

Chapter 17

The Fishes of the Gulf of Guinea Oceanic Islands



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Abstract This chapter reviews the current knowledge of the marine (including deep-sea species) and freshwater fishes of the Gulf of Guinea oceanic islands. Some biogeographic and conservation considerations are also presented. A total of 1045 species are likely present in the region, including 107 Elasmobranchii (37 confirmed, 65 potential, and 5 erroneous), one confirmed Holocephali, and 937 Actinopteri species (515 confirmed, 385 potential, 32 erroneous, and 5 questionable). Most of the coastal species are shared with the surrounding African continental shelf, while several species are amphi-Atlantic (present in both sides of the Atlantic Ocean), and some species have sister-species in the western Atlantic. A total of 15 species are endemic to the region, and 2 are introduced. Further studies are still needed to better understand the ichthyofauna of the Gulf of Guinea oceanic islands and help policymakers better define conservation and protection plans.

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Introduction

The Gulf of Guinea Oceanic Islands (GGOI), Príncipe, São Tomé, and Annobón, are oceanic islands located in the Tropical Eastern Atlantic. The GGOI are part of the Cameroon Volcanic Line, an intraplate basalt in the ocean-continent boundary region, ranging over 1600 km (Burke 2001; Elsheikh et al. 2014; Belay et al. 2019). All three GGOI are ideally located for fish diversity: close enough to the African continent to host typical shelf region fish species, but also with a narrow platform separated by seas with over 1500 m depth that provide coastal habitat to several fishes. In addition, several currents contribute to coastal upwelling (Bakun 1978; Djakouré et al. 2017) and biological productivity (Binet 1997; Ukwé et al. 2006) for highly migratory offshore and deep-sea fish species. The GGOI are at the crossroads of three major currents: one incoming (from west to east), the Guinea Current (GC), and two outgoing (from east to west), the South Equatorial Current (SEC) and the Gabon-Congo Undercurrent (Djakouré et al. 2014). The GC, sourcing from the combination of the North Equatorial Countercurrent and the Canary Current, flows east along the western coast of Africa (from Sierra Leone to Nigeria) with slight seasonal flow variations in direction and velocity, salinity, and sea-surface temperature (Richardson and Reverdin 1987; Odekunle and Eludoyin 2008; Djakouré et al. 2014, 2017). The northern part of the SEC borders the GC and flows westward. The Equatorial Undercurrent (EUC) also flows eastward below the SEC (Djakouré et al. 2014; Herbert et al. 2016; Houndegnonto et al. 2021; see also Ceríaco et al. 2022a). A Guinea Undercurrent (GUC) is also present, flowing eastward, in deeper water along the coast. The GGOI are influenced by all these currents in the “southern alternance region,” dominated by strong seasonal contrasts and with influxes of equatorial upwelling (Le Lœuff and Cosel 1998). Water salinity, temperature, and turbidity are also influenced by major freshwater river discharges (Congo and Niger basins) and resulting plumes (Alory et al. 2021; Houndegnonto et al. 2021; Ceríaco et al. 2022a). The combination of these characteristics, along with the upwelling and high biological productivity, contribute to the occurrence of a spectacular fish diversity.

The marine ichthyofauna of the Gulf of Guinea, including the continental shelf, continental islands (Bioko), and oceanic islands, presents a remarkable level of endemism (approximately 20%), but many species are still poorly known and studied (Jones 1994). The endemism of reef fish species reaches about 65% in some of these areas, indicating their high degree of isolation (Jones 1994). By contrast, only three freshwater fish species (all non-indigenous) are recorded for the islands of Príncipe, São Tomé, and Annobón, all showing tolerance to salinity and capable of dispersal among the oceanic islands (Jones 1994). The GGOI are part of the Guinea Current Large Marine Ecosystem (GCLME), extending from Guinea Bissau to Angola (to the northern seasonal limit of the Benguela Current) and

covering 16 countries' Exclusive Economic Zones (Ukwe et al. 2006). Because of its bathymetry, chemistry, hydrography, and trophodynamics, the GCLME is among the most productive coastal and offshore waters in the world with rich fishery resources, an important reservoir of marine biological diversity, and excellent potential for tourism (Ukwe et al. 2003).

Most of the fish species recorded from the GGOI are also present in other parts of the Gulf of Guinea, with few species endemic to the islands, and several species with amphi-Atlantic or circum-global distributions. As of 2019, a total of 268 coastal fish species have been recorded in the GGOI (see "Species Diversity" section) with about 12% of the species (28) reported as endemic to the Gulf of Guinea, and a few of these only observed in São Tomé and Príncipe, such as *Clepticus africanus* Heiser, Moura and Robertson, 2000, and *Scorpaena annobonae* Eschmeyer, 1969 (Wirtz et al. 2007; Wirtz 2017). This low level of endemism is likely a consequence of the vagility of marine fishes as zooplankton and the proximity of the islands to the African continent (Krakstad et al. 2010).

The current chapter presents a brief overview of the marine and freshwater ecosystems present in the GGOI, the current knowledge of marine and freshwater fish species, biogeography and evolution, and finally conservation. An updated taxonomic checklist of marine (coastal, offshore, and deep-water) and freshwater species is presented, with revised inventories for coastal and reef fish species.

Brief History of Ichthyology Research

In 1871, the Portuguese naturalist Félix António Brito Capello (1828–1879) published the first list of fishes accessioned at the Lisbon Museum collection. This list, in three parts, includes specimens from the Portuguese islands of Madeira and Azores, and from its overseas territories, including São Tomé and Príncipe (Capello 1871a, b, 1872). After his death, António Roberto Pereira Guimarães (?–1889?) continued Capello's analysis of the material housed at the Lisbon Museum and published two additional papers on the topic (Guimarães 1882, 1884). Later, the Portuguese zoologist Balthazar Osório (1855–1926) presented the first list focusing on fish species from São Tomé and Príncipe, mostly based on the specimens collected by the Portuguese naturalists Adolfo Möller (1842–1920) and Francisco Newton (1864–1909) (Osório 1891, 1892, 1893, 1894, 1895a, 1898, 1906), and from Annobón (Osório 1895b), with several descriptions of species and original information. After a gap of about five decades, Frade (1955) and Frade and Correia da Costa (1956, 1957) reported new records based on pelagic fisheries species (see also Almeida and Alves 2019). Later, from 1961 to 1987, several international scientific expeditions provided complementary information (Arnoult et al. 1966; Bayer et al. 1966; Blanc et al. 1968; Iwamoto 1970; see Afonso et al. 1999 and Ceríaco et al. 2022b for a detailed bibliography), with rare studies reporting new records (Thys van den Audenaerde and Tortonese 1974). Only during the late

twentieth and early twenty-first centuries, several publications focused on São Tomé or Príncipe and published new species description and records (e.g., Afonso et al. 1999; Wirtz et al. 2007; Rocha et al. 2012; Almeida and Alves 2017, 2019; Iwamoto and Wirtz 2018). Complementarily, several reports and guides estimating species occurrence around the Gulf of Guinea Islands were published by FAO and others (e.g., Allen 1985; Carpenter and De Angelis 2016a–c; Almeida and Biscoito 2019; Sutton et al. 2020).

Marine and Freshwater Ecosystems

A marine ecosystem can be defined as the geographic area (of any size), comprised of communities of organisms and their environment, where biological and energy interactions are greater within than with adjacent ecosystems (Zhao and Costello 2020). This biological system is characterized by two factors: the biotic (e.g., plants, animals, microbes) and abiotic (e.g., sunlight, oxygen, dissolved nutrients, depth, temperature). These components influence the dynamics of natural communities at different spatial scales, from global to local. Marine ecosystems of the GGOI are underwater equivalent of tropical forests. Both natural systems are complex and three-dimensional. Furthermore, they have an impressive variety of habitats from the intertidal zone to the abyssal region (Laborel 1974).

The three oceanic islands (Príncipe, São Tomé, and Annobón) that make up this system have different geological ages and the steep underwater relief results in a relatively small, shallow platform (Cowburn 2018; Maia et al. 2018a). The underwater areas of the island seascapes are mainly dominated by volcanic rocky reefs with limited coral growth (Laborel 1974; Quimbayo et al. 2019). Ecological studies carried out in recent years have described a variety of marine habitats. For example, on Príncipe Island, Cowburn (2018) mapped four subtidal habitats and four coastal habitats along the island. In addition, a recent study investigated the role of four different reef microhabitats in shaping biological interactions of fishes (Canterle et al. 2020). Regarding São Tomé Island, the scenario is very similar to that of Príncipe. Maia et al. (2018a) characterized reef environments on this island based on the composition of the benthic community and found a diversity of habitats between the ranges of 10–30 m deep, including a new habitat in the deep reef north of the island (Morais and Maia 2017).

Major Aquatic Ecosystems in the Gulf of Guinea Oceanic Islands

Estuaries (Fig. 17.1, 1): An estuary is a coastal zone sheltered from extreme weather where oceans meet rivers, and nutrients and salts from the ocean mix with those from the river (Cameron and Pritchard 1963). As a result, estuaries are among the most



Fig. 17.1 Gulf of Guinea oceanic island aquatic ecosystems: (1) Estuary; (2) Mangrove forest; (3–5) Coral reefs; (6) Coral reefs and seagrass; (7) Open and deep-sea ocean; (8) River. Photo credits: (1, 6–8) Hugulay Albuquerque Maia, (2) Luis MP Ceríaco, (3–5) Luiz Rocha

productive places on Earth and support many life forms. Because they are located where rivers join the ocean, estuaries have traditionally supported many human communities and activities like fishing, shipping, and transportation. Some of the

larger rivers flowing from the islands form brackish lagoons, usually bounded at the seaward edge by sand banks that only submerge during the highest tides (Cowburn 2018). These lagoons appear to be an important habitat for some resident fish species (e.g., *Periophthalmus barbarus* (Linnaeus, 1766)) and a nursery area for reef fish species (e.g., *Lutjanus agennes* Bleeker, 1863; *Caranx hippos* (Linnaeus, 1766)), crustaceans, molluscs, and other marine life, probably due to the concentration of nutrients in these areas.

Mangrove Forests (Fig. 17.1, 2): Mangroves are considered blue carbon ecosystems because they are more efficient at absorbing and storing large amounts of carbon compared to terrestrial ecosystems (McLeod et al. 2011). Until 2010 this habitat was mentioned in the literature as present only on the island of São Tomé (Spalding et al. 2010) but more recently, small extensions on Príncipe Island have been identified. Haroun et al. (2018) provided updated information about the flora and fauna, and environmental, conservation and management issues related to mangroves present along the coasts of these islands.

Coral Reefs (Fig. 17.1, 3–6): Despite crystal-clear waters and optimum temperature for coral development, the GGOI do not present a homogeneous matrix of coral reefs, but instead exhibit more complex microhabitats spread in their rocky and biogenic reefs (Maia et al. 2018a). These habitats are composed of some key benthic organisms, including epilithic algal matrix, calcareous algae, coralline algae (that form small ~5 cm diameter globular structures over mobile substrates), macroalgae, hard corals, sponges, zoanthids and gorgonians (Laborel 1974; Maia et al. 2018a). Rocky reefs and solid shores occur where the volcanic basalt bedrock is exposed (Cowburn 2018). The seagrass *Halodule wrightii* Ascherson, 1868 was found along the coast of São Tomé and Príncipe Islands (Alexandre et al. 2017). No data are available for Annobón Island.

Open and Deep-Sea Ocean (Fig. 17.1, 7): Open ocean ecosystems vary widely as the depth of the ocean changes. At the surface of the ocean (the euphotic zone), the ecosystem receives plenty of light and oxygen and thus is fairly warm and supports many photosynthetic organisms. Many of the organisms that we associate with marine ecosystems, such as whales, dolphins, cephalopods, and sharks, live in the open ocean. As the depth of the ocean increases, it gets darker, colder, and less oxygen is available. Organisms living in deep-sea ecosystems within the dysphotic and aphotic zones have unusual adaptations that help them survive in these challenging environments. Some organisms have extremely large mouths that allow them to catch whatever nutrients fall from shallower ocean depths. Others get their energy via the chemosynthesis of chemicals from hydrothermal vents. Although the underwater geomorphology of the GGOI is known, it is thought that they harbor some of the least known tropical reefs in the world. Underwater forests in mesophotic reefs are known from the northwest of São Tomé Island (Moraes and Maia 2017) that are dominated by black corals between 30 and 50 m depth.

Streams and Rivers (Fig. 17.1, 8): The hydrographic structure of the GGOI is radial, from the central mountains to the shore, resulting in numerous streams and small rivers (up to 27 km length) (e.g., in São Tomé: Ió Grande, Caué, Mussacavu, Quija, Rio do Ouro, Contador; in Príncipe: Rio Papagaio; in Annobón: A Bobo; see

Ceríaco et al. 2022a) or crater-lakes (e.g., in São Tomé: Lagoa Amélia; in Annobón: Lago A Pot). The river network is well distributed around the islands, entering the sea by creating small estuarine habitats (12 mangroves in São Tomé and 3 in Príncipe) or small waterfalls or cascades. Several small inland lagoons are also distributed over the islands. These habitats host the fishes *Eleotris vittata* Duméril, 1861, *Sicydium bustamantei* Greeff, 1884, and *Aplocheilichthys spilauchen* (Duméril, 1861). Several aquatic invertebrates also inhabit freshwater habitats, including GGOI endemics such as the snail *Neritina manoeli* (Dohrn, 1866), or the crabs *Potamonautes princeps* Cumberlidge, Clark and Baillie, 2002, *Potamonautes saotome* Cumberlidge and Daniels, 2018, and *Potamonautes margaritarius* (Milne-Edwards, 1869) (Cumberlidge et al. 2002; Allen et al. 2011; Cumberlidge and Daniels 2018).

Species Diversity

To compile an updated taxonomic checklist of the marine (coastal, offshore, and deep-water) and freshwater fish species occurring in the GGOI, we reviewed the bibliography. This included historical and recent inventories and taxonomic studies (Osório 1891, 1892, 1893, 1894, 1895a, b, 1898, 1906, 1917; Fowler 1936a, b; Frade 1955; Frade and Correia da Costa 1956, 1957; Arnoult et al. 1966; Bayer et al. 1966; Blanc et al. 1968; Thys van den Audenaerde and Tortonese 1974; Afonso et al. 1999; Pezold et al. 2006; Fricke 2007; Wirtz et al. 2007; Kovačić and Schliewen 2008; Schliewen and Kovačić 2008; Rocha et al. 2012; Félix et al. 2016; Reiner and Wirtz 2016; Vasco-Rodrigues et al. 2016; Wirtz and Iwamoto 2016; Almeida and Alves 2017, 2019; Fricke and Wirtz 2017; Tuya et al. 2017; Wirtz 2017; Iwamoto and Wirtz 2018) as well as general reports and species revisions on the ichthyofauna of the eastern Atlantic Ocean (Compagno 1984a, b, 2001; Allen 1985; Nakamura 1985; Whitehead 1985; Whitehead et al. 1988; Carpenter and Allen 1989; Heemstra and Randall 1993; Nakamura and Parin 1993; Nielsen et al. 1999; Krakstad et al. 2010; Ebert 2015; Carpenter and De Angelis 2016a–c; Last et al. 2016; Vasco-Rodrigues et al. 2018; Parenti and Randall 2020; Sutton et al. 2020). These later sources allowed us to include deep-sea fishes (mostly Holocephali and Elasmobranchii) and large pelagic species that likely occur in waters around the GGOI.

In addition, we also compiled a list of species that may occur in the waters of the GGOI, based on known occurrences in the Gulf of Guinea. Therefore, we searched for voucher records in databases listing international natural history museum specimens (e.g., FishNet2 2021; Froese and Pauly 2021; GBIF 2021; iDigBio 2021; OBIS 2021) or other published references. Classification, authority and date follow Fricke et al. (2021), and family arrangement follows Van der Laan et al. (2014). We also list several questionable and erroneous records, which were verified by us against specimens in natural history museum collections or published data. Common names are mostly those adopted by the Food and Agricultural Organization of the

United Nations (Carpenter and De Angelis 2016a–c), FishBase (Froese and Pauly 2021) or provided by the original species descriptions.

The compiled full list contains 1045 species (Appendix). Of these, 553 species are confirmed to occur in the GGOI, including 515 Actinopteri distributed in 39 orders (141 families), 37 Elasmobranchii in six orders (17 families), and one Holocephali. The 450 potentially occurring species consist of 385 Actinopteri (30 orders, 109 families) and 65 Elasmobranchii (10 orders, 28 families). Additionally, 32 Actinopteri and five Elasmobranchii previously reported for these islands are here considered as erroneous and five records of Actinopteri are questionable.

Focusing exclusively on the 553 confirmed species, Elasmobranchii (elasmobranchs: sharks, rays, skates, and wedgefishes) accounts for 6.7% (37 species) of the diversity, Holocephali (chimaeras) for 0.2% (one species), and Actinopteri (Actinopterygians: bony or ray-finned fishes) for 93.1% (515 species). A total of 46 orders and 159 families were recorded, with the richest families being Gobiidae (25 species), Carangidae (23), Serranidae (22), Stomiidae (19), and Myctophidae (18—Table 17.1).

Elasmobranchii

Among the Elasmobranchii, 37 species of sharks and batoid fishes (wedgefishes and rays) are confirmed to occur in the GGOI. Sharks, belonging to three orders (Carcharhiniformes, Lamniformes, Orectolobiformes), account for 45.9% (17 species), while rays, belonging to two orders (Myliobatiformes, Torpediniformes), account for 51.4% (19 species) of Elasmobranchii diversity. Wedgefishes, order Rhinopristiformes are represented by a single species (2.7%). The most speciose orders are Myliobatiformes, with 17 species (46%), followed by Carcharhiniformes with 12 species (32.4%). A total of 17 families are listed, with Carcharhinidae, Dasyatidae, and Mobulidae presenting the highest number of species, with 21.6% (8), 18.9% (7), and 10.8% (4), respectively.

The first record of African wedgefish, *Rhynchobatus luebberti* Ehrenbaum, 1915, for São Tomé (Reiner and Wirtz 2016) deserves a special highlight. This species is Critically Endangered (CR—Kyne and Jabado 2019), and has a limited Eastern Tropical Atlantic range distribution, from Mauritania to Congo (Carpenter and De Angelis 2016a). The Scalloped hammerhead shark, *Sphyrna lewini* (Griffith and Smith, 1834), and Sand tiger shark, *Carcharias taurus* Rafinesque, 1810, records from the GGOI (with the exception of Annobón) are also noteworthy as both species are also assessed as CR (Rigby et al. 2021). The iconic Whale shark, *Rhincodon typus* Smith, 1828, assessed as Endangered (EN—Pierce and Norman 2016), was observed in 2015 around São Tomé and the Gulf of Guinea (Vasco-Rodrigues et al. 2016). The species presents a circumtropical distribution with high suitability habitat in the eastern Atlantic (around Gabon, Congo, and Equatorial Guinea) (Sequeira et al. 2014). Recently, a shark specimen captured by locals had several features attributable to Tiger shark, *Galeocerdo cuvier* (Péron and Lesueur, 1822), a Near

Table 17.1 Classification and diversity of the confirmed Gulf of Guinea oceanic islands fish fauna. Taxonomic arrangement follows Van der Laan et al. (2014)

Class	Order	Families	Genera	Species
Elasmobranchii	Orectolobiformes	2	2	2
	Lamniformes	3	3	3
	Carcharhiniformes	4	8	12
	Torpediniformes	1	2	2
	Rhinopristiformes	1	1	1
	Myliobatiformes	6	11	17
Holocephali	Chimaeriformes	1	1	1
Actinopteri	Elopiformes	2	2	3
	Albuliformes	1	1	1
	Notacanthiformes	1	2	3
	Anguilliformes	11	34	43
	Saccopharyngiformes	1	1	1
	Clupeiformes	2	4	6
	Alepocephaliformes	2	3	3
	Siluriformes	1	1	1
	Argentiniiformes	4	8	8
	Stomiiformes	4	25	41
	Aulopiformes	8	12	15
	Myctophiformes	1	13	18
	Lampriformes	1	1	1
	Zeiformes	1	1	1
	Stylephoriformes	1	1	1
	Gadiformes	5	8	11
	Polymixiiformes	1	1	1
	Beryciformes	3	5	5
	Holocentriformes	1	3	3
	Ophidiiformes	3	9	9
	Scombriformes	8	23	26
	Syngnathiformes	6	10	11
	Kurtiformes	1	3	4
	Gobiiformes	3	20	31
	Carangiformes	13	36	62
	Cichliformes	1	1	1
	Atheriniformes	1	1	1
	Cyprinodontiformes	1	1	1
	Beloniformes	3	12	18
	Mugiliformes	1	3	5
	Gobiesociformes	1	2	2
	Blenniiformes	2	6	8
	Acanthuriformes	7	11	12
	Lophiiformes	4	7	10
	Tetraodontiformes	5	12	24

(continued)

Table 17.1 (continued)

Class	Order	Families	Genera	Species
	Centrarchiformes	2	2	5
	Acropomatiformes	3	3	4
	Perciformes *sedis mutabilis*	12	39	69
	Perciformes	13	31	50

Threatened species (NT—Ferreira and Simpfendorfer 2019). Despite the low resolution of the available image (see Fig. 17.2, 1), this is the first observation confirming the occurrence of this species around São Tomé, but the species had already been reported from Príncipe (Carpenter and de Angelis 2016a). In a recent study, Bernard et al. (2021) confirmed that Tiger shark populations from the Atlantic Ocean are genetically distinct from the Indo-Pacific Ocean populations showing that these long-distance dispersing populations are not interbreeding.

Holocephali

The sole Holocephali (Chimaeriformes, Rhinochimaeridae), the Sicklefin Chimaera, *Neoharriotta pinnata* (Schnakenbeck, 1931), accounts for 0.2% of the confirmed species in the region and is considered a Near Threatened species. The Sicklefin Chimaera is known in the eastern Atlantic Ocean off the west African coast from Western Sahara to Namibia, including the Gulf of Guinea islands. The species is found at the edge of the shelf in depths ranging from 200 to 600 m (Carpenter and De Angelis 2016a).

Actinopteri

The Actinopteri is the most diverse fish class, with 515 confirmed species for the GGOI. A total of 141 families were recorded, with Gobiidae being the richest with 4.8% of the species (25), followed by Carangidae with 4.5% (23), Serranidae with 4.3% (22), Stomiidae with 3.7% (19), Myctophidae with 3.5% (18), Sparidae with 2.9% (15), and Haemulidae, Muraenidae, and Ophichthidae with 2.1% (11) each. All 132 remaining families are represented by fewer than ten species and account for the remaining 70% of the species. To be as exhaustive as possible, the current checklist integrates potential deep-sea and large migrant pelagic fish species based on several guides and reports. Due to the deep water around all three GGOI, several species (e.g., *Opisthoproctus soleatus* Vaillant, 1888; *Scopelosaurus argenteus* (Maul, 1954)) were collected by offshore scientific surveys or accidentally by industrial fishing vessels. In addition, several deep-sea fish species are already reported in the



Fig. 17.2 Gulf of Guinea oceanic island fishes: (1) Tiger Shark *Galeocерdo cuvier* (Péron and Lesueur, 1822); (2) Atlantic Mudskipper *Periophthalmus barbarus* (Linnaeus, 1766); (3) São Tomé Clingfish *Apletodon wirtzi* Fricke, 2007; (4) Island Cowfish (juvenile) *Acanthostracion notacanthus* (Bleeker, 1863); (5) Small Goby *Bathygobius burtoni* (O'Shaughnessy, 1875); (6) Small Goby *Gobius* aff. *rubropunctatus* Delais, 1951; (7) Margintail *Paraconger caudilimbatus* (Poey, 1867); (8) African Speckled Scorpionfish *Scorpaenodes africanus* Pfaff, 1933. Photo credits: (1) Ivete Carneiro, (2) Luis MP Ceríaco, (3–8) João Luiz Gasparini

literature for the GGOI (e.g., *Cyclothone* spp., *Ichthyococcus ovatus* (Cocco, 1838), *Vinciguerria nimbaria* (Jordan and Williams, 1895)).

The Actinopteri fishes present a high variety of shapes, distributions, and behaviors. The extraordinary and unusual looking Atlantic mudskipper, *P. barbarus*, occurring along the West African coast, from Morocco to Angola and several offshore islands, is also present in the GGOI (Fig. 17.2, 2). Of special interest are: the São Tomé clingfish, *Apletodon wirtzi* Fricke, 2007, endemic to the GGOI and currently only known from its type locality, Bombom Islet, north of Príncipe Island

(Fricke 2007; Fig. 17.2, 3); the Island cowfish, *Acanthostracion notacanthus* (Bleeker, 1863), which has a restricted distribution around several islands (São Tomé, Príncipe, Saint Helena, Ascension, and Azores) and two African coastal locations (Ghana and Angola) (Fig. 17.2, 4); one small goby, *Bathygobius burtoni* (O'Shaughnessy, 1875), an Endangered species and Gulf of Guinea endemic (Ghana to Cameroon, Bioko Island), which is confirmed from São Tomé and Príncipe islands (Carpenter et al. 2015—Fig. 17.2, 5); another small goby, *Gobius* aff. *rubropunctatus* Delais, 1951, from São Tomé and Príncipe islands that is a putative undescribed species (Wirtz et al. 2007—Fig. 17.2, 6); the Margintail, *Paraconger caudilimbatus* (Poey, 1867), an amphi-Atlantic species, only reported from São Tomé Island in the eastern Atlantic (Wirtz et al. 2007—Fig. 17.2, 7); and the African speckled scorpionfish, *Scorpaenodes africanus* Pfaff, 1933, with a fragmented distribution including Senegal, São Tomé, and Annobón (Eschmeyer 1969—Fig. 17.2, 8).

The American whitespotted filefish, *Cantherhines macrocerus* (Hollard, 1853), a typical western Atlantic species, also occurs in the eastern Atlantic Ocean. The species is suspected to have been transported to the Gulf of Guinea by oil platforms coming from Brazil or the Caribbean (Herrero-Barrencua et al. 2019). Nonetheless, natural dispersal observed in a western Atlantic congener (*Cantherhines pullus* (Ranzani, 1842)) into the Gulf of Guinea (Afonso et al. 1999) suggests a similar scenario for *C. macrocerus* is possible (Herrero-Barrencua et al. 2019). Two introduced freshwater species have been reported for the islands: the Mozambique tilapia, *Oreochromis mossambicus* (Peters, 1852), in São Tomé (Félix et al. 2016), and the Banded lampeye, *A. spilauchen*, in Príncipe (Cravo 2021). Both introduction dates are not determined, but the Mozambique tilapia is already widespread throughout the island (Félix et al. 2016).

Compared to the most recent studies regarding the fishes of the GGOI (Wirtz 2017; Iwamoto and Wirtz 2018), the present work includes several unique and new records: Cichlidae—*O. mossambicus*, introduced species; Exocoetidae—*Hirundichthys affinis* (Günther, 1866), new record for São Tomé; Gempylidae—*Nealotus tripes* Johnson, 1865; Monacanthidae—*C. macrocerus*; Polymixiidae—*Polymixia nobilis* Lowe, 1836; Serranidae—*Anthias cyprinoides* (Katayama & Amaoka, 1986), *Serranus accraensis* (Norman, 1931), *Serranus drewesi* Iwamoto, 2018, *Serranus heterurus* (Cadenat, 1937); Sparidae—*Spicara melanurus* (Valenciennes, 1830); and Stomiidae—*Bathophilus nigerrimus* Giglioli, 1882 (Krakstad et al. 2010; Félix et al. 2016; Almeida and Alves 2017, 2019; Iwamoto and Wirtz 2018; Vasco-Rodrigues et al. 2018; Herrero-Barrencua et al. 2019; Parenti and Randall 2020; Cravo 2021). *Gobioides* cf. *africanus* (Giltay, 1935), Gobiidae, reported by Cravo (2021) needs confirmation.

Biogeography and Evolution of Fishes in Gulf of Guinea Oceanic Islands

Oceanic island ecosystems in the Tropical Eastern Atlantic (TEA) include the Cape Verde archipelago and the islands of the Gulf of Guinea: Príncipe, São Tomé, and Annobón (Floeter et al. 2008). Despite its relatively old age, São Tomé has low marine endemism (e.g., 3% for fishes; Hachich et al. 2015) due to high oceanographic connectivity to the African coast (Wirtz 2003; Floeter et al. 2008). On the other hand, the regional endemism level of the TEA is high (30%; Floeter et al. 2008), a phenomenon presumably due to the geographic isolation of the TEA from the other Atlantic reef areas (e.g., ~3500 km from the Brazil and ~8696 km from the Caribbean; Floeter et al. 2008), as well as a history of recurrent isolation and connectivity with the Indo-Pacific at an evolutionary timescale (Cowman et al. 2017). Indeed, several species show a trans-Atlantic distribution (amphi-Atlantic) with most of the species belonging to families of pelagic-spawners with long pelagic larval durations (e.g., Muraenidae, Serranidae), but also smaller-sized genera (e.g., *Abudefduf taurus*; Müller and Troschel, 1848) and *Centropyge aurantonotus* Burgess, 1974—Floeter et al. 2008). Entire families are composed of amphi-Atlantic species (e.g., Diodontidae, Holocentridae, Priacanthidae, Synodontidae). In addition to the Benguela Current that limits the movements of tropical species from the Indian Ocean, cold waters from the northeastern Atlantic also limit the geographic range of tropical species (Floeter et al. 2008; Almada et al. 2013). Thus, the TEA and the southwestern Indian Ocean only share about 15 species (e.g., *Lithognathus mormyrus* (Linnaeus, 1758) and *Gnatholepis thompsoni* Jordan, 1904) or genera (e.g., *Prionurus* and *Plectorhynchus*—Rocha et al. 2005; Wirtz et al. 2007; Floeter et al. 2008).

Since the waters of the Gulf of Guinea have received limited scientific attention, with Annobón the least studied area of the GGOI (Osório 1895b; Blanc et al. 1968), the marine organisms desperately require further study (Floeter et al. 2008). Recent works dealing with the biogeography and evolution of some reef fish families include representatives from this region, as in the case of the genus *Clepticus* (Labridae). This recent study revealed that *C. africanus*, an endemic species from the Gulf of Guinea, is genetically closer to *Clepticus brasiliensis* Heiser, Moura and Robertson, 2000, from the Brazilian coast, than to the Caribbean *Clepticus parrae* (Bloch and Schneider, 1801) (Beldade et al. 2009). The biogeographic affinities of other endemics in the archipelago are largely unknown.

With 268 coastal fish species in the GGOI, the diversity is high when compared to other Atlantic islands (e.g., 140 coastal fish species from Saint Helena, 170 species from Azores, or 226 species from Madeira—Table 17.2). This is mostly due to the location of the GGOI, closer to the African shelf and surrounded by a vortex created by all the currents crossing the area. However, the total number is low when compared to the Cape Verde (325 coastal fish species) and Canary (330) islands, probably a sampling artifact due to the dearth of surveys around the GGOI.

Table 17.2 Coastal fish species richness, number of endemics and % endemism of Atlantic islands

Islands	Coastal fish species			References
	Total	N ^o endemics	% Endemism	
Ascension	173	11	10.2	Wirtz et al. (2014)
Cape Verde	325	19	8.4	Wirtz et al. (2013); Freitas et al. (2018)
Saint Helena	140	10	12.3	Brown et al. (2019)
Saint Peter and Saint Paul's archipelago	117	5	7.7	Vaske et al. (2008)
Madeira	226	0	0	Wirtz et al. (2008)
Canary	330	NA	NA	Brito et al. (2002)
Azores	170	NA	NA	Santos et al. (1997); Afonso et al. (2013)
São Tomé and Príncipe	268	7	3.0	Wirtz et al. (2007); Wirtz (2017)

Marine fish species are moving, and tropicalization is one of the observed processes in some eastern Atlantic islands where several TEA species are expanding their ranges (e.g., *Muraena melanotis* (Kaup, 1859), *Holacanthus africanus* Cadenat, 1951, and *Cirrhitus atlanticus* Osório, 1893—Brito et al. 2005; Falcón et al. 2018). We also highlight the occurrence of *Epinephelus fasciatus* (Forsskål, 1775), an Indo-Pacific species, potentially introduced by ballast water or in association with oil platforms (Brito et al. 2005; Falcón et al. 2018). Rocha et al. (2005) and confirmed recent connections in several taxa during warm interglacial periods (Peeters et al. 2004), such as the genus *Gnatholepis* that invaded the Atlantic from the Indian Ocean. Currently, the Agulhas Current in extreme conditions can force any tropical invaders from the Indian Ocean to move to the Atlantic Ocean through the 'Agulhas leakage' that forms water rings at the Agulhas retroflexion (Lutjeharms and Van Ballegooyen 1988; Gordon 2003; Lutjeharms 2006; Beal et al. 2011). Invading fish species are likely moving with these rings through the Western Atlantic and South-central Atlantic before ending up in the TEA, rather than moving north with the Benguela Current, which is probably more lethal to tropical fish species (Rocha et al. 2005).

Some fish species have highly skewed distributions, with 84 genera occurring in the eastern Atlantic, but not in the western Atlantic (e.g., *Thorogobius*, *Wheelerigobius*—Floeter et al. 2008; Cowman et al. 2017). Other genera are amphi-Atlantic, but much more diverse in the eastern Atlantic (e.g., *Diplodus*, *Scartella*—Cowman et al. 2017) or with sister-species in the western Atlantic (e.g., *Hypleurochilus aequipinnis* (Günther, 1861)—Wirtz et al. 2007). Finally, several eastern Atlantic genera occur in the Indo-Pacific, but are not present in the western Atlantic (e.g., *Coris*, *Lethrinus*—Cowman et al. 2017). Cowman et al. (2017) observed that the Gulf of Guinea fish species assemblages are distinctive within the east Atlantic cluster (Cape Verde, Gulf of Guinea West, and Sahelian Upwelling).

Conservation

The GGOI, together with Cape Verde, have been considered important global hotspots for marine conservation (Roberts et al. 2002), with high levels of endemism (~30%, Floeter et al. 2008). Several factors likely contribute to this designation including:

1. The geographic location and connectivity with tropical western Atlantic via the Equatorial Counter Current (Wirtz et al. 2007; Floeter et al. 2008; Herrero-Barrencua et al. 2019).
2. The moderate isolation from the Continental slope (Floeter et al. 2008; Hachich et al. 2015; Cowman et al. 2017; Quimbayo et al. 2019).
3. The Benguela Current working as a shield and limiting Indian Ocean tropical fish species from moving northward (Floeter et al. 2008).
4. The northeastern Atlantic cold waters limiting the northern range of tropical fish species (Floeter et al. 2008; Almada et al. 2013).
5. The lowest fish biomass and highest density in reef assemblage (Quimbayo et al. 2019).

With 27 fish species reported, plus two uncertain identifications (*Gobioides* cf. *africanus* and *Citharus* cf. *linguatus* (Linnaeus, 1758)—Cravo 2021), mangroves and seagrasses are also essential habitats to the fish diversity by providing fisheries production (Félix et al. 2016; Alexandre et al. 2017; Cravo 2021).

Globally, mangroves are highly impacted by deforestation for onshore aquaculture (for fish and shellfish production), agriculture, and urban development (FAO 2007; Friess et al. 2019; Goldberg et al. 2020). With at least 35% of world area lost, mangroves, or inter-tidal forest communities, are one of the major tropical environments threatened by agriculture, overharvesting, changing hydrology, pollution, and coastal erosion (Valiela et al. 2001). Otero-Ferrer et al. (2020) emphasized that at the island scale, the protection of fish assemblages needs to consider the interconnected habitat network by including the seascapes boundaries where fundamental ecological functions might also occur. The GGOI exhibit lower biomass despite higher primary productivity, an unexpected observation likely caused by intense fishing activities (Maia et al. 2018a; Quimbayo et al. 2019).

In 2000, Annobón Island and the surrounding waters were designated as a Marine Nature Reserve at National level, limiting fishing to traditional subsistence practices and scientific research (UNEP-WCMC and IUCN 2021). In 2006, the São Tomé Obô and Príncipe Obô Natural Parks were established, covering 262 km² and 45 km² in the respectively islands (UNEP-WCMC and IUCN 2021). The natural park in São Tomé covers three out of 12 mangroves, including Malanza, by far the largest of such ecosystems in the GGOI (Afonso 2019). The natural park in Príncipe included a marine portion on the southwestern coast. Since 2012, the Ramsar site of Tinhosas islets (covering Tinhosa Grande, Tinhosa Pequena and Tinhosinha, south of Príncipe) and the island of Príncipe are a UNESCO World Biosphere Reserve (UNEP-WCMC and IUCN 2021).

Regarding fishing activities, Equatorial Guinea and São Tomé and Príncipe are part of the Fishery Committee for the Eastern Central Atlantic (CECAF) with the purpose of promoting the sustainable utilization of all living marine resources within the delimited area by proper management and development of the fisheries and fishing operations. Fisheries catches include small-scale artisanal, subsistence (fishing operations in remote communities with no access to market to supplement family needs, and portion taken home for consumption from artisanal catch), and foreign industrial (dominated by fleets from the European Union, Japan, Taiwan, and China) catches (Belhabib 2015; Maia et al. 2018b). Nevertheless, only limited data from fisheries surveys are reported (Belhabib 2015). Increasing numbers of fishers, destructive blast fishing practices, and pollution from industrial fishing vessels (oil-spills) are the main causes of negative fish catch changes over time (Maia et al. 2018b). The low biomass of medium and large fish species reflects the long-term fishing pressure on São Tomé Island, as does deeper reef habitats having higher species richness, abundance, and biomass (Maia et al. 2018a).

Within Elasmobranchii, 27 (73%) out of 37 species are considered threatened (Vulnerable—VU, Endangered—EN or Critically Endangered—CR) and one species (2.7%) is Data Deficient (DD), following IUCN categories (Appendix). Few countries impose catch limits and overfishing is a main threat to oceanic sharks, as are the loss and degradation of habitat and climate change (Pacoureau et al. 2021). Regarding Actinopteri, 19 (3.7%) out of 515 species are considered threatened (VU or EN) and 47 species (9.1%) are DD. Fifteen species are reported as endemic to the GGOI, of which seven are Gobiidae (small species with limited dispersive abilities) and four are freshwater/brackish species (Appendix). Annobón Island is the least studied of the GGOI with very few scientific surveys (Osório 1895b; Blanc et al. 1968). Nevertheless, and as expected, about 75% of its ichthyofauna is shared with the African coast. From the remaining species, some are endemic to Annobón Island (*S. annobonae*), only present around the GGOI (*Eleotris annobonensis* Blanc, Cadenat and Stauch, 1968), common to other islands system (*Rypticus saponaceus* (Bloch and Schneider, 1801)), or amphi-Atlantic (*Uroconger syringinus* Ginsburg, 1954). Therefore, the establishment of a network of Marine Protected Area in the GGOI is fundamental to reduce further negative impacts on the reef by commercial fisheries and to secure their sustainability.

Concluding Remarks

The present checklist includes coastal, deep-sea, pelagic marine and freshwater fish species. Nevertheless, further surveys are still needed. These future surveys and research projects should combine traditional and new approaches (e.g., environmental DNA) to understand and highlight the occurrence of discrete (pelagic) species, but also to better define the distribution of endemic species around all three GGOI. Annobón Island should be a region of primary focus because it is the least studied. Moreover, the creation of one or more Marine Protected Areas in co-management

with fisheries will be fundamental to protect the unique GGOI fish biodiversity hotspot, not only for the endemic species, but also to maintain sustainable fisheries.

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Appendix

Checklist of marine and freshwater fish species reported from the Gulf of Guinea Oceanic Islands: Príncipe (P), São Tomé (S), Annobón (A). A complete checklist including confirmed, potential, erroneous and questionable marine and freshwater fish species reported from the Gulf of Guinea Oceanic Islands, together with common names, voucher numbers of museum specimens, and additional notes is available at [https://doi.org/10.1007/978-3-031-06153-0_17]

X, present; I, introduced; #, museum voucher specimen(s); E, endemic. IUCN Red List category: not evaluated (NE), data deficient (DD), least concern (LC), near threatened (NT), vulnerable (VU), endangered (EN), and critically endangered (CR). Taxa arranged according to Van der Laan et al. (2014). References: (1) Collette and Nauen (1983); (2) Allen (1985); (3) Nakamura (1985); (4) Whitehead (1985); (5) Whitehead et al. (1988); (6) Carpenter and Allen (1989); (7) Cohen et al. (1990); (8) Heemstra and Randall (1993); (9) Nakamura and Parin (1993); (10) Compagno (1984a); (11) Compagno (1984b); (12) Afonso et al. (1999); (13) Nielsen et al. (1999); (14) Compagno (2001); (15) Kotlyar (2004); (16) Pezold et al. (2006); (17) Fricke (2007); (18) Wirtz et al. (2007); (19) Kovačić and Schliewen (2008); (20) Krakstad et al. (2010); (21) Kotlyar 2011; (22) Schliewen (2011); (23) Rocha et al. (2012); (24) Ebert (2015); (25) Carpenter and De Angelis (2016a); (26) Carpenter and De Angelis (2016b); (27) Carpenter and De Angelis (2016c); (28) Félix et al. (2016); (29) Last et al. (2016); (30) Reiner and Wirtz (2016); (31) Vasco-Rodrigues et al. (2016); (32) Wirtz and Iwamoto (2016); (33) Almeida and Alves (2017); (34) Fricke and Wirtz (2017); (35) Tuya et al. (2017); (36) Wirtz (2017); (37) Yokota and Carvalho (2017); (38) Haroun et al. (2018); (39) Iwamoto and Wirtz (2018); (40) Vasco-Rodrigues et al. (2018); (41) Almeida and Biscoito (2019); (42) Almeida and Alves (2019); (43) Herrero-Barrencua et al. (2019); (44) Reiner (2019); (45) Parenti and Randall (2020); (46) Sutton et al. (2020); (47) Cravo (2021)

Higher taxonomy	Species	P	S	A	IUCN	Reference
Class Elasmobranchii						
Order Orectolobiformes						
Family Rhincodontidae	<i>Rhincodon typus</i> Smith, 1828	?	X	?	EN	25, 31, 40
Family Ginglymostomatidae	<i>Ginglymostoma cirratum</i> (Bonnaterre, 1788)	?	X	?	VU	10, 12, 18
Order Lamniformes						
Family Carchariidae	<i>Carcharias taurus</i> Rafinesque, 1810	X	X	?	CR	14
Family Pseudocarchariidae	<i>Pseudocarcharias kamoharai</i> (Matsubara, 1936)	X	X	?	LC	14, 24
Family Lamnidae	<i>Isurus oxyrinchus</i> Rafinesque, 1810	X	X	X	EN	14, 25
Order Carcharhiniformes						
Family Scyliorhinidae	<i>Scyliorhinus cervigoni</i> Maurin and Bonnet, 1970	X	?	?	DD	25
Family Hemigaleidae	<i>Paragaleus pectoralis</i> (Garman, 1906)	X	X	X	EN	11, 25
Family Carcharhinidae	<i>Carcharhinus brevipinna</i> (Müller and Henle, 1839)	X	X	X	VU	25
	<i>Carcharhinus falciformis</i> (Bibron in Müller and Henle, 1839)	#	#	X	VU	11, 25
	<i>Carcharhinus galapagensis</i> (Snodgrass and Heller, 1905)	?	X	?	LC	11, 12, 18, 25
	<i>Carcharhinus limbatus</i> (Valenciennes in Müller and Henle, 1839)	?	#	?	VU	11, 25
	<i>Galeocerdo cuvier</i> (Péron and Lesueur, 1822)	X	X	?	NT	25
	<i>Negaprion brevirostris</i> (Poey, 1868)	X	?	?	VU	11, 25
	<i>Prionace glauca</i> (Linnaeus, 1758)	X	X	X	NT	11, 12, 18, 25
	<i>Rhizoprionodon acutus</i> (Rüppell, 1837)	X	X	X	VU	11, 12, 18, 25
Family Sphyrnidae	<i>Sphyrna lewini</i> (Griffith and Smith, 1834)	?	X	?	CR	12
	<i>Sphyrna zygaena</i> (Linnaeus, 1758)	X	?	?	VU	11, 25
Order Torpediniformes						
Family Torpedinidae	<i>Tetronarce nobiliana</i> (Bonaparte, 1835)	?	X	?	LC	12, 25, 29
	<i>Torpedo torpedo</i> (Linnaeus, 1758)	?	X	?	VU	12, 25, 29
Order Rhinopristiformes						
Family Rhinidae	<i>Rhynchobatus luebberti</i> Ehrenbaum, 1915	?	X	?	CR	30
Order Myliobatiformes						
Family Zanobatidae	<i>Zanobatus schoenleinii</i> (Müller and Henle, 1841)	X	X	X	VU	25, 29
Family Dasyatidae	<i>Bathytoshia lata</i> (Garman, 1880)	X	X	?	VU	29
	<i>Dasyatis marmorata</i> (Steindachner, 1892)	X	X	X	NT	25

(continued)

Higher taxonomy	Species	P	S	A	IUCN	Reference
	<i>Dasyatis pastinaca</i> (Linnaeus, 1758)	X	X	?	VU	40
	<i>Fontitrygon margarita</i> (Günther, 1870)	X	X	X	VU	25, 29
	<i>Fontitrygon margaritella</i> (Compagno and Roberts, 1984)	X	X	X	NT	25, 29
	<i>Pteroplatytrygon violacea</i> (Bonaparte, 1832)	X	X	X	LC	25, 29
	<i>Taeniurops grabatus</i> (Geoffroy Saint-Hilaire, 1817)	X	X	X	NT	18, 25, 29
Family Gymnuridae	<i>Gymnura altavela</i> (Linnaeus, 1758)	X	X	X	EN	25, 29
	<i>Gymnura sereti</i> Yokota and Carvalho, 2017	?	#	?	EN	37
Family Aetobatidae	<i>Aetobatus narinari</i> (Euphrasen, 1790)	X	X	X	EN	25, 29
Family Myliobatidae	<i>Aetomylaeus bovinus</i> (Geoffroy Saint-Hilaire, 1817)	X	X	X	CR	25
	<i>Myliobatis aquila</i> (Linnaeus, 1758)	X	X	X	CR	25, 29
Family Mobulidae	<i>Mobula birostris</i> (Walbaum, 1792)	X	X	X	EN	25, 29
	<i>Mobula hypostoma</i> (Bancroft, 1831)	X	X	X	EN	25, 29
	<i>Mobula tarapacana</i> (Philippi, 1892)	?	X	?	EN	31, 40
	<i>Mobula thurstoni</i> (Lloyd, 1908)	?	X	?	EN	31, 40
Class Chondrichthyes subclass Holocephali						
Order Chimaeriformes						
Family Rhinichimaeridae	<i>Neoharriotta pinnata</i> (Schnakenbeck, 1931)	X	X	X	NT	25
Class Actinopterygii subclass Actinopteri						
Order Elopiformes						
Family Elopidae	<i>Elops lacerta</i> Valenciennes, 1847	X	X	X	LC	26
	<i>Elops senegalensis</i> Regan, 1909	?	#	?	DD	12, 26, 28
Family Megalopidae	<i>Megalops atlanticus</i> Valenciennes, 1847	X	#	X	VU	26, 28, 47
Order Albuliformes						
Family Albulidae	<i>Albula goreensis</i> Valenciennes, 1847	?	#	?	NE	18, 42
Order Notacanthiformes						
Family Halosauridae	<i>Aldrovandia oleosa</i> Sulak, 1977	X	X	X	LC	26
	<i>Halosaurus attenuatus</i> Garman, 1899	#	X	X	LC	26
	<i>Halosaurus ovenii</i> Johnson, 1864	X	X	X	LC	26
Order Anguilliformes						
Family Heterenchelyidae	<i>Panturichthys longus</i> (Ehrenbaum, 1915)	E	E	E	LC	26
	<i>Pythonichthys macrurus</i> (Regan, 1912)	X	X	X	NE	26

(continued)

Higher taxonomy	Species	P	S	A	IUCN	Reference
	<i>Pythonichthys microphthalmus</i> (Regan, 1912)	X	X	X	NE	26
Family Chlopsidae	<i>Chlopsis olokun</i> (Robins and Robins, 1966)	X	X	X	LC	26
Family Myrocongridae	<i>Myroconger compressus</i> Günther, 1870	X	#	?	DD	26, 42
Family Muraenidae	<i>Anarchias longicauda</i> (Peters, 1877)	X	X	X	LC	26
	<i>Anarchias similis</i> (Lea, 1913)	?	?	#	LC	26
	<i>Channomuraena vittata</i> (Richardson, 1845)	?	X	X	LC	12, 26, 40
	<i>Echidna peli</i> (Kaup, 1856)	#	X	#	LC	18, 26, 40
	<i>Enchelycore nigricans</i> (Bonnaterre, 1788)	?	X	#	LC	12, 26, 40
	<i>Gymnothorax afer</i> Bloch, 1795	X	X	X	LC	12, 26
	<i>Gymnothorax mareei</i> Poll, 1953	#	X	X	LC	12, 26
	<i>Gymnothorax vicinus</i> (Castelnau, 1855)	X	X	#	LC	26, 40
	<i>Muraena melanotis</i> (Kaup, 1859)	#	X	#	LC	12, 20, 25, 35, 40
	<i>Muraena robusta</i> Osório, 1911	X	X	X	LC	12, 26, 40
	<i>Uropterygius wheeleri</i> Blache, 1967	X	X	X	LC	26, 31
Family Synaphobranchidae	<i>Histiobranchus bathybius</i> (Günther, 1877)	#	?	?	DD	26
Family Ophichthidae	<i>Brachysomophis atlanticus</i> Blache and Saldanha, 1972	#	?	?	LC	26
	<i>Callechelys guineensis</i> (Osório, 1893)	?	X	?	LC	26, 30
	<i>Dalophis boulengeri</i> (Blache, Cadenat and Stauch, 1970)	#	?	?	LC	18, 26
	<i>Dalophis cephalopeltis</i> (Bleeker, 1863)	?	#	?	LC	26, 28
	<i>Echelus myrus</i> (Linnaeus, 1758)	?	X	?	LC	20
	<i>Myrichthys pardalis</i> (Valenciennes, 1839)	X	#	X	LC	12, 26, 35, 40
	<i>Myrophis plumbeus</i> (Cope, 1871)	#	?	?	LC	26
	<i>Ophichthus ophis</i> (Linnaeus, 1758)	?	X	?	LC	20, 26
	<i>Ophichthus rufus</i> (Rafinesque, 1810)	#	?	?	LC	18
	<i>Ophisurus serpens</i> (Linnaeus, 1758)	X	X	X	LC	26
	<i>Pisodonophis semicinctus</i> (Richardson, 1848)	?	X	?	LC	
Family Congridae	<i>Ariosoma balearicum</i> (Delaroche, 1809)	X	#	#	LC	26
	<i>Bathycongrus bertini</i> (Poll, 1953)	X	X	X	LC	26
	<i>Bathyroconger vicinus</i> (Vaillant, 1888)	X	X	X	LC	26
	<i>Heteroconger longissimus</i> Günther, 1870	X	X	?	LC	18, 35
	<i>Paraconger caudilimbatus</i> (Poey, 1867)	?	X	?	LC	18
	<i>Paraconger notialis</i> Kanazawa, 1961	X	X	X	LC	26

(continued)

Higher taxonomy	Species	P	S	A	IUCN	Reference
	<i>Uroconger syringinus</i> Ginsburg, 1954	X	#	#	LC	26
	<i>Xenomystax congroides</i> Smith and Kanazawa, 1989	X	X	X	LC	26
Family Muraenesocidae	<i>Cynoponticus ferox</i> Costa, 1846	X	X	X	LC	26
Family Nemichthyidae	<i>Avocettina infans</i> (Günther, 1878)	X	#	X	LC	46
	<i>Nemichthys curvirostris</i> (Strömman, 1896)	?	X	?	LC	20, 26
	<i>Nemichthys scolopaceus</i> Richardson, 1848	?	#	?	LC	26, 46
Family Serrivomeridae	<i>Serrivomer beanii</i> Gill and Ryder, 1883	?	#	?	LC	26, 46
Family Nettastomatidae	<i>Hoplunnis punctata</i> Regan, 1915	X	#	X	LC	26
	<i>Nettastoma melanura</i> Rafinesque, 1810	X	X	X	LC	26
Order Saccopharyngiformes						
Family Eurypharyngidae	<i>Eurypharynx pelecانoides</i> Vaillant, 1882	?	#	?	LC	26, 46
Order Clupeiformes						
Family Clupeidae	<i>Ethmalosa fimbriata</i> (Bowdich, 1825)	?	#	?	LC	18, 47
	<i>Pellonula vorax</i> Günther, 1868	?	?	#	LC	26
	<i>Sardinella aurita</i> Valenciennes, 1847	?	#	?	LC	12, 20, 42
	<i>Sardinella maderensis</i> (Lowe, 1838)	?	#	?	VU	20, 42
	<i>Sardinella rouxi</i> (Poll, 1953)	#	#	?	DD	4, 18, 42
Family Engraulidae	<i>Engraulis encrasicolus</i> (Linnaeus, 1758)	X	X	X	LC	5, 26
Order Alepocephaliformes						
Family Alepocephalidae	<i>Photostylus pycnopterus</i> Beebe, 1933	?	#	?	LC	26, 46
Family Platyroctidae	<i>Holtbyrnia macrops</i> Maul, 1957	X	X	X	LC	26
	<i>Searsia koefoedi</i> Parr, 1937	#	?	?	LC	46
Order Siluriformes						
Family Ariidae	<i>Carlarius parkii</i> (Günther, 1864)	X	#	X	LC	26
Order Argentiniformes						
Family Argentinidae	<i>Glossanodon polli</i> Cohen, 1958	?	#	?	LC	26
Family Microstomatidae	<i>Microstoma microstoma</i> (Risso, 1810)	?	#	?	LC	26, 46
	<i>Xenophthalmichthys danae</i> Regan, 1925	?	#	?	LC	26, 46
Family Bathylagidae	<i>Bathylagichthys greyae</i> (Cohen, 1958)	?	#	?	LC	46
	<i>Bathylagoides argyrogaster</i> (Norman, 1930)	?	#	#	LC	26, 46
Family Opisthoproctidae	<i>Monacoa grimaldii</i> (Zugmayer, 1911)	?	#	?	LC	26, 46

(continued)

Higher taxonomy	Species	P	S	A	IUCN	Reference
	<i>Opisthoproctus soleatus</i> Vaillant, 1888	#	#	?	LC	26, 46
	<i>Winteria telescopa</i> Brauer, 1901	?	#	?	LC	26, 46
Order Stomiiformes						
Family Gonostomatidae	<i>Bonapartia pedaliota</i> Goode and Bean, 1896	#	#	?	LC	26, 46
	<i>Cyclothone acclinidens</i> Garman, 1899	?	#	#	LC	26
	<i>Cyclothone braueri</i> Jespersen and Tåning, 1926	?	#	#	LC	26
	<i>Cyclothone livida</i> Brauer, 1902	?	#	#	LC	26, 46
	<i>Cyclothone microdon</i> (Günther, 1878)	?	#	#	LC	26
	<i>Diplophos taenia</i> Günther, 1873	?	#	?	LC	26
	<i>Gonostoma atlanticum</i> Norman, 1930	?	#	?	LC	26, 46
	<i>Manducus maderensis</i> (Johnson, 1890)	#	?	?	DD	26, 46
	<i>Sigmops elongatus</i> (Günther, 1878)	#	#	?	LC	26, 46
Family Sternoptychidae	<i>Argyropelecus affinis</i> Garman, 1899	#	#	#	LC	26, 46
	<i>Argyropelecus gigas</i> Norman, 1930	?	#	#	LC	26, 46
	<i>Argyropelecus olfersii</i> (Cuvier, 1829)	?	#	?	LC	46
	<i>Argyropelecus sladeni</i> Regan, 1908	?	#	?	LC	26, 46
	<i>Maurollicus muelleri</i> (Gmelin, 1789)	#	#	?	LC	46
	<i>Polyipnus polli</i> Schultz, 1961	?	#	?	LC	26, 46
	<i>Sternoptyx diaphana</i> Hermann, 1781	#	#	#	LC	26, 46
	<i>Sternoptyx pseudobscura</i> Baird, 1971	?	#	?	LC	26, 46
	<i>Valenciennellus tripunctulatus</i> (Esmark, 1871)	?	#	#	LC	26, 46
Family Phosichthyidae	<i>Ichthyococcus ovatus</i> (Cocco, 1838)	#	?	?	LC	26, 46
	<i>Pollichthys mauli</i> (Poll, 1953)	?	#	#	LC	26, 46
	<i>Vinciguerria attenuata</i> (Cocco, 1838)	?	?	#	LC	26
	<i>Vinciguerria nimbaria</i> (Jordan and Williams, 1895)	#	#	#	LC	26, 46
Family Stomiidae	<i>Aristostomias grimaldii</i> Zugmayer, 1913	#	?	?	LC	26, 46
	<i>Aristostomias xenostoma</i> Regan and Trewavas, 1930	?	#	?	LC	26, 46
	<i>Astronesthes caulophorus</i> Regan and Trewavas, 1929	?	#	?	LC	26, 46
	<i>Astronesthes niger</i> Richardson, 1845	?	#	?	LC	26
	<i>Astronesthes richardsoni</i> (Poey, 1852)	?	#	?	LC	26, 46

(continued)

Higher taxonomy	Species	P	S	A	IUCN	Reference
	<i>Borostomias elucens</i> (Brauer, 1906)	?	#	?	LC	26, 46
	<i>Chauliodus sloani</i> Bloch and Schneider, 1801	#	#	#	LC	26, 46
	<i>Eustomias melanonema</i> Regan and Trewavas, 1930	?	#	?	LC	26, 46
	<i>Eustomias monoclonoides</i> Clarke, 1999	?	#	?	LC	26, 46
	<i>Eustomias monoclonus</i> Regan and Trewavas, 1930	?	?	#	LC	26
	<i>Leptostomias gracilis</i> Regan and Trewavas, 1930	#	?	?	LC	46
	<i>Malacosteus niger</i> Ayres, 1848	?	#	?	LC	26, 46
	<i>Neonesthes capensis</i> (Gilchrist and von Bonde, 1924)	?	#	?	LC	26, 46
	<i>Pachystomias microdon</i> (Günther, 1878)	?	#	?	LC	26, 46
	<i>Photostomias atrox</i> (Alcock, 1890)	?	#	?	LC	26, 46
	<i>Photostomias guernei</i> Collett, 1889	?	#	#	LC	26, 46
	<i>Stomias affinis</i> Günther, 1887	?	#	?	LC	26, 46
	<i>Stomias boa</i> (Risso, 1810)	?	#	?	LC	26
	<i>Stomias longibarbat</i> (Brauer, 1902)	?	#	?	LC	26, 46
Order Aulopiformes						
Family Aulopidae	<i>Aulopus cadenati</i> Poll, 1953	X	X	X	LC	26
Family Ipnopidae	<i>Bathypterois phenax</i> Parr, 1928	#	?	?	LC	26
Family Scopelarchidae	<i>Scopelarchoides danae</i> Johnson, 1974	#	#	?	LC	26, 46
	<i>Scopelarchus analis</i> (Brauer, 1902)	?	#	?	LC	26, 46
	<i>Scopelarchus michaelisars</i> Koefoed, 1955	?	#	?	LC	26, 46
Family Notosudidae	<i>Scopelosaurus argenteus</i> (Maul, 1954)	#	?	?	LC	26, 46
	<i>Scopelosaurus lepidus</i> (Krefft and Maul, 1955)	?	#	?	LC	26, 46
	<i>Scopelosaurus smithii</i> Bean, 1925	#	#	?	LC	26, 46
Family Synodontidae	<i>Saurida brasiliensis</i> Norman, 1935		Err		LC	
	<i>Saurida parri</i> Norman, 1935	?	#	?	LC	20
	<i>Synodus intermedius</i> (Spix and Agassiz, 1829)		Err		LC	12, 18
	<i>Synodus synodus</i> (Linnaeus, 1758)	#	#	?	LC	12, 26, 40, 42
	<i>Trachinocephalus myops</i> (Forster, 1801)	#	#	X	LC	12, 20, 26
Family Paralepididae	<i>Lestrolepis intermedia</i> (Poey, 1868)	#	#	?	LC	26, 46
	<i>Paralepis elongata</i> (Brauer, 1906)	?	#	?	LC	26, 46

(continued)

Higher taxonomy	Species	P	S	A	IUCN	Reference
Family Evermannellidae	<i>Odontostomops normalops</i> (Parr, 1928)	?	#	?	LC	26, 46
Family Omosudidae	<i>Omosudis lowii</i> Günther, 1887	?	#	?	LC	26, 46
Order Myctophiformes						
Family Myctophidae	<i>Benthoosema suborbitale</i> (Gilbert, 1913)	#	#	#	LC	26, 46
	<i>Bolinichthys photothorax</i> (Parr, 1928)	?	#	?	LC	26, 46
	<i>Centrobranchus nigroocellatus</i> (Günther, 1873)	?	#	?	LC	
	<i>Ceratoscopelus warmingii</i> (Lütken, 1892)	?	#	?	LC	
	<i>Dasyscopelus asper</i> (Richardson, 1845)	?	#	#	LC	26, 46
	<i>Diaphus holti</i> Tåning, 1918	?	#	?	LC	26
	<i>Diaphus luetkeni</i> (Brauer, 1904)	?	#	?	LC	26, 46
	<i>Diaphus vanhoeffeni</i> (Brauer, 1906)	?	#	?	LC	26, 46
	<i>Diogenichthys atlanticus</i> (Tåning, 1928)	?	#	#	LC	26, 46
	<i>Hygophum macrochir</i> (Günther, 1864)	?	#	?	LC	26
	<i>Hygophum reinhardtii</i> (Lütken, 1892)	?	#	?	LC	26, 46
	<i>Lampanyctus alatus</i> Goode and Bean, 1896	?	#	?	LC	26, 46
	<i>Lampanyctus isaacsi</i> Wisner, 1974	?	#	?	LC	26
	<i>Lepidophanes guentheri</i> (Goode and Bean, 1896)	?	#	?	LC	26, 46
	<i>Lobianchia dofeini</i> (Zugmayer, 1911)	?	#	?	LC	26, 46
	<i>Myctophum affine</i> (Lütken, 1892)	?	#	#	LC	26, 46
	<i>Myctophum nitidulum</i> Garman, 1899	?	#	?	LC	26, 46
	<i>Notolychnus valdiviae</i> (Brauer, 1904)	?	#	#	LC	26, 46
Order Lampriformes						
Family Lophotidae	<i>Eumecichthys fiski</i> (Günther, 1890)	?	#	?	LC	20, 26, 46
Order Polymixiiformes						
Family Polymixiidae	<i>Polymixia nobilis</i> Lowe, 1836	?	#	?	LC	33, 42
Order Zeiformes						
Family Zeidae	<i>Zeus faber</i> Linnaeus, 1758	#	?	?	DD	20
Order Stylephoriformes						
Family Stylephoridae	<i>Stylephorus chordatus</i> Shaw, 1791	#	#	?	LC	26, 46

(continued)

Higher taxonomy	Species	P	S	A	IUCN	Reference
Order Gadiformes						
Family Bregmacerotidae	<i>Bregmaceros atlanticus</i> Goode and Bean, 1886	?	#	?	LC	26, 46
Family Melanonidae	<i>Melanonus zugmayeri</i> Norman, 1930	?	#	#	LC	26, 46
Family Moridae	<i>Gadella imberbis</i> (Vaillant, 1888)	X	#	X	LC	20, 26
	<i>Laemonema laureysi</i> Poll, 1953	X	X	X	LC	7, 26
	<i>Physiculus cyanostrophus</i> Anderson and Tweddle, 2002	?	#	?	LC	20
	<i>Physiculus huloti</i> Poll, 1953	?	#	?	LC	26
Family Bathygadidae	<i>Bathygadus macrops</i> Goode and Bean, 1885	X	X	X	LC	7, 26
	<i>Bathygadus melanobranchus</i> Vaillant, 1888	X	X	X	LC	7, 26
Family Macrouridae	<i>Coelorinchus geronimo</i> Marshall and Iwamoto, 1973	X	X	X	LC	26
	<i>Malacocephalus laevis</i> (Lowe, 1843)	X	X	X	LC	7, 26
	<i>Malacocephalus occidentalis</i> Goode and Bean, 1885	X	X	X	LC	7, 26
Order Beryciformes						
Family Berycidae	<i>Beryx decadactylus</i> Cuvier, 1829	?	X	?	LC	31, 40
Family Melamphidae	<i>Melamphaes eulepis</i> Ebeling, 1962	?	#	?	LC	15, 46
	<i>Poromitra megalops</i> (Lütken, 1878)	?	X	?	DD	15, 26
	<i>Scopelogadus mizolepis</i> (Günther, 1878)	?	#	?	LC	15, 26, 46
Family Cetomimidae	<i>Cetostoma regani</i> Zugmayer, 1914	?	#	?	DD	
Order Holocentriformes						
Family Holocentridae	<i>Holocentrus adscensionis</i> (Osbeck, 1765)	#	#	#	LC	12, 26, 35, 40, 42
	<i>Myripristis jacobus</i> Cuvier, 1829	#	#	#	LC	12, 26, 35, 40, 42
	<i>Sargocentron hastatum</i> (Cuvier, 1829)	X	#	#	LC	12, 35, 40
Order Ophidiiformes						
Family Ophidiidae	<i>Acanthonus armatus</i> Günther, 1878	#	?	?	LC	26
	<i>Bassozetus normalis</i> Gill, 1883	#	?	?	LC	13, 26
	<i>Brotula barbata</i> (Bloch and Schneider, 1801)	X	X	X	LC	13, 20, 26
	<i>Ophidion saldanhai</i> Matallanas and Brito, 1999	?	#	?	DD	
	<i>Spectrunculus grandis</i> (Günther, 1877)	?	?	#	LC	13, 26
Family Carapidae	<i>Carapus acus</i> (Brünnich, 1768)	#	#	?	LC	20, 26
	<i>Echiodon dentatus</i> (Cuvier, 1829)	?	#	?	LC	26
Family Bythitidae	<i>Grammonus longhursti</i> (Cohen, 1964)	?	#	?	LC	13, 18, 26

(continued)

Higher taxonomy	Species	P	S	A	IUCN	Reference
	<i>Parabrotula plagiophthalma</i> Zugmayer, 1911	?	#	?	LC	27
Order Scombriformes						
Family Nomeidae	<i>Cubiceps pauciradiatus</i> Günther, 1872	#	#	?	LC	20, 27, 46
	<i>Nomeus gronovii</i> (Gmelin, 1789)	#	X	?	LC	27
Family Ariommatidae	<i>Ariomma bondi</i> Fowler, 1930	#	?	?	LC	20
Family Pomatomidae	<i>Pomatomus saltatrix</i> (Linnaeus, 1766)	X	X	X	VU	27, 40
Family Chiasmodontidae	<i>Chiasmodon niger</i> Johnson, 1864	?	#	?	LC	27, 46
	<i>Kali kerberti</i> (Weber, 1913)	?	#	?	LC	27
	<i>Pseudoscopelus altipinnis</i> Parr, 1933	?	#	?	LC	27, 46
Family Scombridae	<i>Acanthocybium solandri</i> (Cuvier, 1832)	?	X	?	LC	1, 12, 27, 40
	<i>Auxis thazard</i> (Lacépède, 1800)	?	#	?	LC	1, 12, 27, 40
	<i>Euthynnus alletteratus</i> (Rafinesque, 1810)	#	#	X	LC	1, 12, 20, 40
	<i>Katsuwonus pelamis</i> (Linnaeus, 1758)	?	X	?	LC	1, 12, 27, 35, 40
	<i>Sarda sarda</i> (Bloch, 1793)	X	#	X	LC	1, 27
	<i>Scomber colias</i> Gmelin, 1789	?	#	?	LC	42
	<i>Scomberomorus tritor</i> (Cuvier, 1832)	X	#	X	LC	1, 12, 27, 42
	<i>Thunnus albacares</i> (Bonnaterre, 1788)	?	X	?	NT	1, 12, 27
	<i>Thunnus obesus</i> (Lowe, 1839)	?	X	?	VU	1, 12, 27, 40, 46
Family Caristiidae	<i>Paracaristius aquilus</i> Stevenson and Kenaley, 2011	#	?	?	LC	46
	<i>Paracaristius nudarcus</i> Stevenson and Kenaley, 2011	?	#	?	DD	27, 46
	<i>Platyberyx andriashevi</i> (Kukuev, Parin and Trunov, 2012)	#	?	?	DD	27, 46
	<i>Platyberyx opalescens</i> Zugmayer, 1911	#	#	#	LC	46
Family Bramidae	<i>Taractichthys longipinnis</i> (Lowe, 1843)	?	#	?	LC	27, 46
Family Gempylidae	<i>Gempylus serpens</i> Cuvier, 1829	#	?	#	LC	9, 27
	<i>Nealotus tripes</i> Johnson, 1865	#	#	?	LC	9, 27, 42, 46
	<i>Nesiarchus nasutus</i> Johnson, 1862	#	#	?	LC	9, 20, 27, 46
	<i>Promethichthys prometheus</i> (Cuvier, 1832)	X	#	#	LC	9, 20, 27, 46
	<i>Ruvettus pretiosus</i> Cocco, 1833	X	X	X	LC	9, 27
Order Syngnathiformes						
Family Dactylopteridae	<i>Dactylopterus volitans</i> (Linnaeus, 1758)	#	#	X	LC	12, 20, 25, 40
Family Mullidae	<i>Mulloidichthys martinicus</i> (Cuvier, 1829)	?	X	?	LC	12, 27, 35, 40
	<i>Pseudupeneus prayensis</i> (Cuvier, 1829)	X	#	#	VU	12, 20, 27, 35, 40, 42
Family Callionymidae	<i>Callionymus bairdi</i> Jordan, 1888	X	#	X	LC	18, 27

(continued)

Higher taxonomy	Species	P	S	A	IUCN	Reference
	<i>Synchiropus phaeton</i> (Günther, 1861)	X	X	X	LC	27
Family Aulostomidae	<i>Aulostomus strigosus</i> Wheeler, 1955	X	#	X	LC	12, 20, 25, 40
Family Fistulariidae	<i>Fistularia petimba</i> Lacépède, 1803	#	#	X	LC	20
	<i>Fistularia tabacaria</i> Linnaeus, 1758	X	#	X	LC	12, 26, 40
Family Syngnathidae	<i>Enneacampus kaupi</i> (Bleeker, 1863)	?	X	?	LC	36
	<i>Hippocampus algiricus</i> Kaup, 1856	#	#	?	VU	18, 40
	<i>Microphis aculeatus</i> (Kaup, 1856)	#	#	?	DD	18, 28, 47
Order Kurtiformes						
Family Apogonidae	<i>Apogon imberbis</i> (Linnaeus, 1758)	#	#	#	LC	12, 18, 27, 35, 40
	<i>Apogon pseudomaculatus</i> Longley, 1932	?	#	?	LC	18, 35, 40
	<i>Paroncheilus affinis</i> (Poey, 1875)	X	#	X	LC	18, 27, 35
	<i>Phaeoptyx pigmentaria</i> (Poey, 1860)	X	X	#	LC	18, 27, 40
Order Gobiiformes						
Family Eleotridae	<i>Bostrychus africanus</i> (Steindachner, 1879)	X	#	X	LC	22, 27, 28
	<i>Dormitator lebretonis</i> (Steindachner, 1870)	X	X	X	LC	
	<i>Eleotris annobonensis</i> Blanc, Cadenat and Stauch, 1968	E#	E#	E#	DD	18, 27, 28
	<i>Eleotris feai</i> Thys van den Audenaerde and Tortonese, 1974	?	?	#	NE	
	<i>Eleotris vittata</i> Duméril, 1861	#	#	X	LC	27
Family Gobiidae	<i>Awaous bustamantei</i> (Greeff, 1882)	?	E#	E	VU	22, 28
	<i>Awaous lateristriga</i> (Duméril, 1861)	X	#	X	LC	22, 27, 28, 42
	<i>Bathygobius burtoni</i> (O'Shaughnessy, 1875)	#	#	?	EN	12, 22, 27, 28, 40
	<i>Bathygobius casamancus</i> (Rochebrune, 1880)	X	X	#	LC	22, 27
	<i>Bathygobius soporator</i> (Valenciennes, 1837)	#	#	#	LC	22, 27
	<i>Corcyrogobius lubbocki</i> Miller, 1988	X	#	#	VU	18, 22, 27
	<i>Ctenogobius lepturus</i> (Pfaff, 1933)	X	X	X	LC	22, 27, 30
	<i>Didogobius amicuscaridis</i> Schlieven and Kovačić, 2008	E	E#	?	VU	18, 22, 27
	<i>Gnatholepis thompsoni</i> Jordan, 1904	?	#	?	LC	12, 40
	<i>Gobioides africanus</i> (Giltay, 1935)	X	X	X	LC	22, 27
	<i>Gobioides sagitta</i> (Günther, 1862)	X	X	X	LC	22, 27
	<i>Gobionellus occidentalis</i> (Boulenger, 1909)	X	X	X	LC	22, 27

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Higher taxonomy	Species	P	S	A	IUCN	Reference
	<i>Gobius aff. rubropunctatus</i> Delais, 1951	#	#	?	LC	18, 22
	<i>Gobius senegambiensis</i> Metzelaar, 1919	X	X	X	LC	22, 27
	<i>Gorogobius nigricinctus</i> (Delais, 1951)	X	#	#	LC	18
	<i>Gorogobius stevcici</i> Kovačić and Schlieven, 2008	?	E#	?	VU	18, 19, 22, 27, 40
	<i>Nematogobius brachynemus</i> Pfaff, 1933	#	#	#	LC	18
	<i>Nematogobius maindroni</i> (Sauvage, 1880)	#	#	X	LC	18, 22, 27
	<i>Porogobius schlegelii</i> (Günther, 1861)	X	#	X	LC	22, 27, 28, 47
	<i>Sicydium brevifile</i> Ogilvie-Grant, 1884	E#	E#	E#	LC	16, 18, 22, 27
	<i>Sicydium bustamantei</i> Greeff, 1884	E#	E#	E#	DD	16, 18, 22, 27
	<i>Thorogobius laureatus</i> Sauberer, Iwamoto and Ahnelt, 2018	?	E#	?	NE	
	<i>Wheelerigobius maltzani</i> (Steindachner, 1881)	X	#	#	LC	18, 22, 27, 40
	<i>Wheelerigobius wirtzi</i> Miller, 1988	E#	E#	?	LC	12, 18, 22, 40
	<i>Yongeichthys thomasi</i> (Boulenger, 1916)	?	X	?	LC	22
Family Oxudercidae	<i>Periophthalmus barbarus</i> (Linnaeus, 1766)	#	#	X	LC	27, 28, 47
Order Carangiformes						
Family Sphyraenidae	<i>Sphyraena afra</i> Peters, 1844	X	X	X	LC	27
	<i>Sphyraena barracuda</i> (Edwards, 1771)	X	X	X	LC	12, 27, 35, 40
	<i>Sphyraena guachancho</i> Cuvier, 1829	X	#	X	LC	18, 20, 27
	<i>Sphyraena sphyraena</i> (Linnaeus, 1758)	X	#	X	LC	12, 20, 27, 42
Family Polynemidae	<i>Galeoides decadactylus</i> (Bloch, 1795)	#	#	#	NT	12, 20, 27, 28, 42
	<i>Pentanemus quinquarius</i> (Linnaeus, 1758)	X	X	X	VU	27
	<i>Polydactylus quadrifilis</i> (Cuvier, 1829)	X	X	X	LC	27
Family Psettodidae	<i>Psettodes belcheri</i> Bennett, 1831	X	?	?	DD	20
Family Citharidae	<i>Citharus linguatula</i> (Linnaeus, 1758)	?	#	?	LC	20
Family Cyclosettidae	<i>Syacium guineense</i> (Bleeker, 1862)	X	X	X	LC	20, 27
Family Bothidae	<i>Arnoglossus imperialis</i> (Rafinesque, 1810)	X	#	X	LC	20, 27
	<i>Arnoglossus sp.</i> Bleeker, 1862	?	#	?	-	
	<i>Bothus guibei</i> Stauch, 1966	?	#	#	DD	12, 20, 27, 42
	<i>Bothus lunatus</i> (Linnaeus, 1758)	?	X	?	LC	12, 27, 40
	<i>Bothus podas</i> (Delaroche, 1809)	?	#	#	LC	20, 27
	<i>Chascanopsetta lugubris</i> Alcock, 1894	?	#	?	DD	44

(continued)

Higher taxonomy	Species	P	S	A	IUCN	Reference
	<i>Monolene microstoma</i> Cadenat, 1937	X	X	X	LC	27
Family Paralichthyidae	<i>Citharichthys stampflii</i> (Steindachner, 1894)	?	#	?	LC	44
Family Soleidae	<i>Dagetichthys lusitanicus</i> (de Brito Capello, 1868)	X	X	X	DD	27
	<i>Dicologlossa cuneata</i> (Moreau, 1881)	?	#	?	LC	18
	<i>Heteromycteris proboscideus</i> (Chabanaud, 1925)	X	#	X	DD	27
	<i>Microchirus boscanion</i> (Chabanaud, 1926)	X	X	X	DD	27
	<i>Microchirus frechkopi</i> Chabanaud, 1952	?	#	?	DD	20
	<i>Microchirus hexophthalmus</i> (Bennett, 1831)	?	#	?	LC	20
	<i>Microchirus wittei</i> Chabanaud, 1950	X	#	X	LC	27
	<i>Pegusa lascaris</i> (Risso, 1810)	X	#	X	LC	27
	<i>Pegusa triophthalma</i> (Bleeker, 1863)	X	X	X	DD	27
Family Cynoglossidae	<i>Cynoglossus browni</i> Chabanaud, 1949	?	#	?	DD	44
	<i>Cynoglossus cadenati</i> Chabanaud, 1947	#	?	?	DD	
	<i>Cynoglossus canariensis</i> Steindachner, 1882	?	#	?	NT	44
	<i>Cynoglossus monodi</i> Chabanaud, 1949	?	#	?	NT	18
	<i>Cynoglossus senegalensis</i> (Kaup, 1858)	?	#	?	NT	12
Family Istiophoridae	<i>Istiophorus albicans</i> (Latreille, 1804)	?	X	?	NE	3, 12, 40
	<i>Istiophorus platypterus</i> (Shaw, 1792)	?	#	?	LC	27
	<i>Makaira nigricans</i> Lacépède, 1802	?	X	?	VU	3, 31, 40
Family Carangidae	<i>Alectis alexandrina</i> (Geoffroy Saint-Hilaire, 1817)	X	X	X	LC	1, 27, 35
	<i>Alectis ciliaris</i> (Bloch, 1787)	X	X	X	LC	27
	<i>Caranx bartholomaei</i> Cuvier, 1833	X	X	?	LC	18, 20, 40
	<i>Caranx crysos</i> (Mitchill, 1815)	X	#	#	LC	12, 20, 40, 42
	<i>Caranx fischeri</i> Smith-Vaniz and Carpenter, 2007	X	#	X	LC	18
	<i>Caranx hippos</i> (Linnaeus, 1766)	X	#	X	LC	12, 18, 35, 40
	<i>Caranx latus</i> Agassiz, 1831	#	#	X	LC	18, 27, 40
	<i>Caranx lugubris</i> Poey, 1860	X	X	?	LC	18, 27, 40
	<i>Caranx rhonchus</i> Geoffroy Saint-Hilaire, 1817	?	X	?	LC	
	<i>Chloroscombrus chrysurus</i> (Linnaeus, 1766)	X	#	X	LC	27
	<i>Decapterus macarellus</i> (Cuvier, 1833)	X	#	X	LC	12, 20, 27, 42
	<i>Decapterus punctatus</i> (Cuvier, 1829)	X	#	X	LC	12, 20, 27, 40

(continued)

Higher taxonomy	Species	P	S	A	IUCN	Reference
	<i>Elagatis bipinnulata</i> (Quoy and Gaimard, 1825)	X	#	X	LC	12, 27, 35, 40, 42
	<i>Hemicaranx bicolor</i> (Günther, 1860)	X	X	X	LC	27
	<i>Lichia amia</i> (Linnaeus, 1758)	X	X	X	LC	27
	<i>Pseudocaranx dentex</i> (Bloch and Schneider, 1801)	X	X	X	LC	27
	<i>Selar crumenophthalmus</i> (Bloch, 1793)	X	#	#	LC	12, 20, 42
	<i>Selene dorsalis</i> (Gill, 1863)	X	#	X	LC	12, 20, 27, 42
	<i>Seriola carpenteri</i> Mather, 1971	X	X	X	LC	20, 27
	<i>Seriola rivoliana</i> Valenciennes, 1833	X	X	?	LC	18, 20, 27, 40
	<i>Trachinotus goreensis</i> Cuvier, 1832	?	X	?	LC	
	<i>Trachinotus ovatus</i> (Linnaeus, 1758)	X	#	#	LC	12, 27, 35, 42
	<i>Uraspis secunda</i> (Poey, 1860)	X	X	X	LC	12, 20, 27
Family Echeneidae	<i>Echeneis naucrates</i> Linnaeus, 1758	X	X	?	LC	27, 40
	<i>Remora brachyptera</i> (Lowe, 1839)	#	X	?	LC	12, 27
	<i>Remora remora</i> (Linnaeus, 1758)	?	#	?	LC	27
Family Coryphaenidae	<i>Coryphaena equiselis</i> Linnaeus, 1758	?	X	?	LC	12, 27
	<i>Coryphaena hippurus</i> Linnaeus, 1758	?	#	?	LC	31, 40
Order Cichliformes						
Family Cichlidae	<i>Oreochromis mossambicus</i> (Peters, 1852)	?	I	?	LC	28
Order Atheriniformes						
Family Atherinidae	<i>Atherina lopeziana</i> Rossignol and Blache, 1961	X	X	X	DD	26
Order Cyprinodontiformes						
Family Procatopodidae	<i>Aplocheilichthys spilauchen</i> (Duméril, 1861)	I	?	?	LC	47
Order Beloniformes						
Family Belonidae	<i>Ablennes hians</i> (Valenciennes, 1846)	X	X	X	LC	12, 26
	<i>Platybelone argalus</i> (Lesueur, 1821)	X	X	X	LC	26
	<i>Platybelone argalus annobonensis</i> Collette and Parin, 1970	X	X	X	LC	12, 18
	<i>Strongylura senegalensis</i> (Valenciennes, 1846)	X	X	X	LC	26
	<i>Tylosurus acus rafale</i> Collette and Parin, 1970	X	#	X	LC	12, 42
	<i>Tylosurus crocodilus</i> (Péron and Lesueur, 1821)	#	#	X	LC	12, 26

(continued)

Higher taxonomy	Species	P	S	A	IUCN	Reference
Family Hemiramphidae	<i>Hemiramphus balao</i> Lesueur, 1821	X	#	#	LC	12, 26, 42
	<i>Hemiramphus brasiliensis</i> (Linnaeus, 1758)	X	X	X	LC	26
	<i>Hyporhamphus picarti</i> (Valenciennes, 1847)	X	X	X	LC	26
Family Exocoetidae	<i>Cheilopogon cyanopterus</i> (Valenciennes, 1847)	X	#	#	LC	20, 26
	<i>Cheilopogon melanurus</i> (Valenciennes, 1847)	?	X	?	LC	12
	<i>Cheilopogon milleri</i> (Gibbs and Staiger, 1970)	#	X	X	LC	26
	<i>Cheilopogon pinnatibaratus</i> (Bennett, 1831)	X	X	X	LC	
	<i>Exocoetus obtusirostris</i> Günther, 1866	?	#	?	LC	
	<i>Exocoetus volitans</i> Linnaeus, 1758	#	X	?	LC	
	<i>Fodiator acutus</i> (Valenciennes, 1847)	?	X	?	LC	
	<i>Hirundichthys affinis</i> (Günther, 1866)	X	#	#	LC	20, 26
	<i>Prognichthys gibbifrons</i> (Valenciennes, 1847)	X	#	X	LC	
Order Mugiliformes						
Family Mugilidae	<i>Chelon dumerili</i> (Steindachner, 1870)	?	X	?	DD	
	<i>Chelon richardsonii</i> (Smith, 1846)	?	X	?	NE	30
	<i>Mugil cephalus</i> Linnaeus, 1758	X	X	X	LC	26
	<i>Mugil curema</i> Valenciennes, 1836	#	#	?	LC	18, 42, 47
	<i>Parachelon grandisquamis</i> (Valenciennes, 1836)	?	#	?	DD	18, 26, 28, 47
Order Gobiesociformes						
Family Gobiesocidae	<i>Apletodon wirtzi</i> Fricke, 2007	E#	E#	?	LC	17, 18, 27, 40
	<i>Lecanogaster gorgoniphila</i> Fricke and Wirtz, 2017	?	E#	?	NE	34
Order Blenniiformes						
Family Labrisomidae	<i>Labrisomus nuchipinnis</i> (Quoy and Gaimard, 1824)	#	#	#	LC	12, 27
Family Blenniidae	<i>Entomacrodus cadenati</i> Springer, 1967	?	X	#	LC	12, 27
	<i>Hypoleurochilus aequipinnis</i> (Günther, 1861)	?	X	#	LC	12, 40
	<i>Hypoleurochilus langi</i> (Fowler, 1923)	?	?	X	LC	27
	<i>Hypoleurochilus pseudoaequipinnis</i> Bath, 1994	#	#	?	LC	18
	<i>Microlipophrys velifer</i> (Norman, 1935)	?	#	?	LC	12, 40
	<i>Ophioblennius atlanticus</i> (Valenciennes, 1836)	#	#	#	LC	12, 40
	<i>Scartella cristata</i> (Linnaeus, 1758)	?	#	#	LC	12

(continued)

Higher taxonomy	Species	P	S	A	IUCN	Reference
Order Acanthuriformes						
Family Lobotidae	<i>Lobotes surinamensis</i> (Bloch, 1790)	?	#	?	LC	12, 27
Family Pomacanthidae	<i>Centropyge aurantonotus</i> Burgess, 1974	?	#	?	LC	18, 40
	<i>Holacanthus africanus</i> Cadenat, 1951	#	X	?	LC	12, 27, 40
Family Drepaneidae	<i>Drepane africana</i> Osório, 1892	X	X	?	LC	12, 18, 20, 27, 42
Family Chaetodontidae	<i>Chaetodon hoeferi</i> Steindachner, 1881	?	#	#	LC	20, 27
	<i>Chaetodon robustus</i> Günther, 1860	?	#	?	LC	12, 18, 40, 42
	<i>Prognathodes marcellae</i> (Poll, 1950)	?	#	?	LC	18, 20, 27, 40
Family Ephippidae	<i>Chaetodipterus lippei</i> Steindachner, 1895	?	X	?	LC	30
	<i>Ephippus goreensis</i> Cuvier, 1831	?	X	?	LC	12, 20, 27, 40
Family Acanthuridae	<i>Acanthurus monroviae</i> Steindachner, 1876	X	X	#	LC	12, 18, 20, 27, 35
	<i>Prionurus biafraensis</i> (Blache and Rossignol, 1962)	E	E#	E	LC	12, 18, 27, 35
Family Antigoniidae	<i>Antigonia capros</i> Lowe, 1843	?	#	?	LC	27
Order Lophiiformes						
Family Antennariidae	<i>Antennarius multiocellatus</i> (Valenciennes, 1837)	?	#	?	LC	18
	<i>Antennarius pardalis</i> (Valenciennes, 1837)	#	#	?	LC	18, 20, 26
	<i>Antennarius striatus</i> (Shaw, 1794)	?	#	?	LC	26
	<i>Histrio histrio</i> (Linnaeus, 1758)	?	#	?	LC	26
Family Oneirodidae	<i>Lophodolos acanthognathus</i> Regan, 1925	?	#	?	LC	26
	<i>Oneirodes anisacanthus</i> (Regan, 1925)	?	#	?	DD	26
	<i>Oneirodes carlsbergi</i> (Regan and Trewavas, 1932)	?	#	?	LC	26
Family Ceratiidae	<i>Ceratias uranoscopus</i> Murray, 1877	?	#	?	LC	26, 46
	<i>Cryptopsaras couesii</i> Gill, 1883	?	#	?	LC	20
Family Linophrynidae	<i>Linophryne arborifera</i> Regan, 1925	?	#	?	LC	26
Order Tetraodontiformes						
Family Diodontidae	<i>Chilomycterus mauretanicus</i> (Le Danois, 1954)	#	X	X	LC	20, 27
	<i>Chilomycterus reticulatus</i> (Linnaeus, 1758)	?	X	#	LC	12, 40
	<i>Diodon holocanthus</i> Linnaeus, 1758	#	X	#	LC	12, 20
	<i>Diodon hystrix</i> Linnaeus, 1758	?	X	?	LC	12

(continued)

Higher taxonomy	Species	P	S	A	IUCN	Reference
Family Tetraodontidae	<i>Canthigaster rostrata</i> (Bloch, 1786)		Err #		LC	20
	<i>Canthigaster supramacula</i> Moura and Castro, 2002	#	#	?	LC	18, 35, 40
	<i>Lagocephalus laevigatus</i> (Linnaeus, 1766)	X	#	X	LC	12, 20, 27
	<i>Lagocephalus lagocephalus</i> (Linnaeus, 1758)	X	X	#	LC	20, 27
	<i>Sphoeroides marmoratus</i> (Lowe, 1838)	X	X	X	LC	12, 27, 35, 40
	<i>Sphoeroides pachygaster</i> (Müller and Troschel, 1848)	#	X	X	LC	20, 27
Family Ostraciidae	<i>Acanthostracion guineense</i> (Bleeker, 1865)	X	X	X	LC	20, 27
	<i>Acanthostracion notacanthus</i> (Bleeker, 1863)	#	X	?	DD	1, 39
Family Monacanthidae	<i>Aluterus heudelotii</i> Hollard, 1855	#	X	?	LC	30
	<i>Aluterus monoceros</i> (Linnaeus, 1758)	X	X	X	LC	20
	<i>Aluterus schoepfii</i> (Walbaum, 1792)	X	X	X	LC	27
	<i>Aluterus scriptus</i> (Osbeck, 1765)	X	#	X	LC	12, 27, 35, 40
	<i>Cantherhines macrocerus</i> (Hollard, 1853)	X	?	?	LC	43
	<i>Cantherhines pullus</i> (Ranzani, 1842)	X	X	#	LC	12, 27, 35, 40
	<i>Stephanolepis hispida</i> (Linnaeus, 1766)	#	X	#	LC	
Family Balistidae	<i>Balistes capriscus</i> Gmelin, 1789	#	#	#	VU	12, 20, 27, 35, 40
	<i>Balistes punctatus</i> Gmelin, 1789	#	#	X	VU	12, 20, 27, 35, 40
	<i>Balistes vetula</i> Linnaeus, 1758	X	X	X	NT	27
	<i>Canthidermis maculata</i> (Bloch, 1786)	X	#	X	LC	27
	<i>Canthidermis sufflamen</i> (Mitchill, 1815)	X	X	?	LC	12, 35, 40
	<i>Melichthys niger</i> (Bloch, 1786)	X	X	X	LC	27, 35, 40
Order Centrarchiformes						
Family Kyphosidae	<i>Kyphosus bigibbus</i> Lacépède, 1801	X	X	X	LC	27
	<i>Kyphosus incisor</i> (Cuvier, 1831)	X	#	X	NE	12, 28
	<i>Kyphosus sectatrix</i> (Linnaeus, 1758)	?	#	?	LC	42
	<i>Kyphosus vaigiensis</i> (Quoy and Gaimard, 1825)	X	X	X	LC	
Family Cirrhitidae	<i>Cirrhitus atlanticus</i> Osório, 1893	#	#	X	LC	12, 27, 35, 40
Order Acropomatiformes						
Family Synagropidae	<i>Synagrops bellus</i> (Goode and Bean, 1896)	?	#	?	LC	20
Family Epigonidae	<i>Epigonus constanciae</i> (Giglioli, 1880)	?	#	?	LC	18
	<i>Epigonus denticulatus</i> Dieuzeide, 1950	?	#	?	LC	
Family Howellidae	<i>Howella sherborni</i> (Norman, 1930)	#	#	?	NE	46

(continued)

Higher taxonomy	Species	P	S	A	IUCN	Reference
Order Perciformes *sedis mutabilis*						
Family Serranidae	<i>Alphestes afer</i> (Bloch, 1793)	?	X	?	LC	18, 27, 36, 40, 45
	<i>Anthias anthias</i> (Linnaeus, 1758)	#	#	X	LC	12, 20
	<i>Anthias cyprinoides</i> (Katayama and Amaoka, 1986)	?	?	X	DD	45
	<i>Cephalopholis nigri</i> (Günther, 1859)	#	#	?	LC	8, 12, 27, 35, 40, 42
	<i>Cephalopholis taeniops</i> (Valenciennes, 1828)	#	#	#	LC	8, 12, 27, 35, 40, 42, 45
	<i>Epinephelus adscensionis</i> (Osbeck, 1765)	#	#	#	LC	12, 40, 42, 45
	<i>Epinephelus aeneus</i> (Geoffroy Saint-Hilaire, 1817)	X	X	X	NT	12, 20, 27, 35
	<i>Epinephelus costae</i> (Steindachner, 1878)	X	X	X	DD	27
	<i>Epinephelus goreensis</i> (Valenciennes, 1830)	X	#	X	NT	12, 20, 27, 40
	<i>Epinephelus marginatus</i> (Lowe, 1834)	?	#	?	VU	27, 42
	<i>Hyporthodus haifensis</i> (Ben-Tuvia, 1953)	X	X	X	LC	27
	<i>Liopropoma emanueli</i> Wirtz and Schlieven, 2012	?	X	?	NE	31, 40
	<i>Liopropoma</i> n.sp.	X	X	?	-	18
	<i>Paranthias furcifer</i> (Valenciennes, 1828)	#	#	#	LC	8, 12, 20, 27, 40, 42
	<i>Pseudogramma guineensis</i> (Norman, 1935)	X	#	#	LC	18, 27, 45
	<i>Rypticus saponaceus</i> (Bloch and Schneider, 1801)	X	#	#	LC	12, 18, 20, 27, 35, 40, 42
	<i>Rypticus subbifrenatus</i> Gill, 1861	#	X	#	LC	18, 27, 45
	<i>Serranus accraensis</i> (Norman, 1931)	X	#	?	LC	20, 39, 45
	<i>Serranus cabrilla</i> (Linnaeus, 1758)	#	#	?	LC	27, 39, 42
	<i>Serranus drewesi</i> Iwamoto, 2018	?	E#	?	DD	39, 45
	<i>Serranus heterurus</i> (Cadenat, 1937)	?	#	#	LC	39, 45
	<i>Serranus pulcher</i> Wirtz and Iwamoto, 2016	E#	E#	?	LC	18, 32, 40, 45
Family Priacanthidae	<i>Heteropriacanthus cruentatus</i> (Lacépède, 1801)	X	X	#	LC	12, 35, 40
	<i>Priacanthus arenatus</i> Cuvier, 1829	#	#	X	LC	20
	<i>Branchiostegus semifasciatus</i> (Norman, 1931)	?	X	?	LC	12
Family Emmelichthyidae	<i>Erythrocles monodi</i> Poll and Cadenat, 1954	?	#	?	LC	12, 42
Family Lutjanidae	<i>Apsilus fuscus</i> Valenciennes, 1830	X	#	X	LC	2, 12, 20, 27, 40
	<i>Lutjanus agennes</i> Bleeker, 1863	X	#	X	DD	27, 28, 40, 47
	<i>Lutjanus dentatus</i> (Duméril, 1861)	#	#	X	DD	2, 27, 40, 42
	<i>Lutjanus endecacanthus</i> Bleeker, 1863	#	#	X	DD	2, 18, 27, 28, 42

(continued)

Higher taxonomy	Species	P	S	A	IUCN	Reference
	<i>Lutjanus fulgens</i> (Valenciennes, 1830)	X	#	X	LC	2, 12, 20, 27, 40, 42
	<i>Lutjanus goreensis</i> (Valenciennes, 1830)	#	#	X	DD	12, 20, 27, 28, 40, 47
	<i>Lutjanus griseus</i> (Linnaeus, 1758)	?	?	#	LC	
Family Gerreidae	<i>Eucinostomus melanopterus</i> (Bleeker, 1863)	X	#	#	LC	12, 27, 28, 42, 47
	<i>Gerres nigri</i> Günther, 1859	X	X	X	LC	27
Family Haemulidae	<i>Brachydeuterus auritus</i> (Valenciennes, 1832)	X	#	X	NT	18, 20, 27
	<i>Parakuhlia macrophthalmus</i> (Osório, 1993)	X	#	X	DD	12, 27, 40
	<i>Parapristipoma humile</i> (Bowdich, 1825)	X	X	X	LC	27
	<i>Parapristipoma octolineatum</i> (Valenciennes, 1833)	X	X	X	LC	27
	<i>Plectorhinchus macrolepis</i> (Boulenger, 1899)	X	#	X	LC	27, 28
	<i>Plectorhinchus mediterraneus</i> (Guichenot, 1850)	X	X	X	LC	27
	<i>Pomadasys incisus</i> (Bowdich, 1825)	X	#	#	LC	20, 27, 40, 42
	<i>Pomadasys jubelini</i> (Cuvier, 1830)	X	#	X	LC	28
	<i>Pomadasys perotaei</i> (Cuvier, 1830)	?	X	#	LC	
	<i>Pomadasys rogerii</i> (Cuvier, 1830)	X	#	X	LC	12, 20
	<i>Pomadasys suillus</i> (Valenciennes, 1833)	#	X	?	NE	
Family Sparidae	<i>Boops boops</i> (Linnaeus, 1758)	X	#	X	LC	12, 20, 27, 35, 40, 42
	<i>Dentex canariensis</i> Steindachner, 1881		Err		LC	20
	<i>Dentex congoensis</i> Poll, 1954	#	#	X	LC	12, 20, 27, 42
	<i>Dentex gibbosus</i> (Rafinesque, 1810)	X	X	X	LC	27
	<i>Dentex macrophthalmus</i> (Bloch, 1791)	X	X	X	LC	27
	<i>Lithognathus mormyrus</i> (Linnaeus, 1758)	X	X	X	LC	27
	<i>Oblada melanura</i> (Linnaeus, 1758)	X	X	X	LC	27, 35
	<i>Pagellus bellottii</i> Steindachner, 1882	X	#	X	LC	12, 20, 27, 42
	<i>Pagrus africanus</i> Akazaki, 1962	X	X	X	LC	27
	<i>Pagrus auriga</i> Valenciennes, 1843	X	X	X	LC	27
	<i>Pagrus caeruleostictus</i> (Valenciennes, 1830)	X	#	X	LC	12, 20, 27, 42
	<i>Pagrus pagrus</i> (Linnaeus, 1758)	?	X	?	LC	
	<i>Spicara alta</i> (Osório, 1917)	X	X	X	LC	27
	<i>Spicara melanurus</i> (Valenciennes, 1830)	X	X	X	LC	27, 40
	<i>Spicara nigricauda</i> (Norman, 1931)	X	#	?	LC	12

(continued)

Higher taxonomy	Species	P	S	A	IUCN	Reference
	<i>Spondyliosoma cantharus</i> (Linnaeus, 1758)	X	X	X	LC	27
Family Lethrinidae	<i>Lethrinus atlanticus</i> Valenciennes, 1830	#	#	#	LC	6, 12, 20, 27, 40, 42
Family Sciaenidae	<i>Pseudotolithus senegalensis</i> (Valenciennes, 1833)	?	#	?	EN	18, 20
	<i>Pseudotolithus senegallus</i> (Cuvier, 1830)	?	#	?	VU	18, 42
	<i>Umbrina canariensis</i> Valenciennes, 1843	?	X	#	LC	20
	<i>Umbrina cirrosa</i> (Linnaeus, 1758)	?	X	?	VU	18
Family Monodactylidae	<i>Monodactylus sebae</i> (Cuvier, 1829)	X	#	X	LC	18, 27, 28
Family Cepolidae	<i>Cepola pauciradiata</i> Cadenat, 1950	X	#	X	DD	27
Order Perciformes						
Family Pomacentridae	<i>Abudefduf hoefleri</i> (Steindachner, 1881)	X	#	?	DD	27, 35, 40, 42
	<i>Abudefduf saxatilis</i> (Linnaeus, 1758)	X	#	X	LC	12, 27, 35, 40, 42
	<i>Abudefduf taurus</i> (Müller and Troschel, 1848)	?	#	#	LC	18
	<i>Azurina multilineata</i> (Guichenot, 1853)	#	X	?	LC	12, 27, 35, 40
	<i>Chromis cadenati</i> Whitley, 1951	?	X	?	LC	31, 40
	<i>Chromis limbata</i> (Valenciennes, 1833)	?	X	?	LC	31, 40
	<i>Microspathodon frontatus</i> Emery, 1970	X	#	#	LC	12, 27, 35, 40, 42
	<i>Stegastes imbricatus</i> Jenyns, 1840	#	#	#	LC	12
Family Labridae	<i>Acantholabrus palloni</i> (Risso, 1810)	X	X	X	LC	18, 27
	<i>Bodianus pulchellus</i> (Poey, 1860)	?	#	?	LC	12, 18, 40, 42
	<i>Bodianus speciosus</i> (Bowdich, 1825)	X	X	X	DD	12, 20
	<i>Clepticus africanus</i> Heiser, Moura and Robertson, 2000	?	E#	?	DD	18, 35
	<i>Coris atlantica</i> Günther, 1862	X	X	?	LC	12, 35, 40
	<i>Doratonotus megalepis</i> Günther, 1862	X	X	?	LC	27
	<i>Thalassoma newtoni</i> (Osório, 1891)	X	#	?	LC	18, 27
	<i>Xyrichtys novacula</i> (Linnaeus, 1758)	#	#	X	LC	12, 20, 27, 35, 40
	<i>Xyrichtys sanctaehelenae</i> (Günther, 1868)	?	#	?	LC	18
Family Scaridae	<i>Nicholsina collettei</i> Schultz, 1968	X	X	X	LC	18, 27
	<i>Nicholsina usta</i> (Valenciennes, 1840)	?	#	?	LC	18
	<i>Scarus hoefleri</i> (Steindachner, 1881)	#	#	X	LC	12, 27, 35, 40
	<i>Sparisoma choati</i> Rocha, Brito and Robertson, 2012	X	#	X	NE	18, 23, 27, 35

(continued)

Higher taxonomy	Species	P	S	A	IUCN	Reference
Family Ammodytidae	<i>Gymnammodytes capensis</i> (Barnard, 1927)	?	X	?	LC	
Family Trachinidae	<i>Trachinus armatus</i> Bleeker, 1861	X	#	?	LC	20
	<i>Trachinus lineolatus</i> Fischer, 1885	?	X	?	LC	26
	<i>Trachinus radiatus</i> Cuvier, 1829	X	?	?	LC	20
Family Uranoscopidae	<i>Uranoscopus albesca</i> Regan, 1915	X	X	X	LC	27
	<i>Uranoscopus cadenati</i> Poll, 1959	X	X	X	LC	27
	<i>Uranoscopus polli</i> Cadenat, 1951	#	X	X	LC	12, 20, 27
Family Bembropidae	<i>Bembrops greyae</i> Poll, 1959	?	#	?	LC	27, 44
Family Sebastidae	<i>Helicolenus dactylopterus</i> (Delaroche, 1809)	X	X	X	LC	26
Family Setarchidae	<i>Ectreposebastes imus</i> Garman, 1899	X	X	#	LC	26
	<i>Setarches guentheri</i> Johnson, 1862	X	X	X	LC	26
Family Scorpaenidae	<i>Pontinus accraensis</i> Norman, 1935	X	#	X	LC	18, 26
	<i>Pontinus kuhlii</i> (Bowdich, 1825)	?	#	?	DD	12, 26
	<i>Scorpaena angolensis</i> Norman, 1935	X	X	X	LC	26
	<i>Scorpaena annobonae</i> Eschmeyer, 1969	?	?	#	DD	
	<i>Scorpaena elongata</i> Cadenat, 1943	X	X	X	LC	26
	<i>Scorpaena laevis</i> Troschel, 1866	X	#	#	LC	12, 20, 26
	<i>Scorpaena normani</i> Cadenat, 1943	X	X	X	LC	26
	<i>Scorpaena stephanica</i> Cadenat, 1943	X	X	X	LC	26
	<i>Scorpaenodes africanus</i> Pfaff, 1933	?	#	#	DD	18, 26
Family Triglidae	<i>Chelidonichthys gabonensis</i> (Poll and Roux, 1955)	?	#	?	LC	20
	<i>Chelidonichthys lastoviza</i> (Bonnaterre, 1788)	X	?	?	LC	20
	<i>Lepidotrigla cadmani</i> Regan, 1915	#	#	X	LC	26
	<i>Lepidotrigla carolae</i> Richards, 1968	X	#	X	LC	20, 26
Family Peristediidae	<i>Peristedion cataphractum</i> (Linnaeus, 1758)	X	X	X	LC	26
Family Platycephalidae	<i>Solitas gruvelli</i> (Pellegrin, 1905)	X	#	X	LC	20, 26

References

- Afonso F (2019) A importância dos mangais de São Tomé: percepções e serviços ecossistémicos. MSc Thesis. University of Lisbon, Lisbon, 94 pp
- Afonso P, Porteiro FM, Santos RS, Barreiros JP, Worms J, Wirtz P (1999) Coastal marine fishes of São Tomé Island (Gulf of Guinea). *Arquipélago. Life and Marine Sciences* 17A:65–92
- Afonso P, Porteiro FM, Fontes J et al (2013) New and rare coastal fishes in the Azores islands: occasional events or tropicalization process? *Journal of Fish Biology* 83(2):272–294
- Alexandre A, Silva J, Ferreira R, Paulo D, Serrão EA, Santos R (2017) First description of seagrass distribution and abundance in São Tomé and Príncipe. *Aquatic Botany* 142:48–52
- Allen GR (1985) FAO species catalogue. Vol. 6. Snappers of the world. An annotated and illustrated catalogue of lutjanid species known to date. FAO Fisheries Synopsis No. 125, Rome, 208 pp
- Allen DJ, Brooks EGE, Darwall WRT (2011) The status and distribution of freshwater biodiversity in central Africa. IUCN, Gland, Switzerland, 126 pp
- Almada VC, Toledo JF, Brito A et al (2013) Complex origins of the Lusitania biogeographic province and northeastern Atlantic fishes. *Frontiers of Biogeography* 5(1):20–28
- Almeida AJ, Alves MJ (2017) First record of *Polymixia nobilis* Lowe, 1836 (Polymixiidae) for Eastern Central Atlantic, São Tomé Island. *Cybium* 41(3):293–294
- Almeida AJ, Alves MJ (2019) Fishes of São Tomé—results of the expeditions of Fernando Frade (1954) and Fernando Correia da Costa (1955). *Cybium* 43(3):265–273
- Almeida AJ, Bischoito M (2019) Chaves para a identificação dos peixes do Oceano Atlântico oriental, Mar Mediterrâneo e Mar Negro. I. Myxini; Petromyzontida; Chondrichthyes. Boletim do Museu de História Natural do Funchal, Suplemento n°15. Câmara Municipal do Funchal, Funchal, 195 pp
- Alory G, Da-Allada CY, Djakouré S, Dadou I, Jouanno J, Loemba DP (2021) Coastal upwelling limitation by onshore geostrophic flow in the Gulf of Guinea around the Niger River plume. *Frontiers in Marine Science* 7:607216
- Arnoult J, D'Aubenton F, Bauchot ML, Blanc M (1966) Poissons téléostéens (première partie). In: Campagne de la Calypso dans le Golfe de Guinée et aux îles Principe, São Tomé et Annobon (1956). *Annales de l'Institut Océanographique Monaco* NS 44:1–22
- Bakun A (1978) Guinea Current upwelling. *Nature* 271:147–150
- Bayer FM, Voss GL, Robins CR (1966) The R/V Pillsbury deep-sea biological expedition to the Gulf of Guinea, 1964–1965. *Studies in Tropical Oceanography* No. 4 (Part 1), Institute of Marine Science, University of Miami, Parker Printing, Coral Gables, 239 pp
- Beal L, De Ruijter W, Biastoch A, Zahn R, SCOR/WCRP/IAPSO Working Group 136 (2011) On the role of the Agulhas system in ocean circulation and climate. *Nature* 472:429–436
- Belay IG, Tanaka R, Kitagawa H, Kobayashi K, Nakamura E (2019) Origin of ocean island basalts in the West African passive margin without mantle plume involvement. *Nature Communications* 10:3022
- Beldade R, Heiser JB, Robertson DR, Gasparini JL, Floeter SR, Bernardi G (2009) Historical biogeography and speciation in the Creole wrasses (Labridae, *Clepticus*). *Marine Biology* 156: 679–687
- Belhabib D (2015) Fisheries of Sao Tome and Principe, a catch reconstruction (1950–2010). Working Paper Series #2015-67. The University of British Columbia, Vancouver, 13 pp
- Bernard AM, Finnegan KA, Bitar PP, Stanhope MJ, Shivji MS (2021) Genomic assessment of global population structure in a highly migratory and habitat versatile apex predator, the Tiger Shark (*Galeocerdo cuvier*). *Journal of Heredity* 112(6):497–507
- Binet D (1997) Climate and pelagic fisheries in the Canary and Guinea currents 1964–1993: the role of trade winds and the Southern Oscillation. *Oceanologia Acta* 20:177–190
- Blanc M, Cadenat J, Stauch A (1968) Contribution à l'étude de l'ichtyofaune de l'île Annobón. Bulletin de l'Institut Fondamental d'Afrique Noire (Serie A) Sciences Naturelles 30(1):238–256

- Brito A, Pascual P, Falcón JM, Sancho A, González G (2002) Peces de las islas Canarias. Catálogo comentado e ilustrado. Francisco Lemus Editor, La Laguna, 419 pp
- Brito A, Falcón JM, Herrera R (2005) About the recent tropicalisation of the littoral ichthyofauna of the Canary Islands and its relationship with environmental changes and human activities. *Vieraea* 33:515–525
- Brown J, Beard A, Clingham E, Fricke R, Henry L, Wirtz P (2019) The fishes of St Helena Island, central Atlantic Ocean—new records and an annotated check-list. *Zootaxa* 4543(2):151–194
- Burke K (2001) Origin of the Cameroon Line of Volcano-capped swells. *The Journal of Geology* 109(3):349–362
- Cameron WM, Pritchard DW (1963) Estuaries. In: Hill MN (ed) *The seas, ideas and observations on progress in the study of the seas*, vol 2. Wiley Interscience, New York, pp 306–324
- Canterle AM, Nunes LT, Fontoura L, Maia HA, Floeter SR (2020) Reef microhabitats mediate fish feeding intensity and agonistic interactions at Príncipe Island Biosphere Reserve, Tropical Eastern Atlantic. *Marine Ecology* 41(5):e12609
- Capello FB (1871a) Primeira lista dos peixes da Ilha da Madeira, Açores e das possessões portuguesas d’Africa, que existem no museu de Lisboa. *Jornal de Sciencias Mathematicas, Physicas e Naturaes* 3(11):194–202
- Capello FB (1871b) Primeira lista dos peixes da Ilha da Madeira, Açores e das possessões portuguesas d’Africa, que existem no museu de Lisboa. (Continuação). *Jornal de Sciencias Mathematicas, Physicas e Naturaes* 3(12):280–282
- Capello FB (1872) Primeira lista dos peixes da Ilha da Madeira, Açores, e das possessões portuguesas d’Africa, que existem no museu de Lisboa (Continuação). *Jornal de Sciencias Mathematicas, Physicas e Naturaes* 4(13):83–88
- Carpenter KE, Allen GR (1989) FAO species catalogue. Vol. 9. Emperor fishes and large-eye breams of the world (family Lethrinidae). An annotated and illustrated catalogue of lethrinid species known to date. FAO Fisheries Synopsis No. 125, Rome, 118 pp
- Carpenter KE, De Angelis N (2016a) The living marine resources of the Eastern Central Atlantic. Volume 2: Bivalves, gastropods, hagfishes, sharks, batoid fishes, and chimaeras. FAO Species Identification Guide for Fishery Purposes, Rome, pp 665–1509
- Carpenter KE, De Angelis N (2016b) The living marine resources of the Eastern Central Atlantic. Volume 3: Bony fishes part 1 (Elopiformes to Scorpaeniformes). FAO Species Identification Guide for Fishery Purposes, Rome, pp 1511–2342
- Carpenter KE, De Angelis N (2016c) The living marine resources of the Eastern Central Atlantic. Volume 4: Bony fishes part 2 (Perciformes to Tetradontiformes). FAO Species Identification Guide for Fishery Purposes, Rome, pp 2343–3124
- Carpenter KE, Smith-Vaniz WF, de Bruyne G, de Morais L (2015) *Bathygobius burtoni* Available via The IUCN Red List of Threatened Species 2015. <https://doi.org/10.2305/IUCN.UK.2015-4.RLTS.T2621A21912374.en>. Accessed 15 Aug 2021
- Ceríaco LMP, Santos BS, Lima RF et al (2022a) Physical geography of the Gulf of Guinea oceanic islands. In: Ceríaco LMP, Lima RF, Melo M, Bell RC (eds) *Biodiversity of the Gulf of Guinea Oceanic Islands: science and conservation*. Springer, Cham, pp 13–36
- Ceríaco LMP, Santos BSS, Viegas S, Paiva J, Figueiredo E (2022b) The history of biological research in the Gulf of Guinea oceanic islands. In: Ceríaco LMP, Lima RF, Melo M, Bell RC (eds) *Biodiversity of the Gulf of Guinea Oceanic Islands: science and conservation*. Springer, Cham, pp 87–140
- Cohen DM, Inada T, Iwamoto T, Scialabba N (1990) FAO species catalogue. Vol. 10. Gadiform fishes of the world (Order Gadiformes). An annotated and illustrated catalogue of cods, hakes, grenadiers and other gadiform fishes known to date. FAO Fisheries Synopsis No. 125, Rome, 442 pp
- Collette BB, Nauen CE (1983) FAO species catalogue. Vol. 2. Scombrids of the world. An annotated and illustrated catalogue of tunas, mackerels, bonitos and related species known to date. FAO Fisheries Synopsis No. 125, Rome, 137 pp

- Compagno LJV (1984a) FAO species catalogue. Vol. 4. Sharks of the world. An annotated and illustrated catalogue of sharks species known to date. Part 1. Hexanchiformes to Lamniformes. FAO Fisheries Synopsis No. 125, Rome, pp 1–249
- Compagno LJV (1984b) FAO species catalogue. Vol. 4. Sharks of the world. An annotated and illustrated catalogue of sharks species known to date. Part 2. Carcharhiniformes. FAO Fisheries Synopsis No. 125, Rome, pp 251–655
- Compagno LJV (2001) Sharks of the world. An annotated and illustrated catalogue of shark species known to date. Volume 2. Bullhead, mackerel and carpet sharks (Heterodontiformes, Lamniformes and Orectolobiformes). FAO Species Catalogue for Fishery Purposes, Rome, 269 pp
- Cowburn B (2018) Marine Habitats of Príncipe, Eastern Tropical Atlantic—description and map. Available via the Omali Vida Nón project. <https://omaliprincipeen.weebly.com/resources.html>. Accessed 15 Aug 2021
- Cowman PF, Parravicini V, Kulbicki M, Floeter SR (2017) The biogeography of tropical reef fishes: endemism and provinciality through time: reef fish endemism and provinciality. *Biological Reviews* 92(4):2112–2130
- Cravo M (2021) Fish assemblages at Praia Salgada mangrove, Príncipe Island (Gulf of Guinea). MSc Thesis. University of Lisbon, Lisbon, 49 pp
- Cumberlidge N, Daniels SR (2018) A new species of *Potamonautes* from São Tomé Island, Central Africa, with redescrptions of *P. margaritarius* (A. Milne-Edwards, 1869) from São Tomé, and *P. principe* Cumberlidge, Clark and Baillie, 2002, from Príncipe (Decapoda: Potamonautidae). *Contributions to Zoology* 87(4):287–303
- Cumberlidge N, Clark PF, Baillie J (2002) A new species of freshwater crab (Brachyura, Potamoidea, Potamonautidae) from Príncipe, Gulf of Guinea, Central Africa. *Bulletin of the Natural History Museum Zoology* 68(01):13–18
- Djakouré S, Penven P, Bourlès B, Veitch J, Koné V (2014) Coastally trapped eddies in the north of the Gulf of Guinea. *Journal of Geophysical Research: Oceans* 119(10):6805–6819
- Djakouré S, Penven P, Bourlès B, Koné V, Veitch J (2017) Respective roles of the Guinea Current and local winds on the coastal upwelling in the northern Gulf of Guinea. *Journal of Physical Oceanography* 47:1367–1387
- Ebert DA (2015) Deep-sea cartilaginous fishes of the Southeastern Atlantic Ocean. FAO Species Catalogue for Fishery Purposes, Rome, 251 pp
- Elsheikh AA, Gao SS, Liu KH (2014) Formation of the Cameroon Volcanic Line by lithospheric basal erosion: insight from mantle seismic anisotropy. *Journal of African Earth Sciences* 100: 96–108
- Eschmeyer WN (1969) A systematic review of the scorpionfishes of the Atlantic Ocean (Pisces: Scorpaenidae). *Occasional Papers California Academy of Sciences* 79:1–143
- Falcón JM, Brito A, Herrera R et al (2018) New records of tropical littoral fishes from the Canary Islands as a result of two driving forces: natural expansion and introduction by oil platforms. *Revista de la Academia Canaria de Ciencias* 30:39–56
- FAO (2007) The world's mangroves 1980-2005. FAO Forestry Paper 153. FAO, Rome, 77 pp
- Félix PM, Chainho P, Lima RF et al (2016) Mangrove fishes of São Tomé Island (Gulf of Guinea): new occurrences and habitat usage. *Marine and Freshwater Research* 68:123–130
- Ferreira LC, Simpfendorfer C (2019) *Galeocerdo cuvier*. Available via the IUCN Red List of Threatened Species 2019. <https://doi.org/10.2305/IUCN.UK.2019-1.RLTS.T39378A2913541.en>. Accessed 15 Aug 2021
- FishNet2 (2021) Multiple provider institutions. Available via FishNet2. <http://fishnet2.net>. Accessed 15 Aug 2021
- Floeter SR, Rocha LA, Robertson DR et al (2008) Atlantic reef fish biogeography and evolution. *Journal of Biogeography* 35(1):22–47
- Fowler HW (1936a) The marine fishes of West Africa based on the collection of the American Museum Congo expedition, 1909-1915. Part I. *Bulletin of the American Museum of Natural History* 70:1–605

- Fowler HW (1936b) The marine fishes of West Africa based on the collection of the American Museum Congo expedition, 1909-1915. Part II. Bulletin of the American Museum of Natural History 70:607–1493
- Frade F (1955) Missão científica de São Tomé. Relatório dos trabalhos de prospecção realizados na província de São Tomé e Príncipe pela secção zoológica da missão. Centro de Zoologia da Junta de Investigações do Ultramar, Lisbon, 19 pp
- Frade F, Correia da Costa F (1956) Investigações sobre os peixes de superfície e a pesca nas ilhas de São Tomé e do Príncipe. Conferência Internacional dos Africanistas Ocidentais, 6ª sessão. São Tomé, Comunicações 4:152–175
- Frade F, Correia da Costa F (1957) Thunnidae et Cybiidae de S. Tomé et Príncipe Annales Biologiques. Conseil Permanent International pour l'Exploration de la Mer 12:218–219
- Freitas R, Falcón JM, González JA et al (2018) New and confirmed records of fishes from the Cabo Verde archipelago based on photographic and genetic data. Arquipélago. Life and Marine Sciences 35:67–83
- Fricke R (2007) A new species of the clingfish genus *Apletodon* (Teleostei: Gobiesocidae) from São Tomé and Príncipe, Eastern Central Atlantic. Ichthyological Research 54:68–73
- Fricke R, Wirtz P (2017) *Lecanogaster gorgoniphila*, a new species of clingfish (Teleostei: Gobiesocidae) from São Tomé and Príncipe, Eastern Atlantic Ocean. Arquipélago. Life and Marine Sciences 35:1–10
- Fricke R, Eschmeyer WN, Van der Laan R (eds) (2021) Eschmeyer's catalog of fishes: genera, species, references. Available via <http://researcharchive.calacademy.org/research/ichthyology/catalog/fishcatmain.asp>. Accessed 5 Oct 2021
- Friess DA, Rogers K, Lovelock CE et al (2019) The state of the world's mangrove forests: past, present, and future. Annual Review of Environment and Resources 44:89–115
- Froese R, Pauly D (eds) (2021) FishBase. Available via www.fishbase.org. Accessed 1 June 2021
- GBIF (2021) Global Biodiversity Information Facility. Available via <https://www.gbif.org>. Accessed 15 Aug 2021
- Goldberg L, Lagomasino D, Thomas N, Fatoyinbo T (2020) Global declines in human-driven mangrove loss. Global Change Biology 26(10):5844–5855
- Gordon AL (2003) The browniest retroflection. Nature 421:904–905
- Guimarães ARP (1882) Lista dos peixes da Ilha da Madeira, Açores e das possessões portuguesas d'Africa, que existem no museu de Lisboa (Suplemento). Jornal de Sciencias Mathematicas, Physicas e Naturaes 9(32):30–39
- Guimarães ARP (1884) Lista dos peixes da Ilha da Madeira, Açores e das possessões portuguesas d'Africa, que existem no Museu de Lisboa (Segundo Suplemento). Jornal de Sciencias Mathematicas, Physicas e Naturaes 10(37):11–28
- Hachich NF, Bonsall MB, Arraut EM, Barneche DR, Lewinsohn TM, Floeter SR (2015) Island biogeography: patterns of marine shallow-water organisms in the Atlantic Ocean. Journal of Biogeography 45:1871–1882
- Haroun R, Herrero-Barrencua A, Abreu AD (2018) Mangrove habitats in São Tomé and Príncipe (Gulf of Guinea, Africa): conservation and management status. In: Makowski C, Finkl C (eds) Threats to mangrove forests. Coastal Research Library, vol 25. Springer, Cham, pp 589–605
- Heemstra PC, Randall JE (1993) FAO species catalogue. Vol. 16. Groupers of the world (Family Serranidae, Subfamily Epinephelinae). An annotated and illustrated catalogue of the grouper, rockcod, hind, coral grouper and lyretail species known to date. FAO Fisheries Synopsis No. 125, Rome, 382 pp
- Herbert G, Bourlès B, Penven P, Grelet J (2016) New insights on the upper layer circulation north of the Gulf of Guinea. Journal of Geophysical Research: Oceans 121(9):6793–6815
- Herrero-Barrencua A, Jaber JR, Abreu AD, Haroun R, Castro JJ (2019) On the presence of *Cantherhines macrocerus* (Hollard, 1853) in the Príncipe Island (Gulf of Guinea). Cahiers de Biologia Marine 60:289–292

- Houndegnonto OJ, Kolodziejczyk N, Maes C, Bourlès B, Da-Allada CY, Reul N (2021) Seasonal variability of freshwater plumes in the eastern Gulf of Guinea as inferred from satellite measurements. *Journal of Geophysical Research: Oceans* 126(5):e2020JC017041
- iDigBio (2021) Integrated digitized biocollections. Available via <https://www.idigbio.org/portal/search>. Accessed 15 Aug 2021
- Iwamoto T (1970) Macrourid fishes of the Gulf of Guinea. The R/V Pillsbury deep-sea biological expedition to the Gulf of Guinea, 1964–65. *Studies in Tropical Oceanography* (Miami) 4(2): 316–431
- Iwamoto T, Wirtz P (2018) A synopsis of the Eastern and Central Atlantic Combers of the Genus *Serranus* (Teleostei: Scorpaeniformes: Serranidae). *Proceedings of the California Academy of Sciences, Series 4* 65(1):1–39
- Jones PJ (1994) Biodiversity in the Gulf of Guinea: an overview. *Biodiversity and Conservation* 3: 772–784
- Kotlyar AN (2004) Family Melamphaidae Gill 1893—big scales. *California Academy of Sciences Annotated Checklists of Fishes* 29:1–11
- Kotlyar AN (2011) Revision of Genus *Melamphaes* (Melamphaidae). II. Multi-Raker Species: *M. polylepis*, *M. falsidicus* sp. nova, *M. pachystomus* sp. nova, *M. macrocephalus*, *M. leprus*. *Journal of Ichthyology* 51(8):569–580
- Kovačić M, Schlieven UK (2008) A new species of *Gorogobius* (Perciformes: Gobiidae) from São Tomé Island. *Zootaxa* 1686:29–36
- Krakstad J, Alvheim O, Lopes JDS, Iwamoto T (2010) Surveys of the fish resources of São Tomé & Príncipe. Survey of the demersal resources 10 May–20 May 2010. Institute of Marine Research, Bergen, 66 pp
- Kyne PM, Jabado RW (2019) *Rhynchobatus luebberti*. Available via the IUCN Red List of Threatened Species 2019. <https://doi.org/10.2305/IUCN.UK.2019-2.RLTS.T60180A124448712.en>. Accessed 15 Aug 2021
- Laborel J (1974) West African reef corals, an hypothesis on their origin. *Proceedings of the Second International Symposium on Coral Reefs, volume 1*. Great Barrier Reef Committee, Brisbane, pp 425–443
- Last PR, White WT, Carvalho MR, Séret B, Stehmann MFW, Naylor GJP (eds) (2016) *Rays of the world*. CSIRO, Comstock, Clayton, 790 pp
- Le Lœuff P, Cosel R (1998) Biodiversity patterns of the marine benthic fauna on the Atlantic coast of tropical Africa in relation to hydroclimatic conditions and paleogeographic events. *Acta Oecologia* 19(3):309–321
- Lutjeharms JRE (2006) *The Agulhas Current*. Springer, Berlin, 329 pp
- Lutjeharms JRE, Van Ballegooyen RC (1988) The retroflection of the Agulhas Current. *Journal of Physical Oceanography* 18(11):1570–1583
- Maia HA, Morais RA, Quimbayo JP et al (2018a) Spatial patterns and drivers of fish and benthic reef communities at São Tomé Island, Tropical Eastern Atlantic. *Marine Ecology* 39(6):e12520
- Maia HA, Morais RA, Siqueira AC, Hanazaki N, Floeter SR, Bender MG (2018b) Shifting baselines among traditional fishers in São Tomé and Príncipe islands, Gulf of Guinea. *Ocean and Coastal Management* 154:133–142
- McLeod E, Chmura GL, Bouillon S et al (2011) A blueprint for blue carbon: toward an improved understanding of the role of vegetated coastal habitats in sequestering CO₂. *Frontiers in Ecology and the Environment* 9(10):552–560
- Morais RA, Maia HA (2017) Lush underwater forests in mesophotic reefs of the Gulf of Guinea. *Coral Reefs* 36:95
- Nakamura I (1985) *FAO species catalogue. Vol. 5. Billfishes of the world. An annotated and illustrated catalogue of marlins, sailfishes, spearfishes and swordfishes known to date*. FAO Fisheries Synopsis No. 125, Rome, 65 pp
- Nakamura I, Parin NV (1993) *FAO species catalogue. Vol. 15. Snake mackerels and cutlassfishes of the world (Families Gempylidae and Trichiuridae). An annotated and illustrated catalogue of the snake mackerels, snoeks, escolars, gemfishes, sackfishes, domine, oilfish, cutlassfishes,*

- scabbardfishes, hairtails, and frofishes known to date. FAO Fisheries Synopsis No. 125, Rome, 136 pp
- Nielsen JG, Cohen DM, Markle DF, Robins CR (1999) FAO species catalogue. Vol. 18. Ophidiiform fishes of the world (Order Ophidiiformes). An annotated and illustrated catalogue of pearlfishes, cusk-eels, brotulas and other ophidiiform fishes known to date. FAO Fisheries Synopsis No. 125, Rome, 178 pp
- OBIS (2021) Ocean Biodiversity Information System. Available via the Intergovernmental Oceanographic Commission of UNESCO. <https://mapper.obis.org>. Accessed 15 Aug 2021
- Odekunle TO, Eludoyin AO (2008) Sea surface temperature patterns in the Gulf of Guinea: their implications for the spatio-temporal variability of precipitation in West Africa. *International Journal of Climatology* 28(11):1507–1517
- Osório B (1891) Estudos ichtyológicos acerca da fauna dos domínios portugueses na África, 3ª nota: Peixes marítimos das ilhas de S. Thomé, do Príncipe e ilheo das Rolas. *Jornal de Sciencias Mathematicas, Physicas e Naturaes* 2ª Série 2(6):97–139
- Osório B (1892) Estudos ichtyológicos acerca da fauna dos domínios portugueses na África, 3ª nota: Peixes marítimos das ilhas de S. Thomé, do Príncipe e ilheo das Rolas. (continuação). *Jornal de Sciencias Mathematicas, Physicas e Naturaes* 2ª Série 2(7):205–209
- Osório B (1893) Estudos ichtyológicos acerca da fauna dos domínios portugueses da África, 3ª nota: Peixes marítimos das ilhas de S. Thomé, do Príncipe e ilheo das Rolas. *Jornal de Sciencias Mathematicas, Physicas e Naturaes* 2ª Série 3(10):136–140
- Osório B (1894) Estudos ichtyológicos acerca da fauna dos domínios portugueses da África, 3ª nota: Peixes marítimos das ilhas de S. Thomé, do Príncipe e ilheo das Rolas. (continuação). *Jornal de Sciencias Mathematicas, Physicas e Naturaes* 2ª Série 3(11):173–182
- Osório B (1895a) Les poissons d'eau douce des îles du Golfe de Guinée. *Jornal de Sciencias Mathematicas, Physicas e Naturaes* 2ª Série 4(13):59–64
- Osório B (1895b) Peixes da ilha d'Anno Bom. *Jornal de Sciencias Mathematicas, Physicas e Naturaes* 2ª Série 3(12):243–240
- Osório B (1898) Da distribuição geographica dos peixes e crustaceos colhidos nas possessões portuguesas d'África occidental e existentes no Museu Nacional de Lisboa. *Jornal de Sciencias Mathematicas, Physicas e Naturaes* 2ª Série 5(19):185–202
- Osório B (1906) Indicações de algumas espécies que devem ser acrescentadas à fauna ichtyológica da ilha de S. Thomé. *Jornal de Sciencias Mathematicas, Physicas e Naturaes*. 2ª Série 7(27): 156–158
- Osório B (1917) Nota sobre algumas espécies de peixes que vivem no Atlântico occidental. *Arquivo da Universidade de Lisboa* 4:103–131
- Otero-Ferrer F, Tuya F, Bosch Guerra NE, Herrero-Barrencua A, Abreu AD, Haroun R (2020) Composition, structure and diversity of fish assemblages across seascape types at Príncipe, an understudied tropical island in the Gulf of Guinea (Eastern Atlantic Ocean). *African Journal of Marine Science* 42(4):381–391
- Pacoureau N, Rigby CL, Kyne PM et al (2021) Half a century of global decline in oceanic sharks and rays. *Nature* 589:567–571
- Parenti P, Randall JE (2020) An annotated checklist of the fishes of the family Serranidae of the world with description of two new related families of fishes. *FishTaxa* 5(1):1–170
- Peeters FJC, Acheson R, Brummer GJA et al (2004) Vigorous exchange between the Indian and Atlantic oceans at the end of the past five glacial periods. *Nature* 430:661–665
- Pezold F, Iwamoto T, Harrison IJ (2006) The California Academy of Sciences Gulf of Guinea Expedition (2001) V. Multivariate analysis of sicydiines of São Tomé & Príncipe with redescription of *Sicydium brevifile* and *S. bustamantei* (Teleostei: Gobiidae) and a key to West African sicydiines. *Proceedings of the California Academy of Sciences* 57(34):965–980
- Pierce SJ, Norman B (2016) *Rhincodon typus*. Available via the IUCN Red List of Threatened Species 2016. <https://doi.org/10.2305/IUCN.UK.2016-1.RLTS.T19488A2365291.en>. Accessed 15 Aug 2021

- Quimbayo JP, Dias MS, Kulbicki M et al (2019) Determinants of reef fish assemblages in tropical oceanic islands. *Ecography* 42(1):77–87
- Reiner F (2019) Peixes do arquipélago de São Tomé e Príncipe—Golfo da Guiné (Oceano Atlântico Oriental). Projecto Delfim—Centro Português de Estudo dos Mamíferos Marinheiros, Lisbon, 332 pp
- Reiner F, Wirtz P (2016) Five new records of coastal fishes from São Tome Island. *Revista de la Academia Canaria de Ciencias* 28:127–131
- Richardson PL, Reverdin G (1987) Seasonal cycle of velocity in the Atlantic North Equatorial Countercurrent as measured by surface drifters, current meters, and ship drifts. *Journal of Geophysical Research* 92:3691–3708
- Rigby CL, Carlson J, Derrick D, Dicken M, Pacoureaux N, Simpfendorfer C (2021) *Carcharias taurus*. Available via the IUCN Red List of Threatened Species 2021. <https://doi.org/10.2305/IUCN.UK.2021-2.RLTS.T3854A2876505.en>. Accessed 15 Aug 2021
- Roberts CM, McClean CJ, Veron JEN et al (2002) Marine biodiversity hotspots and conservation priorities for tropical reefs. *Science* 295:1280–1284
- Rocha LA, Robertson DR, Rocha CR, Tassell JL, Craig MT, Bowen BW (2005) Recent invasion of the tropical Atlantic by an Indo-Pacific coral reef fish. *Molecular Ecology* 14(13):3921–3928
- Rocha LA, Brito A, Robertson DR (2012) *Sparisoma choati*, a new species of parrotfish (Labridae: Scarinae) from the tropical eastern Atlantic. *Zootaxa* 3152:61–67
- Santos RS, Porteiro FM, Barreiros JP (1997) Marine fishes of the Azores: annotated check-list and bibliography. Arquipélago. Life and Marine Sciences. Supplement 1:1–241
- Schliwien UK (2011) Diversity and distribution of marine, euryhaline and amphidromous gobies from western, central and southern Africa. In: Patzner RA, Van Tassell JL, Kovačić M, Kapoor BG (eds) The biology of gobies. CRC and Taylor & Francis, Boca Raton, pp 207–234
- Schliwien UK, Kovačić M (2008) *Didogobius amicuscaridis* spec. nov. and *D. wirtzi* spec. nov., two new species of symbiotic gobiid fish from São Tomé and Cape Verde Islands. *Spixiana* 31: 247–261
- Sequeira AMM, Mellin C, Fordham DA, Meekan MG, Bradshaw CJA (2014) Predicting current and future global distributions of whale sharks. *Global Change Biology* 20(3):778–789
- Spalding M, Kainuma M, Collins L (2010) World atlas of mangroves. Earthscan, London, 319 pp
- Sutton TT, Hulley PA, Wienerroither R, Zaera-Perez D, Paxton JR (2020) Identification guide to the mesopelagic fishes of the central and south east Atlantic Ocean. FAO Species Identification Guide for Fishery Purposes, Rome, 327 pp
- Thys van den Audenaerde DFE, Tortonese E (1974) Description of a new *Eleotris* from Annobón Island (Pisces, Gobiidae). *Annali del Museo Civico di Storia Naturale Giacomo Doria* 80:157–161
- Tuya F, Herrero-Barrencia A, Bosch NE, Abreu AD, Haroun R (2017) Reef fish at a remote tropical island (Príncipe Island, Gulf of Guinea): disentangling taxonomic, functional and phylogenetic diversity patterns with depth. *Marine and Freshwater Research* 69:395–402
- Ukwe CN, Ibe CA, Alo BI, Yumkella KK (2003) Achieving a paradigm shift in environmental and living resources management in the Gulf of Guinea: the large marine ecosystem approach. *Marine Pollution Bulletin* 47(1–6):219–225
- Ukwe CN, Ibe CA, Sherman K (2006) A sixteen-country mobilization for sustainable fisheries in the Guinea Current Large Marine Ecosystem. *Ocean and Coastal Management* 49(7–8): 385–412
- UNEP-WCMC, IUCN (2021) World Database of Protected Areas. Available via Protected Planet. www.protectedplanet.net. Accessed 1 Oct 2021
- Valiela I, Bowen JL, York JK (2001) Mangrove forests: one of the world's threatened major tropical environments. *BioScience* 5(10):807–815
- Van der Laan R, Eschmeyer WN, Fricke R (2014) Family-group names of recent fishes. *Zootaxa Monograph* 3882(1):1–230
- Vasco-Rodrigues N, Fontes J, Bertoni AA (2016) Ten new records of marine fishes for São Tomé, West Africa. *Acta Ichthyologica et Piscatoria* 46:123–129

- Vasco-Rodrigues N, Bertoncini A, Fontes J (2018) Peixes marinhos costeiros de São Tomé e Príncipe (Coastal marine fishes of São Tomé and Príncipe). Flying Sharks, Lisbon, 123 pp
- Vaske TJ, Lima KL, Ribeiro ACB, Lessa RP (2008) Record of the St. Helena deepwater scorpionfish, *Pontinus nigropunctatus* (Günther) (Scorpaeniformes: Scorpaenidae) in the Saint Peter and Saint Paul Archipelago, Brazil. Pan-American Journal of Aquatic Sciences 3: 46–48
- Whitehead PJP (1985) FAO species catalog. Volume 7: Clupeoid fishes of the world (suborder Clupeoidei). An annotated and illustrated catalogue of the herrings, sardines, pilchards, sprats, shads, anchovies and wolf-herrings. Part 1—Chirocentridae, Clupeidae and Pristigasteridae. FAO Fisheries Synopsis, No. 125, Rome, pp 1–303
- Whitehead PJP, Nelson GJ, Wongratana T (1988) FAO species catalog. Volume 7: Clupeoid fishes of the world (suborder Clupeoidei). An annotated and illustrated catalogue of the herrings, sardines, pilchards, sprats, shads, anchovies and wolf-herrings. Part 2—Engraulidae. FAO Fisheries Synopsis, No. 125, Rome, pp 305–579
- Wirtz P (2003) New records of marine invertebrates from São Tomé Island (Gulf of Guinea). Journal of the Marine Biological Association of the United Kingdom 83:735–736
- Wirtz P (2017) New records of marine fish species from São Tomé Island (Eastern Atlantic). Bulletin of Fish Biology 17(1–2):79–81
- Wirtz P, Iwamoto T (2016) A new species of *Serranus* from São Tomé and Príncipe, Eastern Atlantic (Pisces Teleostei, Serranidae). Proceedings of the California Academy of Sciences Series 4(63):191–200
- Wirtz P, Ferreira CEL, Floeter SR et al (2007) Coastal fishes of São Tomé and Príncipe islands, Gulf of Guinea (Eastern Atlantic Ocean)—an update. Zootaxa 1523:1–48
- Wirtz P, Fricke R, Biscoito MJ (2008) The coastal fishes of Madeira Island—new records and an annotated check-list. Zootaxa 1715(1):1–26
- Wirtz P, Brito A, Falcón JM et al (2013) The coastal fishes of the Cape Verde Islands—new records and an annotated check-list. Spixiana 36:113–142
- Wirtz P, Bingeman J, Bingeman J, Frick R, Hook TJ, Young J (2014) The fishes of Ascension Island, central Atlantic Ocean—new records and an annotated checklist. Journal of the Marine Biological Association of the United Kingdom 97:783–798
- Yokota L, Carvalho MR (2017) Taxonomic and morphological revision of butterfly rays of *Gymnura micrura* (Bloch & Schneider, 1801) species complex, with the description of two new species (Myliobatiformes: Gymnuridae). Zootaxa 4332(1):1–74
- Zhao Q, Costello MJ (2020) Marine ecosystems of the world. In: Encyclopedia of the world's biomes, vol 4, pp 514–517

Further Reading

- Anderson WD Jr (2018) Annotated checklist of anthiadine fishes (Percoidei: Serranidae). Zootaxa 4475(1):1–62
- Anderson WD Jr, Heemstra PC (2012) Review of Atlantic and eastern Pacific Anthiine fishes (Teleostei: Perciformes: Serranidae), with descriptions of two new genera. Transactions of the American Philosophical Society 102(2):1–173
- Anderson ME, Leslie RW (2001) Review of the deep-sea anglerfishes (Lophiiformes: Ceratioidei) of southern Africa. Ichthyological Bulletin of the J. L. B. Smith Institute of Ichthyology 70:1–32
- Blache J, Saldanha L (1972) Contribution à la connaissance des poissons Anguilliformes de la côte occidentale d'Afrique. 12e note: les genres *Pisodonophis*, *Ophichthus*, *Brachysomophis* et *Ophisurus* (Fam. des Ophichthidae). Bulletin de l'Institut Fondamental d'Afrique Noire (Serie A) Sciences Naturelles 34(1):127–159

- Bowen BW, Karl SA, Pfeiler E (2008) Resolving evolutionary lineages and taxonomy of bonefishes (*Albula* spp.). In: Ault JS (ed) Biology and management of the world tarpon and bonefish fisheries. CRC, Taylor & Francis, Boca Raton, pp 147–154
- Bradbury MG (1999) A review of the fish genus *Dibranchius*, with descriptions of new species and a new genus, *Solocisquama* (Lophiiformes: Ogcocephalidae). Proceedings of the California Academy of Sciences 15(5):259–310
- Brauer A (1906) Die Tiefsee-Fische. I. Systematischer Teil. Wissenschaftliche Ergebnisse der deutschen Tiefsee-Expedition auf dem Dampfer “Valdivia” 1898-1899 15:1–432
- Caruso JH (1989) Systematics and distribution of Atlantic chaunacid anglerfishes (Pisces: Lophiiformes). Copeia 1:153–165
- Craig MT, Bartsch P, Wirtz P, Heemstra PC (2006) Redescription and validation of *Alphestes afer* as an amphiatlantic grouper species (Perciformes: Serranidae). Cybium 30(4):327–331
- Das MK, Nelson JS (1996) Revision of the percophid genus *Bembrops* (Actinopterygii: Perciformes). Bulletin of Marine Science 59(1):9–44
- Ebeling AW (1962) Melamphaidae I. Systematics and zoogeography of the species in the bathypelagic fish genus *Melamphaes* Günther. Dana Report 58:1–164
- Edwards AJ (1986) A new damselfish, *Chromis lubbocki* (Teleostei: Pomacentridae) from the Cape Verde archipelago, with notes on other eastern Atlantic pomacentrids. Zoologische Mededelingen (Leiden) 60(12):181–207
- Eschmeyer WN (1965) Western Atlantic scorpionfishes of the genus *Scorpaena*, including four new species. Bulletin of Marine Science 15(1):84–164
- Faria VV, McDavitt MT, Charvet P, Wiley TR, Simpfendorfer CA, Naylor GJP (2013) Species delineation and global population structure of Critically Endangered sawfishes (Pristidae). Zoological Journal of the Linnean Society 167(1):136–164
- Fricke R, Mahafina J, Behivoke F, Jaonalison H, Léopold M, Ponton D (2018) Annotated checklist of the fishes of Madagascar, southwestern Indian Ocean, with 158 new records. FishTaxa 3(1): 1–432
- Hanel R, John H-C (2014) A revised checklist of Cape Verde Islands sea fishes. Journal of Applied Ichthyology 31(1):135–169
- Heiser JB, Moura RL, Robertson DR (2000) Two new species of creole wrasse (Labridae: *Clepticus*) from opposite sides of the Atlantic. aqua. Journal of Ichthyology and Aquatic Biology 4(2):67–76
- Infante C, Blanco E, Zuasti E, Crespo A, Manchado M (2007) Phylogenetic differentiation between Atlantic *Scomber colias* and Pacific *Scomber japonicus* based on nuclear DNA sequences. Genetica 130:1–8
- Katayama M, Amaoka K (1986) Two new anthiine fishes from the eastern tropical Atlantic. Japanese Journal of Ichthyology 33(3):213–222
- Knudsen SW, Clements KD (2013) Revision of the family Kyphosidae (Teleostei: Perciformes). Zootaxa 3751(1):1–101
- Kotlyar AN (2004) Revision of the genus *Scopeloberyx* (Melamphaidae). Part 1. Multi-raker species of the group *S. robustus*. Journal of Ichthyology 44(8):537–554
- Kotlyar AN (2005) A revision of the genus *Scopeloberyx* (Melamphaidae). Part 3. Species of the group *S. opisthopterus*. Journal of Ichthyology 45(1):16–27
- Kotlyar AN (2010) Revision of the genus *Poromitra* (Melamphaidae): Part 6. Species of the *P. megalops* group. Journal of Ichthyology 50(3):231–245
- Kotlyar AN (2015) Revision of the genus *Melamphaes* (Melamphaidae): 2. Oligo-Raker species: *M. longivelis* Parr, *M. inconspicuus* sp. n., *M. kobylyanskii* sp. n. Journal of Ichthyology 55(3): 311–318
- Kotlyar AN (2016a) Revision of the genus *Melamphaes* (Melamphaidae): 5. Oligo-raker species: *M. indicus*, *M. eurous*, and *M. typhlops*. Journal of Ichthyology 56(1):19–30
- Kotlyar AN (2016b) Revision of the genus *Melamphaes* (Melamphaidae): 6. Oligo-raker species: *M. papavereus*, *M. simus*, *M. hubbsi*. Journal of Ichthyology 56(3):325–335

- Last PR, Séret B (2016) A new Eastern Central Atlantic skate *Raja parva* sp. nov. (Rajoidei: Rajidae) belonging to the *Raja miraletus* species complex. *Zootaxa* 4147(4):477–489
- Last PR, Naylor GJP, Manjaji-Matsumoto BM (2016) A revised classification of the family Dasyatidae (Chondrichthyes: Myliobatiformes) based on new morphological and molecular insights. *Zootaxa* 4139(3):345–368
- Lévêque C, Paugy D, Teugels GG (eds) (1990) Faune des poissons d'eaux douces et saumâtres de l'Afrique de l'Ouest—Tome 1/The fresh and brackish water fishes of West Africa—Volume 1. Collection Faune tropicale no. XXVIII. MRAC (Tervuren) and ORSTOM, Paris, 384 pp
- Longhurst AR (1962) A review of the oceanography of the Gulf of Guinea. *Bulletin de l'Institut Francaise d'Afrique Noire* 24(3):633–663
- Lourie S (2016) Seahorses. A life-size guide to every species. The University of Chicago Press, Chicago, 160 pp
- McCosker JE, Hibino Y (2015) A review of the finless snake eels of the genus *Apterichtus* (Anguilliformes: Ophichthidae), with the description of five new species. *Zootaxa* 3941(1): 49–78
- Melo MRS (2009) Revision of the genus *Chiasmodon* (Acanthomorpha: Chiasmodontidae), with the description of two new species. *Copeia* 2009(3):583–608
- Miller PJ (1988) New species of *Corcyrogobius*, *Thorogobius* and *Wheelerigobius* from west Africa (Teleostei: Gobiidae). *Journal of Natural History* 22(5):1245–1262
- Miller PJ (1998) The West African species of *Eleotris* and their systematic affinities (Teleostei: Gobioidae). *Journal of Natural History* 32:273–296
- Parenti P (2019a) An annotated checklist of the fishes of the family Haemulidae (Teleostei: Perciformes). *Iranian Journal of Ichthyology* 6(3):150–196
- Parenti P (2019b) An annotated checklist of the fishes of the family Sparidae. *FishTaxa* 4(2):47–98
- Parenti P (2020) An annotated checklist of fishes of the family Sciaenidae. *Journal of Animal Diversity* 2(1):1–92
- Petean FF, Naylor GJP, Lima SMQ (2020) Integrative taxonomy identifies a new stingray species of the genus *Hypanus* Rafinesque, 1818 (Dasyatidae, Myliobatiformes) from the Tropical Southwestern Atlantic. *Journal of Fish Biology* 97(4):1120–1142
- Pezold F, Cage B (2002) A review of the spinycheek sleepers, genus *Eleotris* (Teleostei: Eleotridae), of the Western Hemisphere, with comparisons to the West African species. *Tulane Studies in Zoology and Botany* 31(2):19–63
- Pietsch TW (2009) Oceanic anglerfishes. Extraordinary diversity in the deep sea. University of California Press, Berkeley, pp 1–557
- Porriños G, Madruga L, Graça M, Santos A, Nazaré L, Guedes M (2019) Setting a baseline for marine fish biodiversity in São Tomé and Príncipe using Baited Remote Underwater Video. Available via http://www.gporrinos.com/uploads/1/0/8/7/108752045/baf-bruv-en_bruv-surveys_blue-action-project_stp.pdf. Accessed 15 Aug 2021
- Poulsen JY (2015) A new species of pencil smelt *Nansenia boreacrassicauda* (Microstomatidae, Argentiniformes) from the North Atlantic Ocean. *Zootaxa* 4020(3):517–532
- Prokofiev AM, Kukuev EI (2006) Preliminary review of linebellies of the genus *Pseudoscopolus* from the Atlantic Ocean, with remarks on the species composition of the genus in the world's fauna (Perciformes: Chiasmodontidae): II. *Journal of Ichthyology* 46(3):212–233
- Quéro J-C, Hureau J-C, Karrer C, Post A, Saldanha L (1990) Check-list of the fishes of the eastern tropical Atlantic. CLOFETA. UNESCO, Paris, pp 1–1492
- Robertson DR, Karg F, Leao de Moura R, Victor BC, Bernardi G (2006) Mechanisms of speciation and faunal enrichment in Atlantic parrotfishes. *Molecular Phylogenetics and Evolution* 40(3): 795–807
- Sales JBL, Oliveira CN, dos Santos WCR et al (2019) Phylogeography of eagle rays of the genus *Aetobatus*: *Aetobatus narinari* is restricted to the continental western Atlantic Ocean. *Hydrobiologia* 836:169–183
- Sauberer M, Iwamoto T, Ahnelt H (2018) Two new deep-water species of the genus *Thorogobius* (Teleostei: Gobiidae) from the upper continental slope of the Eastern Central Atlantic. *Zootaxa* 4429(2):357–371

- Séret B (2016) *Zanobatus maculatus*, a new species of panray from the Gulf of Guinea, Eastern Central Atlantic (Elasmobranchii: Batoidea: Zanobatidae). *Zootaxa* 4161(4):509–522
- Smith-Vaniz WF, Carpenter KE (2007) Review of the crevalle jacks, *Caranx hippos* complex (Teleostei: Carangidae), with a description of a new species from West Africa. *Fishery Bulletin* 105(2):207–233
- Stevenson DE (2011) Kenaley CP (2011) Revision of the manefish genus *Paracaristius* (Teleostei: Percomorpha: Caristiidae), with descriptions of a new genus and three new species. *Copeia* 3: 385–399
- Weigmann S (2016) Annotated checklist of the living sharks, batoids and chimaeras (Chondrichthyes) of the world, with a focus on biogeographical diversity. *Journal of Fish Biology* 88(3):837–1037
- White W, Corrigan S, Yang L et al (2018) Phylogeny of the manta and devilrays (Chondrichthyes: Mobulidae), with an updated taxonomic arrangement for the family. *Zoological Journal of the Linnean Society* 182:50–75

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