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AN ASSESSMENT OF THE FISH BIODIVERSITY OF ASTOLA ISLAND MARINE PROTECTED AREA

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ABSTRACT

Astola Island was declared as the first Marine Protected Area (MPA) of Pakistan mainly because of its unique and high biodiversity. The area is known to have a well-diversified fish fauna, however, only limited information about the species composition is available. Since the dominant habitat of Astola Island is coral assemblages, therefore, the fish fauna is dominated by species known to be associated with corals or found in shallow coastal waters in rocky, sandy, and sandy cum muddy areas. Fish fauna found around Astola Island is known to be highly diverse and represented by 173 species. It is dominated by Family Blenniidae (17 species), (Family Carangidae (14 species), Family Mugilidae (7 species), Lutjanidae (7 species), Serrenidae (6 species), Haemulidae (6 species) and Sparidae (6 species). *Scarus persicus* Randall and Bruce 1983 which is found in the shipwrecks south of Astola Island is reported for the first time from the coast of Pakistan. Astola Island is known to be an important fishing ground and several species dominated by small pelagics (Indian mackerel and Indian oil Sardinella) are harvested by monofilament gillnetting or illegal seine net (locally known as 'Katra'or "wire net').

Keywords: Astola Island Marine Protected Area, MPA, corals, shipwrecks, SCUBA Diving, Snorkeling, sport fishing fish, biodiversity, *Scarus persicus*..

INTRODUCTION

Astola Island is located at a distance of about 39 km east of Pasni along the north of the Arabian Sea (Fig. 1) It is the largest uninhabited offshore island along the coast of Pakistan. It is also known as Haft Talar (seven hills) due to its small, rocky mountains that span the 6.7 km^2 island, rising to a height of about 240 feet above sea level (MFF Pakistan, 2018). The island has isolated withered rocks on the south-east side, sandy beaches, important nesting sites for sea turtles, on the northern side, and caved cliffs on the south-facing side which provide suitable conditions for a variety of animals and plants (Siddiqui and Amir, 2011). The area around the island has been declared a marine protected area (MPA), including its buffer zone of 401.47 km^2 (MFF Pakistan, 2018). Information about fishing activities around Astola island is available through the work of MFF Pakistan (2018), Moazzam (2024), PWP (2009), and Siddiqui and Amir (2011).

Fig. 1 Astola Island also known as Haft Talar located off Pasni along the Balochistan coast.

Although Astola Island was known to be an important fishing ground, no detailed work on the fisheries and fish fauna was made. It was during the Cruises on board R/V Anton Bruun Cruises 4A and 4B which is part of the U.S. Program in Biology, International Indian Ocean Expedition (September 1, 1959, to December 31, 1965), that a collection of fish was made from Astola Island in November 1963. During this expedition, even rotenone was used for the collection of fish from rockpools and crevices. The fishes collected from Astola Island during this IIOE expedition are housed in the US National Museum of Natural History (USNMNH), Washington, D.C. Most of these specimens have not yet been studied and only a few species were studied from this collection (Anonymous, 2001). Springer (1968) was the first to report four species of blennies (*Antennablennius bifilum*, *A. variopunctatus*, *Istiblennius lineatus* and *Omobranchus banditus*) from Astola Island based on this collection in the National Museum of Natural History. In addition, Springer and Gomon (1975) studied species of *Omobranchus fasciolatus* and *Omobranchus mekranensis* from this collection whereas *Sillaginopodys chondropus* was studied by McKay (1985) from this collection in USNMNH. Some of the species collected during this expedition are also listed on Anonymous (2001), Froese and Pauly (2024) and GBIF (2024).

Fish and shellfish fauna of Balochistan were studied through a research project titled "Fish and shellfish fauna of Balochistan Coast" funded by the Pakistan Agricultural Research Council (1982-1986). The final report of the Project included a draft of a book entitled "Fish and Shellfish Fauna of Balochistan" authored by Muhammad Moazzam, M. A. Burney. N. M. Tirmizi and M. F. Ahmad. This book provided details of 126 species of fishes from Astola Island but since this book was never published, therefore, no further reference to this book is made hereafter.

The first detailed and dedicated study of the fish fauna (PWP, 2009) was made under the Pakistan Wetland Programme which was an initiative of the Ministry of Environment (now Ministry of Climate Change and Environmental Coordination), Government of Pakistan, and was implemented by the World Wide Fund for Nature Pakistan (WWF-Pakistan). A total of 24 species of fish were reported from the Island by PWP (2009). The Pakistan Wetland Programme also provided funds for a project titled " Baseline Survey of Fish Diversity at Astola Island, Balochistan" which was implemented by the Centre of Excellence in Marine Biology, University of Karachi. The final report of the project listed 75 species of marine fish from Astola Island (Siddiqui and Amir, 2011). The report also provides information about fishing gear and boats being used by the fishermen in the area. Mangrove for the Future Project has published a report on the ecological baseline of the Astola Island Marine Protected Area which also listed 25 species of fish found around Astola Island, some of which are commercially exploited (MFF Pakistan, 2018).

Ali *et al.* (2021) have studied the fish fauna associated with coral assemblages along the Pakistan coast including Astola Island. They studied the fish fauna of four habitats around this Island. These sites are rocky habitats (depth 3 m) with few uplifted boulders with dominant corals were massive *Porites* species. The fish diversity was quite low (area AI 1), rocky bed, (depth 3 m) with few sandy pockets and boulders. It has a low coral cover and consists of branching as well as massive and encrusting growth forms. The fish diversity was high as compared to site 1 (area AI 2), similar habitat as in site 2 (depth 3 m). The fish diversity was better at this site (area AI 3) and the rocky habitat with corals (depth 3 m) consisted of massive *Porites*. *Neopomacentrus sindensis* was the dominant fish species (area AI 4). Table I includes 13 species of fish recorded by Ali *et al.* (2021) which indicates the preponderance of species associated with coral in other parts of Pakistan and regional countries.

Table 1. Fishes associated with coral assemblages at Astola Island (after Ali *et al*., 2021).

Scientific Name	English Name	Sites along Astola Island
Abudefduf vaigiensis	Indo-Pacific sergeant	AI 1, AI 2, AI 3, AI 4
Neopomacentrus sindensis	Arabian demoiselle	AI 1, AI 2, AI 3, AI 4
Archamia bleekeri	Gon's cardinal fish	AI 1, AI 2, AI 3, AI 4
Apogonichthyoides sialis	Twin-bar cardinalfish	AI 2, AI 3
Halichoeres nigrescens	Bubblefin wrasse	AI 1, AI 2, AI 3, AI 4
Pseudochromis aldabraensis	Neon dottyback	AI 2
Siganus javus	Streaked spinefoot	AI 3, AI 4
Lutjanus vitta	Brown-stripe red snapper	AI 1, AI 2, AI 3, AI 4
Epinephelus malabaricus	Malabar grouper	AI 3
Epinephelus diacanthus	Spinycheek grouper	AI 3, AI 4
Diplodus capensis	Cape white bream	AI 1, AI 2, AI 4.
Scolopsis vosmeri	Whitecheek monocle bream	AI 2
Sphyraena obtusata	Obtuse barracuda	AI 2, AI 3

MATERIALS AND METHODS

A review of the scientific literature on fish species recorded from Astola Island is made. In addition, clips and videos of marine life around Astola Island posted by the armature and professional SCUBA divers on social media were analyzed frame by frame to identify fish species that are found in the area. Photographic records of various expeditions and scientific tours conducted around Astola Island were analyzed for any record of fish species. The list of fishes of Astola Island is arranged according to the classification followed by Psomadakis *et al*. (2015).

RESULTS AND DISCUSSION

Astola Island offers a variety of habitats for fish which includes coral patches, rock pools, shallow waters with rock or sandy bottom around the island, shipwrecks, and deeper oceanic waters that surround Astola Island (Fig. 2). Coral habitats are especially known for a well-diversified fish fauna (Fig. 3). The island supports a substantially large fisheries that provide livelihood to fishermen communities of the coastal villages and towns.

Fig. 2. Astola Island offers a variety of habitats for fish

Infraphylum GNATHOSTOMATA–Jawed vertebrates
Parvphylum CHONDRICHTHYES – Cartilaginous fish
Class ELASMOBRANCHII – Sharks – Rays – Skates
Order CARCHARHINIFORMES – Ground sharks §and allies

Astola Island is not an ideal habitat for the elamobrachs (including sharks and rays), however, a few species may be encountered ocassionally in the area, however, offshore areas south of Astola Island used to to one of the important fishing ground for longline fisheries for requiem sharks, however, this fishery was stopped in 2000 when the entire shark fleet shifted to gillnet fishing for Indian mackerel. Only five species of Elasmobranch are so far known from Astola Island.

Fig. 3. Coral habitats along Astola Island is solace for diversity of fishes. The photograph depeicts regal semosielle (*Neopomacentrus cyanomos*), Arabian demoiselle (*Neopomacentrus sindensis*) and Indo-Pacific sergeant (*Abudefduf vaigiensis*).

Family CARCHARHINIDAE – Requiem sharks
Negaprion acutidens (Rüppell 1837) (Sicklefin lemon shark)

This species was reported from Astola Island by MFF Pakistan (2018). This species is an inhabitant of the coastal continental and insular shelves, which may occur in the coral areas, as well (Moazzam and Osmany, 2021b). This is not a common species in Astola Island and is seldom reported from the area.

Scoliodon laticaudus Müller and Henle, 1838 (Spadenose shark)

This species is reported from Astola Island by PWP (2009) and Siddiqui and Amir (2011). This is one of the most common species of shark occurring in Pakistan (Moazzam and Osmany, 2021b), however, it is seldom caught in line gears and gillnets around Astola Island.

Order TORPEDINIFORMES – Electric rays
Family TORPEDINIDAE – Torpedos
Torpedo sinuspersici Olfers, 1831 (Variable Torpedo ray)

This species was photographed by an amateur diver group led by Zohaib Merchant (possibly in 2020) from a shipwreck south of Astola Island. Only a single specimen was photographed, however, this species is one of the most common electric rays found along the Pakistan coast (Moazzam and Osmany, 2021c).

Order MYLIOBATIFORMES – Stingrays – Butterfly rays – Manta rays §
Family DASYATIDAE – Stingrays
Himantura leoparda Manjaji-Matsumoto and Last, 2008 (Leopard stingray)

This species of stingray was reported from Astola Island by an amateur diver group known as Diver Reef Karachi (possibly in 2015). This species is one of the common stingrays with markings and reticulation on its dorsal surface found in Pakistan (Moazzam and Osmany, 2021c). Two speciemens of this species were photographed at Astola Island.

Maculabatis randalli (Last, Manjaji-Matsumoto and Moore 2012) (Arabian banded whipray) Fig. 4.

Fig. 4. *Maculabatis randalli* photographed at Astola Island in 2010.

This species was photographed by WWF-Pakistan Team in Astola Island in 2010. It was caught by the bottom set gillnet laid along Astola Island. This species is the most dominating stingray species found in Pakistan and is now commercially exploited in some areas of Pakistan for the export of its frozen wings to Southeast Asian countries (Moazzam and Osmany, 2021c).

Parvphylum OSTEICHTHYES – Bony fishes
Class ACTINOPTERYGII – Ray finned fishes
Order ALBULIFORMES – Bonefishes
Family ALBULIDAE – Bonefishes
Albula oligolepis Hidaka, Iwatsuki and Randall 2008. (Smallscale bonefish)

This species is reported from Astola land by Siddiqui and Amir (2011) as *Albula vulpes. A. vulpes* is known from the Eastern Pacific, Western Atlantic, and Northwest Atlantic (Froese and Pauly, 2024). Specimens from the Arabian Sea and Western Indian Ocean are identified as *Albula oligolepis* by Hidaka *et al.* (2008) and Matsunuma *et al.* (2022). Smallscale bonefish although considered as a reef-associated fish are seldom caught along Astola Island. Although consumed locally but not considered to be a preferred species.

Order ANGUILLIFORMES – Eels
Family MURAENIDAE Morays
Gymnothorax favagineus Bloch and Schneider 1801(Laced moray)

This species was photographed by an amateur diver Abdul Rahim in 2019 from Astola Island. Only a single specimen was photographed, however, this species is one of moray eel found at Churna Island and reported from other parts of Pakistan (Moazzam and Osmany, 2015). Moray eels are of no commercial value and, therefore, usually discarded.

Gymnothorax flavoculus (Böhlke & Randall 1996) (Yellowtickle moray

This species was reported from Astola Island by GBIF (2024). It is known to inhabit crevices and gaps in coral and associated habitats at Astola Island. Moray eels are of no commercial value and, therefore, usually discarded.

Gymnothorax pseudothyrsoideus (Bleeker, 1853) (Highfin moray)

This species was photographed by an amateur diver group led by Zohaib Merchant (possibly in 2020) from Astola Island. Only a single specimen was photographed, however, this species is one of the most common moray eel found along the Pakistan coast (Moazzam and Osmany, 2015). Moray eels are of no commercial value and, therefore, usually discarded.

Gymnothorax prolatus Sasaki and Amaoka, 1991 (Elongated moray)

This species was photographed by an amateur diver group called Monster 9.0 (possibly in 2021) from Astola Island. Only a single specimen was photographed which was caught on handline. This species is known from Pakistan but is of rare occurrence (Moazzam and Osmany, 2015). Moray eels are of no commercial value and, therefore, usually discarded.

Gymnothorax punctatus Bloch and Schneider 1801(Red Sea whitespotted moray)

This species was reported from Astola Island by GBIF (2024). It is known to inhabit crevices and gaps in coral and associated habitats at Astola Island. Moray eels are of no commercial value and, therefore, usually discarded.

Order CLUPEIFORMES – Herrings and allies
Family CLUPEIDAE Herrings – Shads – Gizzard shads – Sardines – Sardinellas
Anodontostoma chacunda (Hamilton 1822) (Chacunda gizzard shad)

This species was reported from Astola Island by Siddiqui and Amir (2011). It was observed in the commercial catch of fishing boat and was caught by gillnet. It is a commercially important species that is not preferred by locals as food, therefore, it is mainly used for the production of fishmeal.

Nematalosa nasus (Bloch, 1795) (Bloch's gizzard shad)

This species was reported from Astola Island by Siddiqui and Amir (2011). It was observed in the commercial catch of fishing boat and was caught by gillnet. It is a commercially important species, however, not preferred as food by locals.

Sardinella longiceps Valenciennes 1847 (Indian oil Sardinella)

This species was reported from Astola Island by MFF Pakistan (2018). It was observed in the commercial catch of fishing boats and was caught by gillnet. It is a commercially important species and there is an important gillnet fishery established along the Pakistan coast including around Astola Island. It is harvested by gillnet and illegally by seine net ('Katra' or 'wire net') by Karachi or Damb-based fishing boats. It is locally consumed and exported to Southeast Asian countries in frozen form.

Family ENGRAULIDAE Anchovies
Thryssa malabarica (Bloch 1795) (Malabar thryssa)

This species was reported from Astola Island by Siddiqui and Amir (2011) as *Thryssa hamiltoni*. It was observed in the commercial catch of fishing boats and was caught by gillnet. It is a commercially important species that is mainly used for the production of fishmeal.

Family PRISTIGASTERIDAE Ilishas and pellonas
Ilisha megaloptera (Swainson 1839) (Bigeye ilisha)

This species was reported from Astola Island by Siddiqui and Amir (2011). It was observed in the commercial catch of fishing boats and was caught by gillnet. It is a commercially important species that is mainly exported to Southeast Asian countries whereas smaller specimens are used for the production of fishmeal.

Ilisha melastoma (Bloch and Schneider 1801) (Indian Ilisha) Fig. 5.

This species was photographed by WWF-Pakistan Team in Astola Island in 2010. It was observed in the commercial catch of fishing boat and was caught by gillnet. It is a commercially important species that is not preferred by locals as food, therefore, it is mainly used for the production of fishmeal.

Opisthopterus tardoore (Cuvier, 1829) (Tardoore)

This species was reported from Astola Island by Siddiqui and Amir (2011). It was observed in the commercial catch of fishing boat and was caught by gillnet. It is a commercially important species that is mainly used for the production of fishmeal.

Fig. 5. Indian ilisha (*Ilisha melastoma*) caught by gillnet (source: WWF-2010).

Family **CHIROCENTRIDAE Wolf-herrings**
Chirocentrus dorab (Forsskål, 1775) (Dorab wolf-herring)

This species was reported from Astola Island by Siddiqui and Amir (2011). It was observed in the commercial catch of fishing boat and was caught by gillnet. It is a commercially important species that is mainly used for human consumption.

Order GONORHYNCHIFORMES – Milkfish and allies
Family CHANIDAE Milkfish
Chanos chanos (Forsskål, 1775) (Milkfish) Fig. 6

Fig. 6. Milkfish (*Chanos chanos*) caught by gillnet (source: WWF-2010).

This species was photographed by WWF-Pakistan Team in Astola Island in 2010. It was observed in the commercial catch of fishing boat and was caught by gillnet. It is a commercially important species that is not preferred by locals as food, therefore, it is mainly used for the production of fishmeal.

Order SILURIFORMES – Catfishes
Family ARIIDAE- Seacatfishes
Arius maculatus (Thunberg 1792) (Spotted catfish)

This species was reported from Astola Island by Siddiqui and Amir (2011). It was observed in the commercial catch of fishing boat caught by gillnet. This species gathers in shallow waters during March and April for mass-scale breeding. Its small juveniles are released by mouth-breeding males in May and can be seen in large numbers along the surf zone around Astola Island in May and June It is a commercially important species that is mainly consumed locally.

Netuma thalassina (Rüppell 1837) (Giant catfish)

This species was reported from Astola Island by Moazzam (2024). It was observed in the commercial catch of fishing boat and was caught by gillnet. This species gathers in shallow waters during March and April for mass-scale breeding. Its small juveniles are released by mouth-breeding males in May and can be seen in large numbers along the surf zone around Astola Island in May and June. It is a commercially important species that is mainly consumed locally.

Family **PLOTOSIDAE-Eel catfishes**
Plotosus lineatus (Thunberg 1787) (Striped eel catfish)

This species was reported from Astola Island by PWP (2010) and Siddiqui and Amir (2011). It was observed in the commercial catch of fishing boat and was caught by gillnet. It is not of commercial importance species rather dread for its venomous spines and discarded. This species may be seen forming large schools in coral habitats.

Order BATRACHOIDIFORMES – Toadfishes
Family BATRACHOIDIDAE Toadfishes
Colletteichthys occidentalis Greenfield 2012

This species is reported from Astola Island by GBIF (2024). It is known to inhabit intertidal and upper subtidal areas along rock shores. Usually found under boulders in shallow rocky pools. When disturbed it makes a croaking sound.

Order LOPHIIFORMES – Anglerfishes and allies
Family ANTENNARIIDAE – Frogfishes
Antennarius indicus Schultz 1964 (Indian frogfish)

This species was reported from Astola Island by Anonymous (2001), Froese and Pauly (2024) and GBIF (2024). This species is observed buried in sand or rubbles among corals. Usually caught with handlines and seldom by other fishing gears. It is of no commercial value and is usually discarded.

Order GOBIESOCIFORMES – Clingfishes
Family Gobiesocidae - Clingfishes and singleslits
Lepadichthys ctenion Briggs and Link 1963

This species was reported from Astola Island by GBIF (2024). This species is observed to attached to rocks in the tidepools and upper littoral zone. It is of no commercial value and is considered poisonous.

Order ATHERINIFORMES – Silverside
Family ISONIDAE – Surf sprites
Iso flosmaris Jordan and Starks 1901 (Sea spirite)

This species was reported from Astola Island by GBIF (2024). It frequently occurs in large aggregations in strong surf, close to the shoreline, and often near rocks around Astola Island. It is sometimes found in tidal pools as well.

Order BELONIFORMES – Flyingfishes and allies
Family BELONIDAE Needlefishes
Strongylura strongylura (van Hasselt 1823) (Spottail needlefish)

This species was reported from Astola Island by PWP (2010) and Siddiqui and Amir (2011). It was observed in the commercial catch of fishing boat and was caught by gillnet. It is considered a commercially importance species but not preferred as a food fish.

Family HEMIRAMPHIDAE - Halfbeaks
Hyporhamphus sindensis (Regan 1905) (Sindh halfbeak)

This species was reported from Astola Island by Anonymous (2001) and GBIF (2024). It is generally found in the near shore and near the surface around Astola Island. It is observed to form small schools and can be seen over coral heads. It was observed in the commercial catch of fishing boat and was caught by gillnet. It is not considered a commercially importance species and not preferred as a food fish.

Order SCORPAENIFORMES – Scorpionfishes and allies
Family SCORPAENIDAE-Scorpionfishes-rockfishes
Scorpaenopsis lactomaculata (Herre 1945) (Whiteblotched scorpionfish)

This species was reported from Astola Island by Anonymous (1993), GBIF (2024), PWP (2010), and Siddiqui and Amir (2011). It is usually camouflaged among the corals and usually caught on lines and sometimes by gillnets. It is not of commercial importance species rather dread for its venomous spines and discarded.

Scorpaenopsis ramaraoi Randall & Eschmeyer 2002 (Rama Rao's scorpionfish)

This species was reported from Astola Island by Anonymous (2001), Froese and Pauly (2024), and GBIF (2024). It is usually camouflaged among the corals and usually caught on lines and sometimes by gillnets. It is not of commercial importance species rather dread for its venomous spines and discarded.

Family PLATYCEPHALIDAE –Spiny flatheads
Platycephalus indices (Linnaeus 1758) (Bartail flathead)

This species was reported from Astola Island by Siddiqui and Amir (2011). It was observed in the commercial catch of fishing boat and was caught by gillnet. It is a commercially important species that is mainly consumed locally, and well known for its excellent meat quality. During low tides, fishermen may be seen looking for this species in the intertidal area and manually capturing this fish, as well.

Order PERCIFORMES: PERCOIDEI – Perch–like fishes
Family **SERRANIDAE -**Groupers – Seabasses – Rockcods – Hinds – Combers – Coral trouts – Lyretails
Epinephelus malabaricus (Bloch and Schneider 1801) (Malabar grouper)

This species was reported from Astola Island by Ali *et al*. (2021) and Moazzam (2024). Ali *et al*. (2021) reported it from the area with rocky bed with few sandy pockets and boulders which have low coral cover, consisting of branching as well as massive and encrusting growth forms. This species was also recorded by several amateur diving groups who have photographed them hiding in the overhangs, large crevices and shipwreks. This species is considered to be of high commercial importance in Pakistan. It is the second most common of the large groupers which is exported mainly to the Persian Gulf countries. Because of its large size and typical colouration, it fetches high prices in the export market (Moazzam and Osmany, 2023). There are no specific aimed fisheries for this species around Astola Island but it is caught with bottom-set gillnets, handlines, and longlines.

Epinephelus diacanthus (Valenciennes 1828) (Spinycheek grouper)

This species was reported from Astola Island by Ali *et al*. (2021), Moazzam (2024). PWP (2009), and Siddiqui and Amir (2011). Ali *et al*. (2021) reported it from the area with rocky bed with few sandy pockets and boulders which has low coral cover, consisting of branching as well as massive and encrusting growth forms as well as in the

rocky habitat with coralsconsisted of massive *Porites*. This species is considered to be of high commercial importance as it is mainly exported to the Persian Gulf countries (Moazzam and Osmany, 2023). There are no specific aimed fisheries for this species around Astola Island but it is caught with bottom-set gillnets, handlines, and longlines.

Epinephelus coioides (Hamilton 1822) Greasy grouper

This species was reported from Astola Island by PWP (2009) and Siddiqui and Amir (2011) as *Epinephelus tauvina*. This species was also recorded by several amateur diving groups who have photographed them hiding in the overhangs, large crevices and shipwrecks. This species is considered to be of high commercial importance in Pakistan. It is one of the common large groupers which is exported to the Persian Gulf countries. Because of its large size and typical colouration, it fetches high prices in the export market (Moazzam and Osmany, 2023). There are no specific aimed fisheries for this species around Astola Island but it is caught with bottom-set gillnets, handlines, and longlines.

Epinephelus polylepis Randall and Heemstra 1991 (Small scaled grouper)

This species was reported from Astola Island by Moazzam (2024), PWP (2009),catfish and Siddiqui and Amir (2011) as *Epinephelus chloristigma*. This species is considered to be of high commercial importance in Pakistan. It is a common medium-sized grouper that is exported to the Persian Gulf countries. Because of its typical colouration, it fetches high prices in the export market (Moazzam and Osmany, 2023). There are no specific aimed fisheries for this species around Astola Island but it is caught with bottom-set gillnets, handlines, and longlines.

Epinephelus erythrurus (Valenciennes, 1828) (Cloudy grouper)

This species was photographed by an amateur diver group led by Zohaib Merchant (possibly in 2020) from Astola Island. Only a single specimen was photographed, however, this species may be common in some coral areas on the Pakistan coast (Moazzam and Osmany, 2023). Because of rare occurrence, it is seldom exported and consumed locally.

Epinephelus stoliczkae (Day 1875) (Epaulet grouper)

This species was reported from Astola Island by Anonymous (2001), Froese and Pauly (2024), GBIF (2024),MFF Pakistan (2018). Because of its striking colouration, this species is considered to be of high commercial importance as it is mainly exported to the Persian Gulf countries (Moazzam and Osmany, 2023). There are no specific aimed fisheries for this species around Astola Island but it is caught with bottom-set gillnets, handlines, and longlines.

Family **PSEUDOCHROMIDAE-Dottybacks**

Halidesmus thomaseni (Nielsen 1961) (Thomasen's snakelet)

This species was reported from Astola Island by Anonymous (2001), Froese and Pauly (2024), and GBIF (2024). It is known from intertidal pools and marginal subtidal areas. It is also found hiding under the stones in the intertidal areas.

Pseudochromis aldabraensis Bauchot-Boutin 1958 (Neon dottyback)

This species was reported from Astola Island by Ali *et al*. (2021) and Gon (2024). Ali *et al*. (2021) reported it from those areas of Astola Island that have rocky bed, with few sandy pockets and boulders that have low coral cover and consist of branching as well as massive and encrusting growth forms. This species was also recorded by several amateur diving groups who have photographed them on coral assemblages around Astola Island.

Pseudochromis caudalis Boulenger 1898 (Stripe-tailed dottyback) Fig. 7.

This species was reported from Astola Island by Anonymopus (2001), GBIF (2024) and Gill (2004) and also photographed at Astola Island. by an amateur diver group known as Diver Reef Karachi. This species was also

recorded by several amateur diving groups who have photographed them on coral assemebledges around Astola Island. This species is not rare in rocky habitats which have uplifted boulders with dominant corals of *Porites* species. The holotype of this species (BMNH 1898.6.29.75) was collected from Karachi (Boulenger, 1898) which is housed in British Museum in London. It is one of the common dityback found along rocky and reef areas along Pakistan coast.

Fig. 7 *Pseudochromis caudalis* photographed by Diver Reef Karachi

Pseudochromis dutoiti Smith 1955 (Dotoiti)

This species was reported from Astola Island by Anonymous (2001), Froese and Pauly (2024) and GBIF (2024). It is reported rocky beds and coral heads, usually occurring individually but sometime a few can be seen in the coral areas.

Family **TERAPONTIDAE Terapons, grunters**

Terapon jarbua (Fabricius 1775) (Jarbua terapon)

This species was reported from Astola Island by Siddiqui and Amir (2011). It was caught by handline from Astola Island. It is a commercially important species that is mainly consumed locally. It is an inhabitant of shallow coastal waters including intertidal areas as well as sandy and rocky shores along the Astola Island.

Family **APOGONIDAE Cardinalfishes**

Archamia bleekeri (Günther 1859) (Gon's cardinalfish)

This species was reported from Astola Island by Ali *et al*. (2021). They reported it from all four habitats identified around Astola Island. This species was also recorded by several amateur diving groups who have photographed this species associated with corals as well as in the shipwrecks around Astola Island.

Apogonichthyoides sialis (Jordan and Thompson 1914) (Two-bar cardinalfish)

This species was reported from Astola Island by Ali *et al.* (2021). They reported it from the rocky bed that has a few sandy pockets and boulders. The areas have a low coral cover and consist of branching as well as massive and encrusting growth forms. This species was also recorded by several amateur diving groups who have photographed this species associated with corals as well as in the shipwrecks around Astola Island. It is not found in large schools and only a few specimens were observed at a time.

Ostorhinchus aureus (Lacepede 1802) (Ring-tailed cardinalfish) Fig. 8,

This species was photographed by an amateur diver group led by Zohaib Merchant (possibly in 2020) from an area that has branching as well as massive and encrusting growth forms in Astola Island. Only a few specimens were photographed,

Fig. 8. *Ostorhinchus aureus* photographed by Zohaib Merchant.

Ostorhinchus cookii (Macleay 1881) (Cook's crdinalfish)

This species was reported from Astola Island by Anonymous (2001) as *Apogon cookii* and GBIF (2024). It is associated with corals as well as in the shipwrecks around Astola Island. It is not found in large schools and only a few specimens were observed at a time which are usually observed taking shelter among overhangs.

Family **SILLAGINIDAE- Sillago**

Sillago sihama (Fabricius 1775) (Silver sillago)

This species was reported from Astola Island by Siddiqui and Amir (2011). It was observed in the commercial catch of fishing boat and was caught by gillnet. It is a commercially important species that is mainly used for human consumption and also exported.

Sillaginopodys chondropus (Bleeker 1849) (Clubfoot sillago)

This species was reported from Astola Island by Anonymopus (2001), GBIF (2024), McKay (1985) based on the specimen collected during this IIOE expedition are housed in the US National Museum of Natural History (USNMNH), Washington, D.C. It is a commercially important species that is mainly used for human consumption and also exported.

Family **CARANGIDAE- Jacks – Trevallies – Scads – Queen–fishes –Runners – Pompanos**

Scyris indica Rüppell 1830 (Indian threadfish)

This species was reported from Astola Island by PWP (2009), Siddiqui and Amir (2011), and MFF Pakistan (2018) as *Alectis indicus*. This species is of commercial importance in Pakistan and is locally consumed. It is mainly caught by gillnets. This species usually forms small schools over coral heads.

Alepes djedaba (Fabricius 1775) (Shrimp scad)

This species was reported from Astola Island by Siddiqui and Amir (2011) and MFF Pakistan (2018). This species is of commercial importance in Pakistan and is locally consumed. It is mainly caught by gillnets. This species usually forms large schools over coral heads.

Alepes kleinii (Bloch 1793) (Razorbelly scad)

This species was reported from Astola Island by Siddiqui and Amir (2011) as *Caranx para*. This species is of commercial importance in Pakistan and is locally consumed. It is mainly caught by gillnets. This species usually forms large schools over coral heads.

Platycaranx chrysophrys (Cuvier 1833) (Longnose trevally)

This species was reported from Astola Island by Siddiqui and Amir (2011) as as *Carangoides chrysophrys.* This species is of commercial importance in Pakistan and is locally consumed. It is mainly caught by gillnets. This species usually forms large schools over coral heads.

Caranx sexfasciatus Quoy and Gaimard 1825 (Bigete trevally)

This species was photographed by an amateur diver group led by Zohaib Merchant (possibly in 2020) from Astola Island. It was also reported from Astola Island by Anonymous (1993). This species is of commercial importance in Pakistan and is locally consumed. It is mainly caught by gillnets. This species usually forms large schools over coral heads.

Caranx heberi (Bennett 1830) (Blacktip trevally)

This species was photographed by an amateur diver group led by Zohaib Merchant (possibly in 2020) from Astola Island. This species is of commercial importance in Pakistan and is locally consumed. It is mainly caught by gillnets. This species usually forms large schools over coral heads.

Caranx melampygus Cuvier 1833 (Bluefin trevally)

This species was reported from Astola Island by PWP (2009), Siddiqui and Amir (2011), and MFF Pakistan (2018) as *Alectis indicus*. This species is of commercial importance in Pakistan and is locally consumed. It is mainly caught by gillnets. This species usually forms small schools over coral heads.

Gnathanodon speciosus (Forsskål 1775) (Golden trevally) Fig. 9

This species was caught and photographed by an amateur diver group called MaatiTV at Astola Island. This species is of commercial importance in Pakistan and is locally consumed. It is mainly caught by gillnets and handlines around Astola Island. Extremely large speciemens (more than 1 m long) are also caught around Astola Island.

Scomberoides commersonnianus Lacepède 1801 (Talang queenfish)

This species was reported from Astola Island by Siddiqui and Amir (2011), and MFF Pakistan (2018). This species is of commercial importance in Pakistan and is locally consumed. It is mainly caught by gillnets and handlines around Astola Island. Extremely large speciemens (more than 1 m long) are also caught around Astola Island.

Scomberoides lysan (Fabricius 1775) (Doublespotted queenfish)

This species was photographed by an amateur diver group called Monster 9.0 from Astola Island. This species is of commercial importance in Pakistan and is locally consumed. It is mainly caught by handlines around Astola Island.

Scomberoides tala (Cuvier 1832) (Barred queenfish)

This species was reported from Astola Island by MFF Pakistan (2018). This species is of commercial importance in Pakistan and is locally consumed. It is mainly caught by gillnets and handlines. This species usually forms small schools over coral heads.

Seriola dumerili (Risso 1810) (Greater amberjack)

This species was photographed by an amateur diver group called Karachi Diver Reef from Astola Island. This species is of commercial importance in Pakistan and is locally consumed. It is mainly caught by handlines around Astola Island. This species usually forms small schools over coral heads.

Fig. 9. Golden trevally (*Gnathanodon speciosus* photographed by MaatiTV

Selaroides leptolepis (Cuvier 1833) (Yellowstripe trevally)

This species was reported from Astola Island by Siddiqui and Amir (2011). This species is of commercial importance in Pakistan and is locally consumed. It is mainly caught by gillnets and handlines around Astola Island. This species usually forms small schools over coral heads.

Trachinotus baillonii (Lacepède 1801) (Small spotted dart) Fig. 10.

This species was reported from Astola Island by Siddiqui and Amir (2011). This species is of commercial importance in Pakistan and is locally consumed. It is mainly caught by gillnets and handlines around Astola Island. This species usually forms small schools over coral heads.

Fig. 10. Small spotted dart (*Trachinotus baillonii*) caught by gillnet (source: WWF-2010).

Family **LEIOGNATHIDAE** Ponyfishes – Slipmouths – Tooth-ponies

Karalla daura (Cuvier 1829) (Goldstripe ponyfish)

This species was reported from Astola Island by Siddiqui and Amir (2011) as *Leiognathus daura*. This species is not considered to be of commercial importance in Pakistan and is usually used for the production of fishmeal. It is mainly caught by gillnets and seine net ('katra" or 'wire net') around Astola Island. This species usually forms large schools over coral heads.

Family **LUTJANIDAE** – Snappers – Jobfishes

Lutjanus coeruleolineatus (Rüppell 1838) (Blueline snapper)

This species was photographed by an amateur diver group led by Zohaib Merchant (possibly in 2020) from Astola Island. This species is of commercial importance in Pakistan as it is locally consumed and exported. It is mainly caught by gillnets.

Lutjanus fulviflamma (Forsskål 1775) (Dory snapper)

This species was reported from Astola Island by PWP (2009), Siddiqui and Amir (2011) and MFF Pakistan (2018). This species is of commercial importance in Pakistan as it is locally consumed as well as exported. It is mainly caught by gillnets and handlines around Astola Island.

Lutjanus johnii (Bloch 1792) (John's snapper)

This species was reported from Astola Island by Siddiqui and Amir (2011) and MFF Pakistan (2018). This species is of commercial importance in Pakistan as it is locally consumed as well as exported. It is mainly caught by gillnets and handlines around Astola Island.

Lutjanus lemniscatus (Valenciennes 1828) (Yellowstreaked snapper)

This species was photographed by an amateur diver group called Karachi Diver Reef from Astola Island. This species is of commercial importance in Pakistan as it is locally consumed as well as exported. It is mainly caught by gillnets and handlines around Astola Island.

Lutjanus lutjanus Bloch 1790 (Bigeye snapper)

This species was photographed by an amateur diver group led by Zohaib Merchant (possibly in 2020) from Astola Island. This species is of commercial importance in Pakistan as it is locally consumed as well as exported. It is mainly caught by gillnets and handlines around Astola Island.

Lutjanus rivulatus (Cuvier 1828) (Blubberlip snapper)

This species is frequently caught around Astola Island along with other demersal species (Moazzam, 2024). It is mot dominating snapper found in the area. This species is of commercial importance in Pakistan as it is locally consumed as well as exported. It is mainly caught by gillnets and handlines around Astola Island.

Lutjanus vitta (Quoy and Gaimard 1824) (Brown-stripe red snapper)

This species was reported from Astola Island by Ali *et al*. (2021). It was found in all the sub-habitats identified by Ali *et al*. (2021) around Astola Island. This species is of commercial importance in Pakistan as it is locally consumed as well as exported. It is mainly caught by gillnets and handlines around Astola Island.

Family **CAESIONIDAE** – Fusiliers

Caesio varilineata Carpenter 1987 (Variable-lined fusilier)

This species was photographed by an amateur diver Abdul Rahim in 2019 from Astola Island. This species is of commercial importance in Pakistan as it is locally consumed. It is mainly caught by gillnets and handlines around Astola Island.

Family **GERREIDAE** –Silverbiddies – Mojarras
Gerres oyena (Fabricius 1775) (Common silver-biddy)

This species was reported from Astola Island by Siddiqui and Amir (2011). This species is not considered to be of commercial importance in Pakistan and is usually used for the production of fishmeal. It is mainly caught by gillnets and seine net ('katra" or 'wire net') around Astola Island. This species usually forms small schools over coral heads.

Pentaprion longimanus (Cantor 1849) (Longfin mojarra)

This species was reported from Astola Island by WWF-Pakstan in 2010. This species is not considered to be of commercial importance in Pakistan and is usually used for the production of fishmeal. It is mainly caught by gillnets and seine net ('katra" or 'wire net') around Astola Island. This species usually forms small schools over coral heads.

Family **HAEMULIDAE** – Grunts – Sweetlips – Rubberlips – Hotlips
Plectorhinchus gibbosus (Lacepède 1802) (Harry hotlips)

This species was reported from Astola Island by Siddiqui and Amir (2011). This species is of commercial importance in Pakistan as it is locally consumed. It is mainly caught by gillnets and handlines around Astola Island. This species can be seen individually or in small schools over coral heads.

Plectorhinchus schotaf (Walbaum 1792) (Minstrel sweetlips)

This species was reported from Astola Island by Siddiqui and Amir (2011). This species is of commercial importance in Pakistan as it is locally consumed. It is mainly caught by gillnets and handlines around Astola Island. This species can be seen individually or in small schools over coral heads.

Pomadasys aheneus McKay and Randall 1995 (Yellowback grunt) Fig. 11

This species was photographed by an amateur diver group led by Zohaib Merchant (possibly in 2020) from Astola Island. This species is of commercial importance in Pakistan as it is locally consumed. It is mainly caught by gillnets and handlines around Astola Island. This species can be seen individually or in small schools over coral heads.

Pomadasys argenteus (Forsskål 1775) (Silver grunt)

This species was reported from Astola Island by Siddiqui and Amir (2011). This species is of commercial importance in Pakistan as it is locally consumed. It is mainly caught by gillnets and handlines around Astola Island. This species can be seen individually or in small schools over coral heads.

Fig. 11 Yellowback grunt (*Pomadasys aheneus*) (a) among coral heads/ (b) in shipwreck. photographed by Zohaib Merchant.

Pomadasys furcatus (Bloch and Schneider 1801) (Banded grunter)

This species was reported from Astola Island by GBIF (2024). This species is of commercial importance in Pakistan as it is locally consumed. It is mainly caught by gillnets and handlines around Astola Island. This species can be seen individually or in small schools over coral heads.

Pomadasys kaakan (Cuvier 1830) (Javelin grunter)

This species was reported from Astola Island by Siddiqui and Amir (2011). This species is of commercial importance in Pakistan as it is locally consumed. It is mainly caught by gillnets and handlines around Astola Island. This species can be seen individually or in small schools over coral heads.

Pomadasys stridens (Forsskål 1775) (Striped piggy)

This species was reported from Astola Island by Siddiqui and Amir (2011). This species is not considered to be of commercial importance in Pakistan. It is mainly used for the production of fishmeal. It is mainly caught by gillnets and seldom by handlines around Astola Island.

Family **SPARIDAE** Porgies – Seabreams

Diplodus capensis (Smith 1844) (Cape white bream)

This species was reported from Astola Island by Ali *et al.* (2021) as *Diplodus sargus*. It was found in all the sub-habitats identified by them around Astola Island. It is also reported by Siddiqui and Amir (2011) who found it to be dead on the shore. This species is of commercial importance in Pakistan as it is locally consumed. It is mainly caught by gillnets and handlines around Astola Island. This species can be seen individually or in small schools over coral heads. This species can be distinguished from *Diplodus kotschyi* in having saddle-like black blotch on the caudal peduncle which is larger than the eye.

Diplodus kotschyi (Steindachner 1876) (Onespot seabream)

This species was photographed by an amateur diver group led by Zohaib Merchant (possibly in 2020) from Astola Island. This species is of commercial importance in Pakistan as it is locally consumed. It is mainly caught by gillnets and handlines around Astola Island. This species can be seen individually or in small schools over coral heads. This species can be distinguished from *Diplodus capensis* in having a distinct round black blotch on the caudal peduncle which is smaller than or subequal to the eye diameter.

Acanthopagrus berda (Fabricius 1775) (Goldsilk seabream)

This species was reported from Astola Island by Anonymopus (2001), Froese and Pauly (2024) and GBIF (2024), PWP (2009), Siddiqui and Amir (2011) and MFF Pakistan (2018).. This species is of commercial importance in Pakistan as it is locally consumed. It is mainly caught by gillnets and handlines around Astola Island. This species can be seen individually over coral heads.

Acanthopagrus bifasciatus (Forsskål 1775) (Twobar seabream)

This species was reported from Astola Island by PWP (2009) and Siddiqui and Amir (2011). This species is of commercial importance in Pakistan as it is locally consumed. It is mainly caught by gillnets and handlines around Astola Island. This species can be seen individually over coral heads.

Acanthopagrus arabicus Iwatsuki 2013 (Arabian yellowfin bream)

This species was reported from Astola Island by PWP (2009) and Siddiqui and Amir (2011) as *Acanthopagrus latus* (Houttuyn 1782). This species is of commercial importance in Pakistan as it is locally consumed. It is mainly caught

by gillnets and handlines around Astola Island. This species can be seen individually or in small schools over coral heads.

Argyrops spinifer (Forsskål 1775) (King soldierbream)

This species was reported from Astola Island by Moazzam (2024) and Siddiqui and Amir (2011). This species is of commercial importance in Pakistan as it is locally consumed and exported. It is mainly caught by gillnets and handlines around Astola Island.

Family **LETHRINIDAE** Emperors – Large-eye breams – Emperor snappers
Lethrinus nebulosus (Forsskål 1775) (Spangled emperor)

This species was reported from Astola Island by Moazzam (2024), Siddiqui and Amir (2011), and MFF Pakistan (2018), This species is of commercial importance in Pakistan as it is locally consumed and exported. It is mainly caught by gillnets and handlines around Astola Island.

Lethrinus obsoletus (Forsskål 1775) (Orange-stripe emperor)

This species was reported from Astola Island by Siddiqui and Amir (2011) and MFF Pakistan (2018) as *Lethrinus ramak.* This species is of commercial importance in Pakistan as it is locally consumed and exported. It is mainly caught by gillnets and handlines around Astola Island.

Family **NEMIPTERIDAE** Threadfin breams – Monocle breams – Dwarf monocle breams
Scolopsis bimaculata Rüppell 1828 (Tumbprint monocle bream)

This species was reported from Astola Island by PWP (2009) and Siddiqui and Amir (2011). This species was also recorded by several amateur diving groups who have photographed this species associated with corals as well as in the shipwrecks around Astola Island. It is not found in large schools and only a few individuals were observed among corals around Astola Island.

Scolopsis taeniata (Cuvier 1830) (Blackstreaked monocle bream)

This species was reported from Astola Island by PWP (2009) and Siddiqui and Amir (2011). This species was also recorded by several amateur diving groups who have photographed this species associated with corals as well as in the shipwrecks around Astola Island. It is not found in large schools and only a few individuals were observed among corals.

Scolopsis vosmeri (Bloch 1792) (Whitecheek monocle bream)

This species was reported from Astola Island by Ali *et al*. (2021), PWP (2009), and Siddiqui and Amir (2011). This species was also recorded by several amateur diving groups who have photographed this species associated with corals as well as in the shipwrecks around Astola Island.). Ali *et al*. (2021) reported it from rocky beds, that have a few sandy pockets and boulders as well as a low coral cover that consists of branching as well as massive and encrusting growth forms. It is found in small schools among corals. It is among the most common coral inhabiting fish species along the Pakistan coast.

Family **SCIAENIDAE** – Croakers – Drums – Meagres – Weakfishes
Argyrosomus heinii (Steindachner 1902) (Arabian Sea meagre)

This species was reported from Astola Island by MFF-Pakistan (2018). This species is of commercial importance in Pakistan as it is locally consumed. It is not an inhabitant of the coral area but found in abundance in associated sandy and sandy cum muddy areas around Astola Island, especially on the northern and western side of the island as well as in Pasni Bay. It is a predatory fish that feeds on small fishes, shrimp, and other benthic invertebrates. It is mainly caught by gillnets and handlines around Astola Island.

Johnius dussumieri (Cuvier 1830) (Sin croaker)

This species was reported from Astola Island by Siddiqui and Amir (2011) and MFF Pakistan (2018). This species is of commercial importance in Pakistan as it is locally consumed. It is not an inhabitant of the coral area but found in abundance in associated sandy and sandy cum muddy areas around Astola Island, especially on the northern and western side of the island as well as in Pasni Bay. It is a predatory fish that feeds on small fishes, shrimp, and other benthic invertebrates. It is mainly caught by gillnets and handlines around Astola Island.

Johnius belangerii (Cuvier 1830) (Belanger's croaker)

This species was reported from Astola Island by Siddiqui and Amir (2011). This species is of commercial importance in Pakistan as it is locally consumed. It is not an inhabitant of the coral area but found in abundance in associated sandy and sandy cum muddy areas around Astola Island, especially on the northern and western sides of the island as well as in Pasni Bay. It is a predatory fish that feeds on small fishes, shrimp, and other benthic invertebrates. It is mainly caught by gillnets and handlines around Astola Island.

Otolithes ruber (Bloch and Schneider 1801) (Tigertooth croaker)

This species was reported from Astola Island by Siddiqui and Amir (2011), MFF Pakistan (2018), and Moazzam (20240. This species is of commercial importance in Pakistan as it is locally consumed. It is not an inhabitant of the coral area but found in abundance in associated sandy and sandy cum muddy areas around Astola Island, especially on the northern and western sides of the island as well as in Pasni Bay. It is one of the most dominating fish species caught around Astola Island and forms one of the most important fisheries in the area. It is a predatory fish that feeds on small fishes, shrimp, and other benthic invertebrates. It is mainly caught by gillnets and handlines around Astola Island.

Family **PEMPHERIDAE** – Sweepers

Pempheris malabarica Cuvier 1831 (Malabar Sweeper)

This species was photographed by an amateur diver group led by Zohaib Merchant (possibly in 2020) from Astola Island. This species was also recorded by several amateur diving groups who have photographed this species associated with corals as well as in the shipwrecks around Astola Island. It is found in small schools and can be frequently observed among corals.

Pempheris mangula Cuvier 1829 (Indian sweeper)

This species was photographed by an amateur diver group known as Diver Reef Karachi from Astola Island. This species was also recorded by several amateur diving groups who have photographed this species associated with corals as well as in the shipwrecks around Astola Island. It is found in small schools and can be frequently observed among corals.

Pempheris nesogallica Cuvier 1831 (nesogallica sweeper)

This species was photographed by an amateur diver group known as Diver Reef Karachi from Astola Island. This species was also recorded by several amateur diving groups who have photographed this species associated with corals as well as in the shipwrecks around Astola Island. It is found in small schools and can be frequently observed among corals.

Pempheris russellii Day 1888 (Russel's sweeper)

This species was photographed by an amateur diver group led by Zohaib Merchant (possibly in 2020) from Astola Island. This species was also recorded by several amateur diving groups who have photographed this species associated with corals as well as in the shipwrecks around Astola Island. It is found in small schools and can be frequently observed among corals.

Family **DREPANEIDAE**– Sicklefishes

Drepane punctata (Linnaeus 1758) (Spotted sicklefish)

This species was reported from Astola Island by Siddiqui and Amir (2011). This species is of commercial importance in Pakistan and is locally consumed. It is mainly caught by gillnets and handlines around Astola Island.

It is found in abundance in the sandy and sandy cum muddy areas around Astola Island, especially on the northern and western sides of the island as well as in Pasni Bay. This species is sometimes forms small schools over coral heads.

Family **MONODACTYLIDAE**– Moonies
Monodactylus argenteus (Linnaeus 1758) (Silver moony)

This species was photographed by an amateur diver group known as Diver Reef Karachi from Astola Island. This species was also recorded by several amateur diving groups who have photographed this species associated with corals around Astola Island. It forms large schools and can be frequently observed among corals and over coral heads. Its schools are also observed in shipwrecks south of Astola Island.

Family **CHAETODONTIDAE** Butterflyfishes
Chaetodon collare Bloch 1787 (Red butterflyfish)

This species was photographed by an amateur diver group known as Diver Reef Karachi from Astola Island. It does not form schools and is usually seen individually among coral. They are also observed in the shipwrecks south of Astola Island.

Heniochus macrolepidotus (Linnaeus 1758) (Pennant coralfish)

This species was reported from Astola Island by Siddiqui and Amir (2011). This species was also recorded by several amateur diving groups who have photographed this species associated with corals around Astola Island. It forms large schools and can be frequently observed among corals and over coral heads. Its schools are also observed in shipwrecks south of Astola Island. It is one of the common species of fish found among corals as well as in shipwrecks.

Family **MUGILIDAE** Mullets
Chelon parsia (Hamilton 1822) (Goldspot mullet)

This species was reported from Astola Island by MFF Pakistan (2018). This species is of commercial importance in Pakistan as it is locally consumed. It is also used as bait in the handline fisheries. It is not an inhabitant of the coral area but is sometimes found associated with outer coral assemblages. It is mainly caught by castnets and gillnets around Astola Island.

Mugil cephalus Linnaeus 1758 (Flathead grey mullet)

This species was reported from Astola Island by Siddiqui and Amir (2011) and MFF Pakistan (2018). This species is of commercial importance in Pakistan as it is locally consumed. It is also used as bait in the handline fisheries. It is not an inhabitant of the coral area but is sometimes found associated with outer coral assemblages. It is mainly caught by castnets and gillnets around Astola Island.

Moolgarda cunnesius (Valenciennes 1836) (Longarm mullet)

This species was reported from Astola Island by Siddiqui and Amir (2011) as *Valamugil cunnesius.*This species is of commercial importance in Pakistan as it is locally consumed. It is also used as bait in the handline fisheries. It is not an inhabitant of the coral area but is sometimes found associated with outer coral assemblages. It is mainly caught by castnets and gillnets around Astola Island.

Osteomugil speigleri (Bleeker 1858) (Speigler's mullet)

This species was reported from Astola Island by Siddiqui and Amir (2011) as *Valamugil speigleri.*.This species is of commercial importance in Pakistan as it is locally consumed. It is also used as bait in the handline fisheries. It is not an inhabitant of the coral area but is sometimes found associated with outer coral assemblages. It is mainly caught by castnets and gillnets around Astola Island.

Planiliza subviridis (Valenciennes 1836) (Greenback mullet)

This species was reported from Astola Island by Siddiqui and Amir (2011) as *Liza subviridis.*This species is of commercial importance in Pakistan as it is locally consumed. It is also used as bait in the handline fisheries. It is not an inhabitant of the coral area but is sometimes found associated with outer coral assemblages. It is mainly caught by castnets and gillnets around Astola Island.

Planiliza melinopterus (Valenciennes 1836) (Otomebora mullet)

This species was reported from Astola Island by Siddiqui and Amir (2011) as *Liza melinoptera.* This species is of commercial importance in Pakistan as it is locally consumed. It is also used as bait in the handline fisheries. It is not an inhabitant of the coral area but is sometimes found associated with outer coral assemblages. It is mainly caught by castnets and gillnets around Astola Island.

Planiliza carinata (Valenciennes 1836) (Keeled mullet)

This species was reported from Astola Island by Siddiqui and Amir (2011) as *Liza carinata..*This species is of commercial importance in Pakistan as it is locally consumed. It is also used as bait in the handline fisheries. It is not an inhabitant of the coral area but is sometimes found associated with outer coral assemblages. It is mainly caught by castnets and gillnets around Astola Island.

Family **POMACENTRIDAE** Damselfishes

Abudefduf vaigiensis (Quoy and Gaimard 1825) (Indo-Pacific sergeant)

This species was reported from Astola Island by Ali *et al.* (2021), PWP (2009), and Siddiqui and Amir (2011). Ali *et al.* (2021) reported it from all four habitats identified around Astola Island. This species was also recorded by several amateur diving groups who have photographed this species associated with corals around Astola Island. It forms large schools and can be frequently observed among corals and over coral heads. Its schools are also observed in shipwrecks south of Astola Island. It is one of the common species of fish found among corals as well as in shipwrecks.

Abudefduf bengalensis (Bloch 1787) (Bengal sergeant)

This species was photographed by an amateur diver group led by Zohaib Merchant (possibly in 2020) from Astola Island. This species was also recorded by several amateur diving groups who have photographed this species associated with corals around Astola Island. It forms large schools and can be frequently observed among corals and over coral heads. Its schools are also observed in shipwrecks south of Astola Island. It is one of the common species of fish found among corals as well as in shipwrecks.

Chrysiptera unimaculata (Cuvier 1830)(One spot demoiselle)

This species is reported from Astola Island by Anonymous (2001), Froese and Pauly (2024) and GBIF (2024). It is found mainly solitarily or in small groups among coastal rubble or over open beach-rock of coral flats exposed to moderate surge but predominentaly in the tidepools on the rockyshore and rarely associated with coral.

Neopomacentrus cyanomos (Bleeker 1856) (Regal demoiselle) Fig. 3.

This species was photographed by an amateur diver group known as Diver Reef Karachi from Astola Island. This species was also recorded by several amateur diving groups who have photographed this species associated with corals around Astola Island. It forms large schools and can be frequently observed among corals and over coral heads. Its schools are also observed in shipwrecks south of Astola Island. It is one of the common species of fish found among corals as well as in shipwrecks.

Neopomacentrus sindensis (Day 1873) (Arabian demoiselle)

This species was reported from Astola Island by Ali *et al.* (2021) and reported it from all four habitats identified around Astola Island. This species was also recorded by several amateur diving groups who have photographed this species associated with corals around Astola Island. It forms large schools and can be frequently observed among corals and over coral heads. Its schools are also observed in shipwrecks south of Astola Island. It is the most common species of fish found among corals as well as in shipwrecks.

Family **LABRIDAE**– **Wrasses** – **Hogfishes – Tuskfishes**
Thalassoma amblycephalus (Bleeker, 1856) (Blueheaded wrasse)

This species was photographed by an amateur diver group led by Zohaib Merchant (possibly in 2020) from Astola Island. It forms small schools and can be frequently observed among corals and over coral heads. Its schools are also observed in shipwrecks south of Astola Island. It is one of the fish common fish species which is found among corals as well as in shipwrecks.

Halichoeres nigrescens (Bloch and Schneider 1801) (Bubblefin wrasse)

This species was reported from Astola Island by Ali *et al.* (2021) and GBIF (2024). Ali *et al.* (2021) reported from all four habitats identified around Astola Island. This species was also recorded by several amateur diving groups who have photographed this species associated with corals around Astola Island. It forms small schools and can be frequently observed among corals and over coral heads. Its schools are also observed in shipwrecks south of Astola Island. It is one of the fish common fish species which is found among corals as well as in shipwrecks.

Thalassoma lunare (Linnaeus 1758) (Moon wrasse)

This species was photographed by an amateur diver group led by Zohaib Merchant (possibly in 2020) from Astola Island. It forms small schools and can be frequently observed among corals and over coral heads. Its schools are also observed in shipwrecks south of Astola Island. It is one of the fish common fish species which is found among corals as well as in shipwrecks.

Family SCARIDAE – **Parrotfishes**
Chlorurus sordidus (Forsskål 1775) (Daisy parrotfish)

This species was reported from Astola Island by Siddiqui and Amir (2011) as *Scarus sordidus.* It forms small schools and can be frequently observed among corals and over coral heads. Its schools are also observed in shipwrecks south of Astola Island. . It is one of the fish common fish species which is found among corals as well as in shipwrecks.

Scarus arabicus (Steindachner 1902) (Arabian parrotfish)

This species was reported from Astola Island by MFF Pakistan (2018). It forms small schools and can be frequently observed among corals and over coral heads. Its schools are also observed in shipwrecks south of Astola Island. It is one of the fish common fish species which is found among corals as well as in shipwrecks.

Scarus fuscopurpureus (Klunzinger 1871) (Purple-brown parrotfish)

This species was reported from Astola Island by PWP (2009) and Siddiqui and Amir (2011). It forms small schools and can be frequently observed among corals and over coral heads. Its schools are also observed in shipwrecks south of Astola Island. . It is one of the fish common fish species which is found among corals as well as in shipwrecks.

Scarus persicus Randall and Bruce 1983 (Gulf parrotfish) (Fig. 12)

This species was photographed by an amateur diver group led by Zohaib Merchant (possibly in 2020) from Astola Island. It forms small schools and can be frequently observed among corals and over coral heads. Its schools are also observed in shipwrecks south of Astola Island. . It is one of the fish common fish species which is found among corals as well as in shipwrecks. This species is a new record from Pakistan. The most striling feature of this species

is the presence of broad blackish bar in middle of body continuing at least basally into dorsal fin. This species is previously known from Persian Gulf to southwest of Oman (Froese and Pauly, 2024; Randall and Bruce 1983).

Scarus zufar Randall and Hoover 1995 (Dhoffar parrotfish)

This species was reported from Astola Island by MFF-Pakistan (2018). It forms small schools and can be frequently observed among corals and over coral heads. Its schools are also observed in shipwrecks south of Astola Island. . It is one of the fish common fish species which is found among corals as well as in shipwrecks.

Fig. 12. Persian parrotfish (*Scarus persicus*) Photgraphef in shipwreck by Zohaib Merchant

Order PERCIFORMES: TRACHINOIDEI – Weeverfishes and allies
PINGUIPEDIDAE –Sandperches
Parapercis robinsoni Fowler 1929

Fig. 13. Smallscale grubfish (*Parapercis robinsoni*) on coral rock ((Photo A. Rahim, 2009)

This species was photographic by ameature diver Abdul Rahim in 2009 from Astola Island. This species is found on coral heads and adjacent areas as well as in the area with sandy bottom between corals. Usually found as solitary. It is not a commercially important species but because of its similarity with silver sillago, sometimes it is locally consumed.

Order PERCIFORMES: **BLENNIOIDEI – Blennies and allies**
Family BLENNIIDAE Blennies

Alticus kirkii (Günther 1868)(Kirk's blenny)

This species was reported from Astola Island by Anonymous (2001) and GBIF (2024). It is found in the intertidal zone of exposed rocky shores, and also tidal pools, often coming out of the water. It actively shuttle back and forth between rock pools and air (skipper) and breathe air when out of water. Reported to be quite frequent on the rocky shores on the western side of Astola island.

Antennablennius adenensis Fraser-Brunner 1951 (Aden blenny)

This species was reported from Astola Island by Anonymous (2001) and GBIF (2024). It is found in the intertidal zone of exposed rocky shores, and also tidal pools, Reported to be quite frequent on the rocky shores on the western side of Astola island.

Antennablennius bifilum (Günther 1861) (Horned rockskipper)

This species was reported from Astola Island by Anonymous (2001) and GBIF (2024), Springer (1968) as *Croaltus bifilum.* It is found mainly on rocky shores and tidepools. Reported to be quite frequent on the rocky shores on the western side of Astola island.

Antennablennius variopunctatus (Jatzow and Lenz 1898) (Orange-dotted blenny)

This species was reported from Astola Island by Anonymous (2001) and GBIF (2024), Springer (1968) as *Antennablennius velifer.* It is found mainly on rocky shores and tidepools. Reported to be quite frequent on the rocky shores on the western side of Astola island.

Ecsenius pulcher (Murray 1887) (Gulf blenny)

This species was photographed by an amateur diver group known as Diver Reef Karachi from Astola Island. This species was also recorded by several amateur diving groups who have photographed this species associated with corals around Astola Island. It was also reported from Astola Island by GBIF (2024). It mainly inhabits crevices and holes on coral heads as well as on rocky shores and tidepools.

Hirculops cornifer **(**Rüppell 1830) (Highbrow rockskipper)

This species was reported from Astola Island by Anonymous (2001), Froese and Pauly (2024) and GBIF (2024). It is found in the intertidal zone of exposed rocky shores, and also tidal pools, Reported to be quite frequent on the rocky shores on the western side of Astola island.

Istiblennius dussumieri (Valenciennes 1836) (Streaky rockskipper)

This species was reported from Astola Island by Anonymous (2001), Froese and Pauly (2024) and GBIF (2024) and Springer and Williams (1994). It is found in the intertidal zone of exposed rocky shores, and also tidal pools, Reported to be quite frequent on the rocky shores on the western side of Astola island.

Istiblennius edentulus (Forster & Schneider 1801)(Rippled rockskipper)

This species was reported from Astola Island by Anonymous (2001), Froese and Pauly (2024), GBIF (2024) and Springer and Williams (1994).. It is found in the intertidal zone of exposed rocky shores, and also tidal pools, often coming out of the water. It actively shuttle back and forth between rock pools and air (skipper) and breathe air when out of water. Reported to be quite frequent on the rocky shores on the western side of Astola island.

Istiblennius lineatus (Valenciennes 1836) (Lined rockskipper)

This species was reported from Astola Island by Springer (1968) as *Halmablennius lineatus.* It is found mainly on rocky shores and tidepools. Reported to be quite frequent on the rocky shores on the western side of Astola island.

Istiblennius pox Springer and Williams 1994 (scarface rockskipper)

This species was reported from Astola Island by Anonymous (2001), GBIF (2024) and Springer and Williams (1994).. It is found in the intertidal zone of exposed rocky shores, and also tidal pools, often coming out of the water. It actively shuttle back and forth between rock pools and air (skipper) and breathe air when out of water. Reported to be quite frequent on the rocky shores on the western side of Astola island.

Istiblennius spilotus Springer and Williams 1994 (Spotted rockskipper)

This species was reported from Astola Island by Anonymous (2001), GBIF (2024) and Springer and Williams (1994). It is found in the intertidal zone of exposed rocky shores, and also tidal pools, often coming out of the water. It actively shuttle back and forth between rock pools and air (skipper) and breathe air when out of water. Reported to be quite frequent on the rocky shores on the western side of Astola island.

Omobranchus banditus Smith 1959 (Bandit blenny)

This species was reported from Astola Island by Springer (1968). It is found mainly on rocky shores and tidepools. Reported to be quite frequent on the rocky shores on the western side of Astola island. It may also inhabits crevices and holes on coral heads.

Omobranchus fasciolatus (Valenciennes 1836) (Arab blenny)

This species was reported from Astola Island by Anonymous (2001), GBIF (2024), Siddiqui and Amir (2011) and Springer and Gomon (1975). It is found mainly on rocky shores and tidepools. Reported to be quite frequent on the rocky shores on the western side of Astola island. It may also inhabits crevices and holes on coral heads.

Omobranchus mekranensis (Regan 1905) (Mekran blenny)

This species was reported from Astola Island by Anonymous (2001), GBIF (2024), PWP (2009), Siddiqui and Amir (2011) and Springer and Gomon (1975). It is found mainly on rocky shores and tidepools. Reported to be quite frequent on the rocky shores on the western side of Astola island. It may also inhabits crevices and holes on coral heads.

Parablennius opercularis (Murray 1887)(Cheekspot blenny)

This species was reported from Astola Island by Anonymous (2001), Froese and Pauly (2024) and GBIF (2024). It is found in the intertidal zone of exposed rocky shores, and also tidal pools, often coming out of the water. It actively shuttle back and forth between rock pools and air (skipper) and breathe air when out of water. Reported to be quite frequent on the rocky shores on the western side of Astola island.

Parablennius thysanius (Jordan and Seale 1907) (Tasseled blenny)

This species was reported from Astola Island by Anonymous (2001), Froese and Pauly (2024) and GBIF (2024). It is found in the intertidal zone of exposed rocky shores, and also tidal pools, often coming out of the water. It actively shuttle back and forth between rock pools and air (skipper) and breathe air when out of water. Reported to be quite frequent on the rocky shores on the western side of Astola island.

Scartella emarginata (Günther 1861) (Maned blenny)

This species was reported from Astola Island by Anonymous (2001) and GBIF (2024). It is found in the intertidal zone of exposed rocky shores, and also tidal pools, often coming out of the water. It actively shuttle back and forth between rock pools and air (skipper) and breathe air when out of water. Reported to be quite frequent on the rocky shores on the western side of Astola island.

Family TRIPTERYGIIDAE-Tripplefin blenny
Helcogramma ellioti (Herre 1944) (Elliot's tripplefin blenny)

This species was reported from Astola Island by Anonymous (2001) and GBIF (2024). It is found in the intertidal zone of exposed rocky boulders. They live in small groups, each comprising a male and several females on rock surfaces and under ledges and tidepools.

Order PERCIFORMES: GOBIOIDEI – Gobies and allies
Family GOBIIDAE – Gobies
Bathygobius cyclopterus (Valenciennes 1837) (Spotted frillgoby)

This species was reported from Astola Island by Anonymous (2001), Froese and Pauly (2024), and GBIF (2024). It is found in the intertidal zone of exposed rocky boulders, on rock surfaces, and under ledges and tidepools.

Bathygobius meggitti (Hora and Mukerji 1936)(Meggitt's goby)

This species was reported from Astola Island by GBIF (2024). It is found in the intertidal zone of exposed rocky boulders, on rock surfaces, and under ledges and tidepools.

Hetereleotris zonata (Fowler 1934) (Goggles)

This species was reported from Astola Island by Anonymous (2001), Froese and Pauly (2024), and GBIF (2024). It is found in the intertidal zone in tidepools.

Valenciennea sexguttata (Valenciennes 1837) (Bluespotted glidergoby) (Fig. 13)

Fig. 14. Bluespotted glider goby (*Valenciennea sexguttata*) in a burrow made under a rock (Photo A. Rahim, 2009)

This species is already reported from Astola Island by Anonymous (2001), Froese and Pauly (2024), GBIF (2024), and Hoese and Larson (1994). It is also reported as *Eleotriodes sexguttatus* (Valenciennes, 1837) from Astola island by GBIF (2024). A specimen was photographed by Abdul Rahim in 2009 at Astola Island. This species occurs in male-female pairs which construct their burrow over fine silty coral sands, usually under a rock.

Order PERCIFORMES: ACANTHUROIDEI – Surgeonfishes and allies

Family EPHIPPIDAE Spadefishes
Platax orbicularis (Forsskål 1775) (Orbicular spadefish)

This species was photographed by an amateur diver group led by Zohaib Merchant (possibly in 2020) from Astola Island. It forms small schools and can be frequently observed over coral heads. Its schools are also observed in shipwrecks south of Astola Island. It is also found on the sandy and sandy cum muddy areas around Astola Island.

Family SIGANIDAE Rabbitfishes – Spinefoots
Siganus canaliculatus (Park 1797) (White-spotted spinefoot)

This species was reported from Astola Island by Siddiqui and Amir (2011). It forms small schools and can be frequently observed over coral heads. Its schools are also observed in shipwrecks south of Astola Island. It is also found on the sandy and sandy cum muddy areas around Astola Island. It is a commercially important species which is mainly exported to Persian Gulf countries.

Siganus javus (Linnaeus 1766) (Streaked spinefoot)

This species was reported from Astola Island by Ali *et al*, (2021). It is found along Astola Island on sites that have rocky habitats with few uplifted boulders with dominant corals were massive *Porites* species. It forms small schools and can be frequently observed over coral heads. Its schools are also observed in shipwrecks south of Astola Island. It is also found on the sandy and sandy cum muddy areas around Astola Island. It is a commercially important species that is locally consumed and exported to Persian Gulf countries.

Siganus luridus (Rüppell 1829) (Dusky spinefoot)

This species was reported from Astola Island by Anonymous (2001), Froese and Pauly (2024) and GBIF (2024). It is found in rocky habitats and coral areas. It forms small schools and can be frequently observed over coral heads. Its schools are also observed in shipwrecks south of Astola Island. It is also found on the sandy and sandy cum muddy areas around Astola Island. It is a commercially important species which is locally consumed and exported to Persian Gulf countries.

Siganus spinus (Linnaeus 1758) (Little spinefoot)

This species was reported from Astola Island by Siddiqui and Amir (2011). It forms small schools that can be frequently observed over coral heads. Its schools are also observed in shipwrecks south of Astola Island. It is also found on the sandy and sandy cum muddy areas around Astola Island. It is a commercially important species which is mainly exported to Persian Gulf countries.

Family ACANTHURIDAE Surgeonfishes – Tangs – Unicornfishes
Acanthurus gahhm (Gmelin 1789) (Black surgeonfish)

This species was photographed by an amateur diver group led by Zohaib Merchant (possibly in 2020) from Astola Island. This species was also recorded by several amateur diving groups who have photographed this species associated with corals around Astola Island. It forms small schools and can be frequently observed among corals and over coral heads. Its schools are also observed in shipwrecks south of Astola Island.

Order PERCIFORMES: SPHYRAENOIDEI – Barracudas
Family SPHYRAENIDAE – Barracudas
Sphyraena putnamae Jordan and Seale 1905 (Sawtooth barracuda)

This species was reported from Astola Island by Siddiqui and Amir (2011) who found it to be dead cast on the shore. The species, however, is known to form small schools and can be frequently observed over coral heads. Its schools are also observed in shipwrecks south of Astola Island. It is also found on the sandy and sandy cum muddy areas around Astola Island. It is a commercially important species which is locally consumed.

Sphyraena jello Cuvier 1829 (Pickhandle barracuda) Fig. 13

This species was photographed by an amateur diver group led by Zohaib Merchant (possibly in 2020) from Astola Island. This species was also recorded by several amateur diving groups who have photographed this species associated with corals mainly on slopes on outer edges of coral reefs around Astola Island.. Observed to be Nocturnally more active and varociously feeding on oter fishes. It forms small schools and can be frequently observed among corals and over coral heads. Its schools are also observed above shipwrecks south of Astola Island. It is a commercially important species which is locally consumed.

Fig. 15. Pickhandle barracuda (*Sphyraena jello*) forming large schools over coral beds

Sphyraena obtusata Cuvier 1829 (Obtuse barracuda)

This species was reported from Astola Island by Ali *et al*., (2021). The species, however, is known to form small schools and can be frequently observed over coral heads. Its schools are also observed in shipwrecks south of Astola Island. Along Astola Island, Ali *et al*. (2021) found this species in rocky habitats that have few uplifted boulders with dominant corals were massive *Porites* species and also in areas that have pockets and boulders with a low coral cover and consist of branching as well as massive and encrusting growth forms. It is a commercially important species which is locally consumed.

Order PERCIFORMES: SCOMBROIDEI – Tunas and allies
Family TRICHIURIDAE Cutlassfishes – Hairtailfishes – Frostfishes – Scabbardfishes
Lepturacanthus savala (Cuvier 1829) (Savalai hairtail)

This species was reported from Astola Island by Siddiqui and Amir (2011). It forms small schools and can be frequently observed over coral heads. It is also found on the sandy and sandy cum muddy areas around Astola Island. It is caught with gillnets, handlines, and longlines around Astola Island as well as in the Pasni Bay. It is a commercially important species which is mainly exported to Southeast Asian countries.

Family SCOMBRIDAE Albacore – Bonitos – Kawakawa – Mackerels – Seerfishes – Tunas – Wahoo
Rastrelliger kanagurta (Cuvier 1816) (Indian mackerel)

This species was reported from Astola Island by Siddiqui and Amir (2011), and MFF-Pakistan (2018). It was observed in the commercial catch of fishing boats caught by gillnet. It is a commercially important species and there is an important gillnet fishery established along the Pakistan coast including around Astola Island. It is harvested by gillnet and illegally by seine net ('Katra' or 'wire net') by Karachi or Damb-based fishing boats. It is a commercially important species which is exported to Southeast Asian countries.

Scomberomorus commerson (Lacepède 1800) (Narrow barred Spanish mackerel)

This species was reported from Astola Island by Siddiqui and Amir (2011), and MFF-Pakistan (2018). It was observed in the commercial catch of fishing boats caught by gillnet. It is also caught by handlines and gillnets in the

Pasni Bay adjacent to Astola Island. It is a commercially important species that is locally consumed and exported to Persian Gulf countries.

Scomberomorus guttatus (Bloch and Schneider 1801) (Indo-Pacific King mackerel)

This species was reported from Astola Island by Siddiqui and Amir (2011), and MFF-Pakistan (2018). It was observed in the commercial catch of fishing boats and was caught by gillnet. It is also caught by gillnets in Pasni Bay adjacent to Astola Island. It is a commercially important species that is locally consumed and sometimes exported to Persian Gulf countries.

Thunnus tonggol (Bleeker 1851) (Longtail tuna)

This species was caught by handline by an amateur diver group led by Pervaiz Sadiq in 2015 at Astola Island. It was sometimes observed in the commercial catch of fishing boats caught by gillnet. It is also caught by gillnets in Pasni Bay adjacent to Astola Island but it is extremely rare around Astola Island It is a commercially important species that is transported to the Islamic Republic of Iran.

Order PLEURONECTIFORMES – Flatfishes
Family PSETTODIDAE Spiny turbots
Psettodes erumei (Bloch and Schneider 1801) (Indian halibut)

This species was reported from Astola Island by PWP (2009) and Siddiqui and Amir (2011). It is usually not associated with coral habitats but found around sandy and sandy cum muddy habitats around Astola Island and other parts of Pasni Bay. It is caught with gillnets and considered as a commercially important species which is locally consumed and also exported in skinless fillets or whole to other countries.

Family **BOTHIDAE Lefteye flounders**
Pseudorhombus arsius (Hamilton 1822) (Largetooth flounder)

This species was reported from Astola Island by PWP (2009) and Siddiqui and Amir (2011). It is usually not associated with coral habitats but found around sandy and sandy cum muddy habitats around Astola Island and other parts of Pasni Bay. It is caught with gillnets and considered a commercially important species which is locally consumed and also exported as whole or in the form of skinless fillets to other countries.

Family CYNOGLOSSIDAE Touguesoles
Cynoglossus arel (Bloch and Schneider 1801) (Largescale tonguesaole)

This species was reported from Astola Island by MFF Pakistan (2018). It is usually not associated with coral habitats but found around sandy and sandy cum muddy habitats around Astola Island and other parts of Pasni Bay. It is caught with gillnets and considered as a commercially important species which is locally consumed and also exported in skinless fillets or whole to other countries.

Cynoglossus dispar Day 1877 (Roundhead tonguesole)

This species was reported from Astola Island by Anonymous (2001) and GBIF (2024). It is usually not associated with coral habitats but found around sandy and sandy cum muddy habitats around Astola Island and other parts of Pasni Bay. It is caught with gillnets and considered as a commercially important species which is locally consumed and also exported in whole or in the form of skinless fillets to other countries.

Cynoglossus puncticeps (Richardson 1846) (Speckled toungefish)

This species was reported from Astola Island by Siddiqui and Amir (2011) and MFF Pakistan (2018). It is usually not associated with coral habitats but found around sandy and sandy cum muddy habitats around Astola Island and other parts of Pasni Bay. It is caught with gillnets and considered as a commercially important species which is locally consumed and also exported whole or in the form of skinless fillets to other countries.

Cynoglossus quadrilineatus (Bleeker 1851) (Fourlined tonguesole)

This species was reported from Astola Island by Anonymous (2001), Froese and Pauly (2024), GBIF (2024), Siddiqui and Amir (2011) and MFF Pakistan (2018) as *Cynoglossus bilineatus*. It is usually not associated with coral habitats but found around sandy and sandy cum muddy habitats around Astola Island and other parts of Pasni Bay. It is caught with gillnets and considered as a commercially important species which is locally consumed and also exported whole or in the form of skinless fillets to other countries.

Paraplagusia bilineata (Bloch 1787)(Doublelined tonguesole)

This species was reported from Astola Island by Anonymous (2001), Froese and Pauly (2024) and GBIF (2024). It is usually not associated with coral habitats but found around sandy and sandy cum muddy habitats around Astola Island and other parts of Pasni Bay. It is caught with gillnets and considered as a commercially important species which is locally consumed and also exported whole or in the form of skinless fillets to other countries.

Paraplagusia bleekeri Kottelat 2013 (Bloch's tongusole)

This species was reported from Astola Island by Anonymous (2001), Froese and Pauly (2024), GBIF (2024) as *Paraplagusia blochii*. It is usually not associated with coral habitats but found around sandy and sandy cum muddy habitats around Astola Island and other parts of Pasni Bay. It is caught with gillnets and considered as a commercially important species which is locally consumed and also exported whole or in the form of skinless fillets to other countries.

Order TETRAODONTIFORMES – Pufferfishes and allies
Family BALISTIDAE Triggerfishes
Abalistes stellatus (Anonymous 1798) (Starry triggerfish)

This species was reported from Astola Island by PWP (2009), and Siddiqui and Amir (2011). It forms small schools and can be frequently observed over coral heads. Its schools are also observed in shipwrecks south of Astola Island. Usually caught with handlines and seldom by other fishing gears. It is of no commercial value and is usually discarded.

Odonus niger (Rüppell 1836) (Red-toothed triggerfish) Fig. 14

This species was reported from Astola Island by a team of WWF- Pakistan in 2007. It forms small schools and can be frequently observed over coral heads. Its schools are also observed in shipwrecks south of Astola Island. It feeds upon zooplankton but can be observed nipping on sponges that grow on corals. Usually caught with handlines and seldom by other fishing gears. It is of no commercial value and is usually discarded

Sufflamen fraenatum (Latreille 1804) (Masked triggerfish) Fig 15

This species was photographed by an amateur diver group known as Diver Reef Karachi from Astola Island. This species is reported by GBIF (2024) as *Sufflamen capistratus* from Astola Island. It does not form schools but individuals can be frequently over coral heads. Usually caught with handlines and seldom by other fishing gears. It is of no commercial value and is usually discarded.

Family OSTRACIIDAE Boxfishes
Tetrosomus gibbosus (Linnaeus 1758) (Humpback turretfish)

This species was found dead at Astola Island by Siddiqui and Amir (2011). This species does not form schools but individuals are frequently observed over coral heads. Usually caught with handlines and seldom by other fishing gears. It is of no commercial value and is usually discarded

Family **DIODONTIDAE Porcupinefishes – Spiny puffers – Burrfishes**
Cyclichthys orbicularis (Bloch 1785) (Birdbeak burrfish)

This species was reported from Astola Island by PWP (2009) and Siddiqui and Amir (2011). This species does not form schools but individuals are frequently observed over coral heads. Usually caught with handlines and seldom by other fishing gears. It is of no commercial value and is usually discarded.

Fig. 16.Red-toothed triggerfish (*Odonus niger*). (source: WWF-2007).

Fig. 17. Masked triggerfish (*Sufflamen fraenatum*) Photo: Diver Reef Karachi

CONCLUSION

Astola Island, being a coral habitat, is known for its rich diversity of fishes which include those fish species that are inhabitant of the coral assemblages. In addition, there are fishes that are associated with the shipwrecks located on the south of Astola Island, as these are encrusted with corals and coral-associated sessile invertebrates, thus offering a similar habitat as coral assemblages found around Astola Island. In addition, the fish fauna that feed on marine life found in coral and associated habitats such as barracuda, groupers, grunts, and carangids are also among the fish fauna dominated in the area. Fishes such as mullets which are detritus feeders also gathered around Astola Island as it provides an ideal feeding ground for these species. Since the area is known to be highly productive, small pelagics including Indian mackerel, *Sardinella*, and other clupeids are also found in abundance around Astola Island and harvested by monofilament gillnets which is the most important fisheries of the area (Moazzam, 2024). Since the area around Astola Island and its vicinity are also rich in demersal fish species, therefore, Karachi-based trawlers can be observed poaching in the area. Additionally, bottom-set gillnetting and longlining are important fishing methods employed for catching demersal fish. Astola Island has always been an important fishing area for handline fishing which was previously aimed at catching tiger-toothed croaker (*Otolithes ruber*) and king solidierbream (*Argyrops spinifer*), However, now hand lining is the most popular gear being used by the tourists and other visitors of the Island. In addition, spearfishing is also an important fishing gear being used in coral habitats and shipwrecks for catching large fishes.

The dominating fish groups at Astola Island belong to Order Perciforms represented by 7 families including Families Blenniidae (17 species), Carangidae (14 species), Mugilidae (7 species), Lutjanidae (7 species), Serrenidae (6 species), Haemulidae (6 species) and Sparidae (6 species). Blennies are commonly found on the rocky shores of Astola Island. Highes dicersity of this family recorded during the present study is attributed mainly to extensive sampling of intertidal fauna undertaken under US Programme of International Indian Ocean Expedition at Astola Island (Anonymous, 2001). Members of Family Carangidae form large schools over coral heads and shipwrecks and feeding around the area whereas there are a few species of this family that are found associated closely with corals. Members of Family Serranidae and genus *Epinephelus* are found as solitary individuals or very small schools (one to three fishes) living in association with coral and seeking shelter in crevices and overhangs. Family Scaridae (parrotfishes) is represented by three species only which includes two specimens of *Scarus persicus* Randall and Bruce 1983 in the shipwreck south of Astola Island which were not previously recorded from Pakistan.

Although 173 species of fishes are known so far from Astola Island, however, there is a need to undertake a comprehensive survey of the fishes inhabiting various habitats around the habitat. Information about seasonal abundance of various species is also required to be collected. Additionally, various gears may be used to collect species that inhabit this island as well as obtain information from traditional ecological knowledge from fishermen community fishing around Astola Island. It may be pointed out that fishermen communities are considered to have excellent knowledge about the fish fauna through their folk taxonomy. The information about the spatial and temporal distribution of commercial fishes will help in the development and implementation of a management plan for Astola Island Marine Protected Area especially in controlling the use of illegal fishing gears such as trawling and seining which are considered harmful for various fish species found in the area.

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