brajuprine</i>
445	<i>Coelorhynchus denticulatus</i>
446	<i>Coelorhynchus karrerae</i>
447	<i>Godomus capensis</i>
448	<i>Hymenocephalus cavernous</i>
449	<i>Macrourus carinatus</i>
450	<i>Malacocephalus laevis</i>
451	<i>Malacocephalus occidentalis</i>
452	<i>Nezumia brevibarbata</i>
453	<i>Nezumia micronychodon</i>
454	<i>Nezumia milleri</i>
Family: Maraenidae	
455	<i>Echidna nebulosa</i>
456	<i>Gymnothorax javanicus</i>

457	<i>Gymnothorax favagineus</i>	
458	<i>Gymnothorax chilospylus</i>	
459	<i>Siderea grisea</i>	
Family: Microdesmidae		
460	<i>Gynnelichthy monostigma</i>	
461	<i>Ptereleotris evides</i>	
Family: Monacanthidae		Filefishes
462	<i>Aluterus monoceros</i>	
463	<i>Aluterus scriptus</i>	
464	<i>Cantherhines pardalis</i>	
465	<i>Paramonacanthus choirocephalus</i>	
466	<i>Paramonacanthus japonicus</i>	
467	<i>Stephanolepis cirrhifer</i>	
468	<i>Stephanolepis diaspros</i>	
469	<i>Thamnaconus modestoides erthraeensis</i>	
Family: Monodactylidae		Monos
470	<i>Monodactylus argenteus</i>	
Family: Moridae		Moras
471	<i>Physiculus argyropastus</i>	
472	<i>Physiculus marisrubri</i>	
473	<i>Physiculus natalensis</i>	
Family: Mugilidae		Mulletts
474	<i>Chelon sbviridis</i>	
475	<i>Liza macrolepis</i>	
476	<i>Liza melinoptera</i>	
477	<i>Liza planiceps</i>	
478	<i>Liza vaiensis</i>	
479	<i>Liza abu</i>	
480	<i>Liza cerinata</i>	
481	<i>Liza klunzingeri</i>	
482	<i>Liza persicus</i>	
483	<i>Liza subviridis</i>	
484	<i>Mugil cephalus</i>	
485	<i>Valamugil buechanani</i>	
486	<i>Valamugil cunnesius</i>	
487	<i>Valamugil pedaraki</i>	
488	<i>Valamugil seheli</i>	

Family: Mugiloididae		Grubfishes
489	<i>Paraperceis pulchella</i>	
Family: Mullidae		Goatfishes
490	<i>Mulloidichthys flavolineatus</i>	
491	<i>Mulloidichthys mimicus</i>	
492	<i>Mulloidichthys vanicolensis</i>	
493	<i>Parupeneus barberinus</i>	
494	<i>Parupeneus bifasciatus</i>	
495	<i>Parupeneus cinnabarinus</i>	
496	<i>Parupeneus cyclostomus</i>	
497	<i>Parupeneus forsskali</i>	
498	<i>Parupeneus fraterculus</i>	
499	<i>Parupeneus indicus</i>	
500	<i>Parupeneus macronemus</i>	
501	<i>Parupeneus rubescens</i>	
502	<i>Upeneus bensasi</i>	
503	<i>Upeneus moluccensis</i>	
504	<i>Upeneus sulphureus</i>	
505	<i>Upeneus taeniopterus</i>	
506	<i>Upeneus tragula</i>	
507	<i>Upeneus vittatus</i>	
Family: Muraenesocidae		Pike congers
508	<i>Congresox talabonoides</i>	
509	<i>Muraenesox cinereus</i>	
Family: Muraenidae		Morays
510	<i>Echidna nebulosa</i>	
511	<i>Echidna zebra</i>	
512	<i>Gymnothorax boschi</i>	
513	<i>Gymnothorax favagineus</i>	
514	<i>Gymnothorax undulates</i>	
515	<i>Lycodontis meleagris</i>	
516	<i>Siderea grisea</i>	
517	<i>Siderea picta</i>	
518	<i>Thyrosoidea macrura</i>	
Family: Myctophidae		Lanternfishes
519	<i>Benthoosema pterotaa</i>	
520	<i>Diaphus coeruleus</i>	
521	<i>Diaphus drachmanni</i>	
522	<i>Diaphus taaningi</i>	

523	<i>Lampadena luminosa</i>	
524	<i>Myctophidae punctatum</i>	
Family: Nemichthyidae		Snie eels
525	<i>Nemichthys scolopaceus</i>	
Family: Nemipteridae		Threadfin breams
526	<i>Nemipterus bipunctatus</i>	
527	<i>Nemipterus japonicus</i>	
528	<i>Nemipterus peronii</i>	
529	<i>Nemipterus randalli</i>	
530	<i>Nemipterus zysron</i>	
531	<i>Parascolopsis aspinosa</i>	
532	<i>Parascolopsis boesemani</i>	
533	<i>Parascolopsis eriomma</i>	
534	<i>Parascolopsis inermis</i>	
535	<i>Scolopsis bimaculatus</i>	
536	<i>Scolopsis ghanam</i>	
537	<i>Scolopsis taeniatus</i>	
538	<i>Scolopsis vosmeri</i>	
Family: Nettastomatidae		Blacktail duckbill
539	<i>Nettastoma porviceps</i>	
Family: Ophichthidae		Snake eels & Worm eels
540	<i>Lamnostoma orientalis</i>	
541	<i>Maraenichthys schultzei</i>	
542	<i>Myrichthys colubrinus</i>	
543	<i>Ophichthus erabo</i>	
544	<i>Ophichthus urolophus</i>	
545	<i>Ophichthus immaculatus</i>	
546	<i>Ophichthus meleagris</i>	
547	<i>Pisodonophis cancrivorus</i>	
548	<i>Tetrosomus concatenates</i>	
549	<i>Tetrosomus gibbosus</i>	
Family: Ophidiidae		Cuskeels & Brotulas
550	<i>Bassobythites braunswigi</i>	
551	<i>Brotula multibarbata</i>	
552	<i>Dicrolene vaillanti</i>	
553	<i>Epetriodus freddy</i>	
554	<i>Glyptophidium longipes</i>	
555	<i>Hoplobrotula gnathopus</i>	
556	<i>Monomitopus conjugator</i>	

557	<i>Neobythites steatiticus</i>
558	<i>Neobythites stefanovi</i>
559	<i>Pycnocraspedum sp</i>
560	<i>Pycnocraspedum squamipinne</i>
Family: Opstognathidae	
Jawfishes	
561	<i>Opistognathus muscatensis</i>
562	<i>Opistognathus nigromarginatus</i>
Family: Ostraciidae	
Trunkfishes	
563	<i>Lactoria cornuta</i>
564	<i>Lactoria diaphana</i>
565	<i>Ostracion cyanurus</i>
566	<i>Ostracion cubicus</i>
567	<i>Ostracion immaculatus</i>
568	<i>Ostracion meleagris</i>
569	<i>Ostracion whiteleyi</i>
570	<i>Tetrosomus concatenates</i>
571	<i>Tetrosomus gibbosus</i>
Family: Paralepididae	
Barracudinas	
572	<i>Lestrolepis intermedia</i>
573	<i>Lestrolepis jayakari</i>
574	<i>Paralepis brevirostris</i>
Family: Paralichthyidae	
Short fin flounder	
575	<i>Pseudorhombus arsius</i>
576	<i>Pseudorhombus elevatus</i>
577	<i>Pseudorhombus javanicus</i>
578	<i>Pseudorhombus malayanus</i>
579	<i>Pseudorhombus natalensis</i>
580	<i>Pseudorhombus triocellatus</i>
Family: Pempheridae	
Sweepers	
581	<i>Pempheris oualensis</i>
Family: Pentacerotidae	
Armourheads	
582	<i>Histiopterus typus</i>
Family: Percophidae	
Duckbills	
583	<i>Bembrops adeneosis</i>
584	<i>Bembrops caudimaculata</i>
585	<i>Bembrops platyrhynchus</i>

Family: Peristediidae		Sea robin
586	<i>Satyrichthys adeni</i>	
587	<i>Peristedion weberi</i>	
Family: Pinguipedidae		Sandperches
588	<i>Parapercis alboguttata</i>	
589	<i>Parapercis robinsoni</i>	
Family: Platacidae		Batfishes
590	<i>Platax orbicularis</i>	
591	<i>Platax pinnatus</i>	
Family: Platycephalidae		Spiny flatheads
592	<i>Cociella crocodile</i>	
593	<i>Grammoplites suppositus</i>	
594	<i>Grammoplites scaber</i>	
595	<i>Inegocia japonica</i>	
596	<i>Kumococius rodericensis</i>	
597	<i>Platycephalus indicus</i>	
598	<i>Regadius asper</i>	
599	<i>Regadius pristiger</i>	
600	<i>Sorsogona nigripinna</i>	
601	<i>Sorsogona tuberculata</i>	
602	<i>Thysanophrys chiltonae</i>	
Family: Plotosidae		Eel Catfishes
603	<i>Plotosus lineatus</i>	
Family: Polymixiidae		Beardfishes
604	<i>Polymixia lusea</i>	
Family: Polynemidae		Thread fins
605	<i>Polynemus paradiseus</i>	
606	<i>Polynemus plebeius</i>	
607	<i>Polynemus sexfilis</i>	
608	<i>Polynemus sextarius</i>	
Family: Pomacanthidae		Angelfishes
609	<i>Apolemichthys xanhotis</i>	
610	<i>Centropyge acanthops</i>	
611	<i>Centropyge multispinnis</i>	
612	<i>Genicanthus caudovittatus</i>	

613	<i>Pomacanthus asfur</i>	<i>endemic</i>
614	<i>Pomacanthus imperator</i>	
615	<i>Pomacanthus maculosus</i>	
616	<i>Pomacanthus semicirculatus</i>	
617	<i>Pygoplites diacanthus</i>	
Family: Pomacentridae		Damselfishes
618	<i>Abudefduf septemfasciatus</i>	
619	<i>Abudefduf sexfasciatus</i>	
620	<i>Abudefduf sordidus</i>	
621	<i>Abudefduf vaigiensis</i>	
622	<i>Amphiprion bicinctus</i>	
623	<i>Amphiprion clarkia</i>	
624	<i>Amphiprion frenatus</i>	
625	<i>Amplglyphidodon leucogaster</i>	
626	<i>Chromis caeruleus</i>	
627	<i>Chromis viridis</i>	
628	<i>Chromis flavaxilla</i>	
629	<i>Chromis margaritifer</i>	
630	<i>Chromis pembae</i>	
631	<i>Chromis ternatensi</i>	
632	<i>Chromis weberi</i>	
633	<i>Chromis xanthopterygia</i>	
634	<i>Chrysiptera annulata</i>	
635	<i>Chrysiptera unimaculata</i>	
636	<i>Dascyllus aruanus</i>	
637	<i>Dascyllus carneus</i>	
638	<i>Dascyllus marginatus</i>	
639	<i>Dascyllus reticulatus</i>	
640	<i>Dascyllus trimaculatus</i>	
641	<i>Neopomacentrus xanthurus</i>	
642	<i>Paraglyphidodon melas</i>	
643	<i>Plectroglyphidodon lacrymatus</i>	
644	<i>Plectroglyphidodon leucozonus</i>	
645	<i>Plectroglyphidodon melas</i>	
646	<i>Pomacentrus caeruleus</i>	
647	<i>Pomacentrus trilineatus</i>	
648	<i>Pomacentrus sulfurous</i>	
649	<i>Pristotis cyanostigma</i>	
650	<i>Teixeirichthys jordani</i>	
Family: Pomatomidae		Bluefishes
651	<i>Pomatomus saltatrix</i>	

Family: Priacanthidae		Bigeyes
652	<i>Cookeolus japonicus</i>	
653	<i>Priacanthus blochii</i>	
654	<i>Priacanthus hamrur</i>	
655	<i>Priacanthus macracanthus</i>	
Family: Psettodidae		Spiny turbot
656	<i>Psettodes erumei</i>	
Family: Pseudochromidae		Dottybacks
657	<i>Pseudochromis flavivertex</i>	<i>endemic</i>
658	<i>Pseudochromis springeri</i>	<i>endemic</i>
659	<i>Pseudochromis frimani</i>	<i>endemic</i>
660	<i>Pseudochromis plivaceus</i>	<i>endemic</i>
Family: Rachycentridae		Cobias
661	<i>Rachycentron canadum</i>	
Family: Scaridae		Parrotfishes
662	<i>Calotomus bicolor</i>	
663	<i>Calotomus viridescens</i>	
664	<i>Chlorurus sordidus</i>	
665	<i>Chlorurus strongylocephalus</i>	
666	<i>Chlorurus zufar</i>	
667	<i>Hipposcarus longiceps</i>	
668	<i>Scarus arabicus</i>	
669	<i>Scarus collana</i>	
670	<i>Scarus freantus</i>	
671	<i>Scarus ferrugineus</i>	
672	<i>Scarus fuscopurpureus</i>	
673	<i>Scarus genazonatus</i>	
674	<i>Scarus ghobban</i>	
675	<i>Scarus gibbus</i>	
676	<i>Scarus niger</i>	
677	<i>Scarus psittacus</i>	
678	<i>Scarus rubroviolaceus</i>	
679	<i>Scarus sordidus</i>	
Family: Sciaenidae		Croakers
680	<i>Argyrosomus amoyensis</i>	
681	<i>Johnius amblycephalus</i>	
682	<i>Johnius belangerii</i>	
683	<i>Johnius carutta</i>	
684	<i>Johnius sina</i>	

685	<i>Johnius vogleri</i>
686	<i>Otolithes cuvieri</i>
687	<i>Otolithes rubber</i>
688	<i>Protonibea diacanthus</i>
689	<i>Umbrina canariensis</i>
690	<i>Umbrina ronchus</i>
Family: Scombridae	
Tunas & Mackerels	
691	<i>Acanthocybium solandri</i>
692	<i>Auxis rochei</i>
693	<i>Auxis thazard</i>
694	<i>Euthynnus affinis</i>
695	<i>Katsuwonus pelamis</i>
696	<i>Rastrelliger kanagurta</i>
697	<i>Sarda orientalis</i>
698	<i>Scomber japonicus</i>
699	<i>Scomberomorus commerson</i>
699	<i>Scomberomorus guttatus</i>
700	<i>Scomberomorus koreanus</i>
701	<i>Thunnus albacares</i>
702	<i>Thunnus tonggol</i>
Family: Scorpaenidae	
Scorpionfishes	
703	<i>Apistus carinatus</i>
704	<i>Choridocty multibabus</i>
705	<i>Dendrochirus brachypterus</i>
706	<i>Minous monodactylus</i>
707	<i>Parapterois heterurus</i>
708	<i>Pseudosynanceia melanostigma</i>
709	<i>Pterois antennata</i>
710	<i>Pterois miles</i>
711	<i>Pterois radiate</i>
712	<i>Pterois russellii</i>
713	<i>Pterois volitans</i>
714	<i>Scorpaenopsis barbatus</i>
715	<i>Scorpaenopsis diabolus</i>
716	<i>Scorpaenopsis gibbosa</i>
717	<i>Sebastapistes marmoratus</i>
718	<i>Synanceia nana</i>
719	<i>Synanceia verrucosa</i>
720	<i>Vespacula dracaena</i>
Family: Serranidae	
Groupers	
721	<i>Aethaloperca rogae</i>
722	<i>Anthias squamipinnis</i>

723	<i>Anthias taeniatus</i>
724	<i>Anyperodon leucogrammicus</i>
725	<i>Cephalopholis argus</i>
726	<i>Cephalopholis aurantia</i>
727	<i>Cephalopholis hemistikos</i>
728	<i>Cephalopholis miniata</i>
729	<i>Cephalopholis oligosticta</i>
730	<i>Cephalopholis sexmaculata</i>
731	<i>Cephalopholis sonnerati</i>
732	<i>Dermatolepis striolatus</i>
733	<i>Diploprion drachi</i>
734	<i>Epinephelus albomarginatus</i>
735	<i>Epinephelus areolatus</i>
736	<i>Epinephelus coioides</i>
737	<i>Epinephelus diacanthus</i>
738	<i>Epinephelus fasciatus</i>
739	<i>Epinephelus flavocaeruleus</i>
740	<i>Epinephelus fuscoguttatus</i>
741	<i>Epinephelus fuscoguttatus</i>
742	<i>Epinephelus lanceolatus</i>
743	<i>Epinephelus latifasciatus</i>
744	<i>Epinephelus magniscuttis</i>
745	<i>Epinephelus malabaricus</i>
746	<i>Epinephelus marginatus</i>
747	<i>Epinephelus merra</i>
748	<i>Epinephelus multinotatus</i>
749	<i>Epinephelus octofasciatus</i>
750	<i>Epinephelus poecilonotus</i>
751	<i>Epinephelus polylepis</i>
752	<i>Epinephelus radiatus</i>
753	<i>Epinephelus rhyncholepis</i>
754	<i>Epinephelus rivultus</i>
755	<i>Epinephelus stoliczkae</i>
756	<i>Epinephelus summana</i>
757	<i>Epinephelus tauvina</i>
758	<i>Epinephelus tukula</i>
759	<i>Epinephelus undulosus</i>
760	<i>Plectropomus laevis</i>
761	<i>Plectropomus pessuliferus</i>
762	<i>Pseudanthias squamipinnis</i>
763	<i>Pseudanthias Marcia</i>
764	<i>Variola albimarginata</i>
765	<i>Variola louti</i>

Family: Siganidae		Rabbitfishes
766	<i>Siganus argenteus</i>	
767	<i>Siganus canaliculatus</i>	
768	<i>Siganus lineatus</i>	
769	<i>Siganus luridus</i>	
770	<i>Siganus rivulatus</i>	
771	<i>Siganus spinus</i>	
772	<i>Siganus stellatus</i>	
773	<i>Siganus sutor</i>	
Family: Silaginidae		Sillagos
774	<i>Sillago Arabica</i>	
775	<i>Sillago attenuate</i>	
776	<i>Sillago sihama</i>	
Family: Soleidae		Soles
777	<i>Aesopia cornuta</i>	
778	<i>Pardachirus marmoratus</i>	
779	<i>Solea elongate</i>	
780	<i>Zebrias quagga</i>	
781	<i>Zebrias synapturoides</i>	
Family: Sparidae		Seabreams & Porgies
782	<i>Acanthopagrus berda</i>	
783	<i>Acanthopagrus bifasciatus</i>	
784	<i>Argyrops filamentosus</i>	
785	<i>Argyrops spinifer</i>	
786	<i>Cheimerius nufer</i>	
787	<i>Chrysoblephus gibbiceps</i>	
788	<i>Diplodus sagus</i>	
789	<i>Diplodus sagus capensis</i>	
790	<i>Pagellus natalensis</i>	
791	<i>Polysteganus haffara</i>	
792	<i>Polysteganus sarba</i>	
793	<i>Sarba salpa</i>	
Family: Sphyraenidae		Barracudas
794	<i>Sphyraena barracuda</i>	
795	<i>Sphyraena forsteri</i>	
796	<i>Sphyraena jello</i>	
797	<i>Sphyraena obtusata</i>	
798	<i>Sphyraena putnamiae</i>	

Family: Sternoptychidae		Hatchetfish
799	<i>Argyropelecus affinis</i>	
800	<i>Argyropelecus gigas</i>	
801	<i>Polyiphus sp</i>	
802	<i>Sternoply sp</i>	
Family: Syngnathidae		Seahorse
803	<i>Hippocampus histrix</i>	
Family: Synodontidae		Lizardfishes
804	<i>Saurida graciles</i>	
805	<i>Saurida longimanus</i>	
806	<i>Saurida tumbil</i>	
807	<i>Saurida undosquamis</i>	
808	<i>Synodus englemani</i>	
809	<i>Synodus hoshinonis</i>	
810	<i>Synodus indicus</i>	
811	<i>Synodus macrops</i>	
812	<i>Synodus variegates</i>	
813	<i>Trachinocephalus myops</i>	
Family: Teraponidae		Terapons
814	<i>Terapon jarbua</i>	
815	<i>Terapon puta</i>	
816	<i>Terapon theraps</i>	
Family: Tetraodontidae		Pufferfishes
817	<i>Amblyrhynchotes hypselogeneion</i>	
818	<i>Amblyrhynchotes honckenii</i>	
819	<i>Arothron diadematus</i>	<i>endemic</i>
820	<i>Arothron hispidus</i>	
821	<i>Arothron immaculatus</i>	
822	<i>Arothron meleagris</i>	
823	<i>Arothron nigropunctatus</i>	
824	<i>Arothron stellatus</i>	
825	<i>Canthigaster solandri</i>	
826	<i>Canthigaster valentine</i>	
827	<i>Canthigaster margaritata</i>	
828	<i>Canthigaster moronata</i>	
829	<i>Chelonodon fluviatilis</i>	
830	<i>Lagocephalus inermis</i>	
831	<i>Lagocephalus lagocephalus</i>	
832	<i>Lagocephalus lunaris</i>	

833	<i>Lagocephalus sceleratus</i>	
834	<i>Torquigener flavimaculatus</i>	
Family: Torpedinidae		
835	<i>Torpedo panthers</i>	
Family: Trachichthyidae		Slimeheads
836	<i>Centroberyx druzhinni</i>	
837	<i>Centroberyx darwini</i>	
838	<i>Centroberyx sp</i>	
839	<i>Hoplostethus atlanticus</i>	
840	<i>Hoplostethus mediterraneus</i>	
Family: Triacanthidae		Tripodfishes
841	<i>Pseudotriacanthus striglifer</i>	
842	<i>Triacanthus biaculeatus</i>	
Family: Trichiuridae		Hairtailfishes & Frostfishes
843	<i>Benthodesmus elongates</i>	
844	<i>Lepidopus caudatus</i>	
845	<i>Lepturacanthus savala</i>	
846	<i>Trichiurus lepturus</i>	
Family: Triglidae		Gurnards & Searobins
847	<i>Lepidotrigla alcocki</i>	
848	<i>Lepidotrigla bentuviai</i>	
849	<i>Lepidotrigla omanensis</i>	
850	<i>Pterygotrigla hemisticta</i>	
Family: Uranoscopidae		Stargazers
851	<i>Uranoscopus japonicus</i>	
852	<i>Uranoscopus dollfusi</i>	
Family: Veliferidae		Sail bearer
853	<i>Velifer africanus</i>	
Family: Zanclidae		Moorish idol
854	<i>Zanclus cornutus</i>	
Family: Zeidae		Dories
855	<i>Cyttopsis roseus</i>	
856	<i>Zenopsis conchifer</i>	
857	<i>Zeus faber</i>	

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