Brazil

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Abstract

Indirect evidence for the occurrence of mesophotic coral ecosystems (MCEs) in Brazil dates back to the 1960s. Only in the last 10 years have Brazilian MCEs been studied systematically, through the use of new tools such as trimix technical diving (open and closed circuit), remotely operated vehicles (ROVs), drop cameras, submersibles, and sidescan sonar. Brazilian MCEs occur along an extensive latitudinal gradient, from the Amazon Reef in the north (5° N) to the Vitória-Trindade Seamount Chain in the south (21° S). Fisheries data and in situ unpublished observations indicate that MCEs also occur further south (24° S), where scleractinian corals, octocorals, and reef fishes are commonly found over rock bottoms between 30 and 70 m. The primary research topics published in the last decade include habitat mapping, benthic and fish assemblage structure, biodiversity surveys, microbial abundance and function, ecosystem assessment, evolution, and conservation. A conservative estimate indicates that at least 25 species of elasmobranchs, 275 teleost fishes, and 476 sessile benthic species (234 algae, 166 sponges, and 76 anthozoan cnidarians) occur in Brazilian MCEs. The primary reef builders are coralline algae (both encrusting and free-living nodules) and the scleractinian coral *Montastraea cavernosa*. Benthic assemblages are generally dominated by sponges, black corals, and octocorals. Fish assemblages are dominated by planktivorous fishes, while piscivorous species, particularly jacks (Carangidae), are also abundant at mesophotic depths. Overfishing, mining, and pollution are among the main threats to Brazilian MCEs.

Keywords

Mesophotic coral ecosystems · Black corals · Rhodolith beds · Sponges · Calcareous algae

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10.1 Introduction

Brazilian reefs are partially isolated from the Caribbean by the Amazon and Orinoco River outflow and from the west coast of Africa by the wide expanse of the Atlantic Ocean (Rocha 2003). This isolation has resulted in high endemism (ca. 25% for reef fishes and 30% for shallow-water zooxanthellate corals) and subsequent recognition of the "Brazilian Province" as a unique ecoregion (Castro and Pires 2001; Floeter et al. 2008). The Brazilian Province may be subdivided into three main regions based on biotic composition and environmental characteristics: the north Brazilian Shelf, the tropical southwestern Atlantic, and the warm-temperate southwestern Atlantic (Spalding et al. 2007). Data for scleractinian corals indicate a further subdivision of the tropical southwestern Atlantic region into the northeastern and eastern regions (Leão

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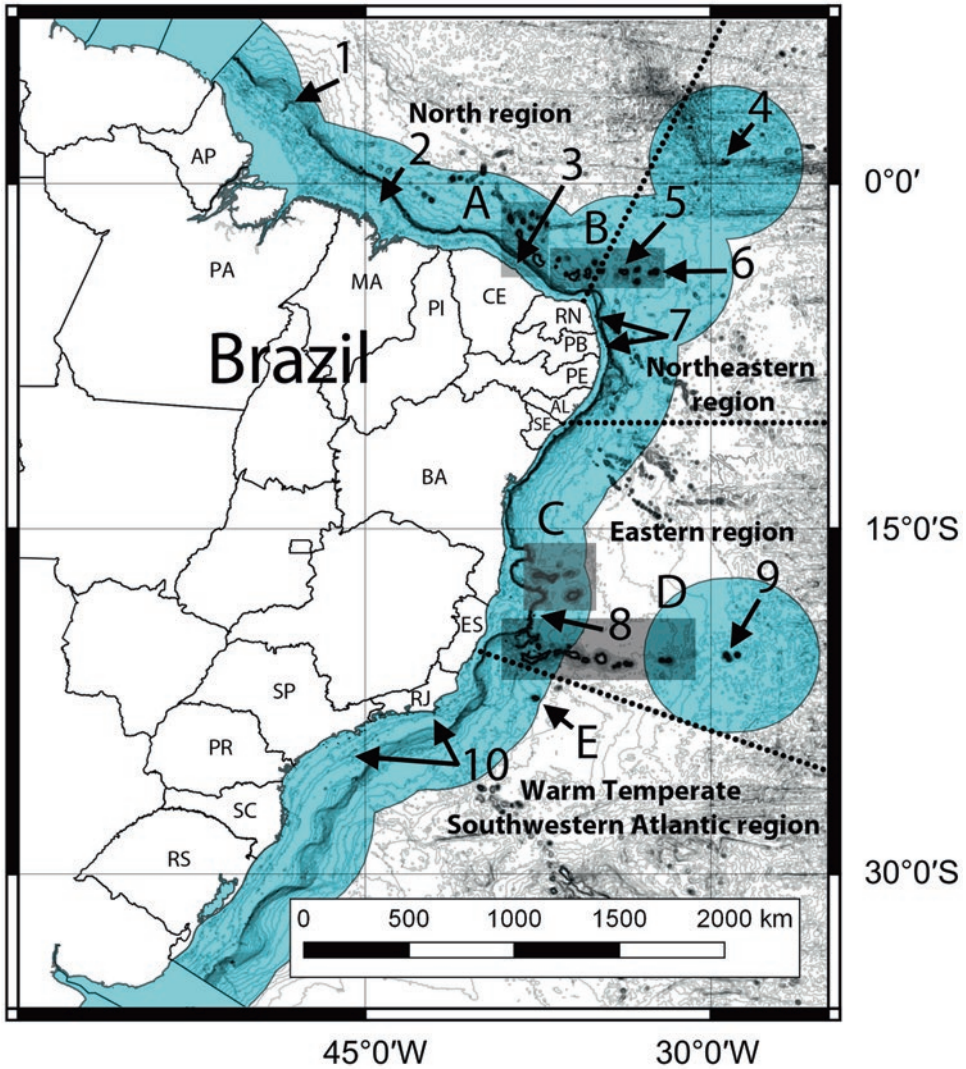

Fig. 10.1 Map of the Brazilian Province showing the four subregions and sites for which studies on MCEs are available: (1) Amazon Reef, (2) Parcel de Manuel Luis, (3) Ceará Continental Shelf, (4) Saint Peter and Saint Paul Archipelago (SPSPA), (5) Rocas Atoll, (6) Fernando de Noronha Archipelago, (7) northeastern shelf (Rio Grande do Norte and Paraíba States), (8) Abrolhos Bank, (9) Trindade and Martin Vaz Insular Group, and (10) southeastern shelf (Rio de Janeiro and São Paulo States). Gray areas denote seamounts with tops reaching mesophotic depths (30–150 m): (A) Northern Chain, (B) Fernando de Noronha Chain, (C) Abrolhos Chain, (D) Vitória-Trindade Chain, and (E) Almirante Saldanha Seamount. Brazilian coastal states: *AP* Amapá, *PA* Pará, *MA* Maranhão, *PI* Piauí, *CE* Ceará, *RN* Rio Grande do Norte, *PB* Paraíba, *PE* Pernambuco, *AL* Alagoas, *SE* Sergipe, *BA* Bahia, *ES* Espírito Santo, *RJ* Rio de Janeiro, *SP* São Paulo, *PR* Paraná, *SC* Santa Catarina, and *RS* Rio Grande do Sul

et al. 2003). All regions within the Brazilian Province support mesophotic coral ecosystems (MCEs; Fig. 10.1).

The first naturalists' accounts of Brazilian reefs date back to the end of the nineteenth century (e.g., Rathbun 1879; Laborel 1969). However, a sharp increase in knowledge of Brazilian reefs only occurred in the early 1990s, when local scientists began using conventional SCUBA to study several aspects of reef science, primarily taxonomy and ecology (e.g., Pires et al. 1992; Rosa and Moura 1997; Ferreira et al. 1998; Sazima et al. 1998). Sparse indirect evidence (e.g., fishing records) for the occurrence of MCEs (30–150 m depth) in Brazil date back to the 1960s (Rezende et al. 2003). However, only in the last 10 years have Brazilian MCEs been studied systematically through the use of new tools such as trimix technical diving (open and closed circuit), remotely operated vehicles (ROVs), drop cameras, submersibles, and sidescan sonar (e.g., Moura et al. 2013; Pinheiro et al. 2015, 2017; Rosa et al. 2016).

Herein, we review the current state of knowledge regarding MCEs in Brazil. We present the historical framework of MCE research, the main habitat types, and associated biodiversity at mesophotic depths, as well as the conservation status and main threats to Brazilian MCEs. We also make some generalizations about MCEs in Brazil by using primary and secondary information obtained from sites distributed across a wide expanse of the Brazilian shelf (5° N–21° S) and four oceanic islands and seamounts (Fig. 10.1). We include an extensive list of all species of reef fishes and selected groups

of sessile benthic organisms, including algae, sponges (Porifera), and cnidarians (Anthozoa: Octocorallia, Antipatharia, calcified Hydrozoa, and Scleractinia) recorded to date on Brazilian MCEs.

10.1.1 Research History

The first evidence for the occurrence of MCEs in Brazil came from fisheries catch data. For example, an important fishery targeting the southern red snapper *Lutjanus purpureus*, a species typically occurring in mesophotic depths (Allen 1985), started in north/northeast Brazil in the early 1960s with the introduction of hook and line fisheries (pargueiras) by Portuguese fishers (Rezende et al. 2003; Fonteles-Filho 2007). The first paper about mesophotic fishes in Brazil was published in 1977 (Collette and Rutzler 1977), with fishes collected by trawling on depths of 40 to 80 m. It includes a description of a "typical reef fish fauna" comprising 45 species associated with reef and sponge habitat at the mouth of the Amazon River.

The first description of MCEs in Brazil using SCUBA was made by Alasdair Edwards and Roger Lubbock in the small and isolated Saint Peter and Saint Paul Archipelago (SPSPA) during the Cambridge University expedition in 1979. They explored depths up to 60 m and obtained data that led to a series of publications about taxonomy, ecology, and zoogeography of the archipelago, including new fish species records for Brazil (e.g., Lubbock and Edwards 1981; Edwards and Lubbock 1983a, b). The next paper using SCUBA to study Brazilian MCEs was not published until 1998 (Rocha et al. 1998) and consisted of a checklist of fish species (157 species from 59 families) in depths between 0.5 and 66 m off the coast of Paraíba State, northeast Brazil. Soon after, Rocha et al. (2000) documented sponge-dwelling fishes off northeast Brazil in depths up to 58 m. The first comprehensive survey of fish assemblages was made by Feitoza et al. (2005), who described semiquantitatively the fish assemblages off northeast Brazil using conventional SCUBA in depths between 35 and 70 m.

In the last 10 years, the knowledge about Brazilian MCEs has increased rapidly for both continental shelf and oceanic sites. The majority of information on Brazilian MCEs is focused on the upper mesophotic zone (30–60 m), although some data are available for the lower mesophotic zone (60–150 m; e.g., Cordeiro et al. 2015; Moura et al. 2016). The main research topics covered in papers published in the last decade include habitat mapping (Amado-Filho et al. 2012a, b, 2016; Pereira-Filho et al. 2012; Bastos et al. 2013; Moura et al. 2013), benthic and fish assemblage structure (Amado-Filho et al. 2007, 2016; Pereira-Filho et al. 2011; Pinheiro et al. 2011; Simon et al. 2013; Magalhães et al. 2015; Meirelles et al. 2015; Rosa et al. 2016), biodiversity surveys (Castro et al. 2006; Cordeiro et al. 2015; Pinheiro et al. 2015; Simon et al. 2016; Soares et al. 2016), microbial abundance and function (Cavalcanti et al. 2013; Meirelles et al. 2015; Moura et al. 2016), ecosystem assessment (Cavalcanti et al. 2013; Moura et al. 2016), evolution (Pinheiro et al. 2017), and conservation (Olavo et al. 2011).

10.2 Environmental Setting

Consolidated substrata occur along most of the wide expanse of the Brazilian continental shelf (~7500 km in length). Biogenic reefs and beach rocks dominate the north/northeast regions, while rocky reefs predominate in the southeast/south region. The largest and most speciose coral reefs in the southwest Atlantic are located in the Abrolhos Bank in the eastern region (Leão et al. 2003), but scleractinian corals have been found as far south as the coast of Santa Catarina State in the warm-temperate southwestern Atlantic region (Cordeiro et al. 2015). Brazilian territorial waters also include four oceanic sites: Fernando de Noronha Archipelago, Rocas Atoll, SPSPA, and the Trindade/Martin Vaz Insular Group (TMVIG; Castro and Pires 2001; Floeter et al. 2008). There are also four main seamount chains that encompass mesophotic depths in Brazil, two in the north/northeast regions (Northern Chain and Fernando de Noronha Chain) and two in the eastern region (Abrolhos Chain and Vitória-Trindade Chain (VTC); Fig. 10.1). The seamounts of the VTC are far better studied from a biological perspective (e.g., Fernandes et al. 2013; Meirelles et al. 2015; Pinheiro et al. 2015, 2017) than the other seamount chains (but see Haimovici et al. 2002; Coelho-Filho 2006).

MCEs in Brazil occur from the reefs adjacent to the Amazon River mouth in the north (5° N; Cordeiro et al. 2015; Moura et al. 2016) to at least the southern portion of the VTC in the south (21° S; Pinheiro et al. 2014; Fig. 10.1). MCEs also occur further south (24° S), where scleractinian corals, octocorals, and reef fishes are commonly found over rock bottoms between 30 and 45 m, and possibly deeper, due to the availability of hard substrata (CELF and CLBF, pers. obs.; Fig. 10.2a). The four Brazilian oceanic islands and seamounts also harbor extensive MCEs.

The north and northeast regions are under the influence of the North and South Equatorial currents (E-W direction; 26–28 °C). Between 3 and 10° N, insular and continental shelves are also affected by the relatively cold subsurface Equatorial Countercurrent (W-E direction). The latter drives frequent upwellings (temperatures as low as 16 °C) between 40 and 70 m depth in the SPSPA, the only Brazilian oceanic outpost in the northern hemisphere (Rocha 2003; Moreira et al. 2015). The northeast, east, and southeast regions are under the influence of the Brazilian Current (BC), a poleward-flowing western boundary current. Rocky reefs of the southeast/south region are also under the influence of the South Atlantic Central Water Mass (SACW; 12–18 °C and salinity <36.4) and the Coastal Water Mass (CW), which has

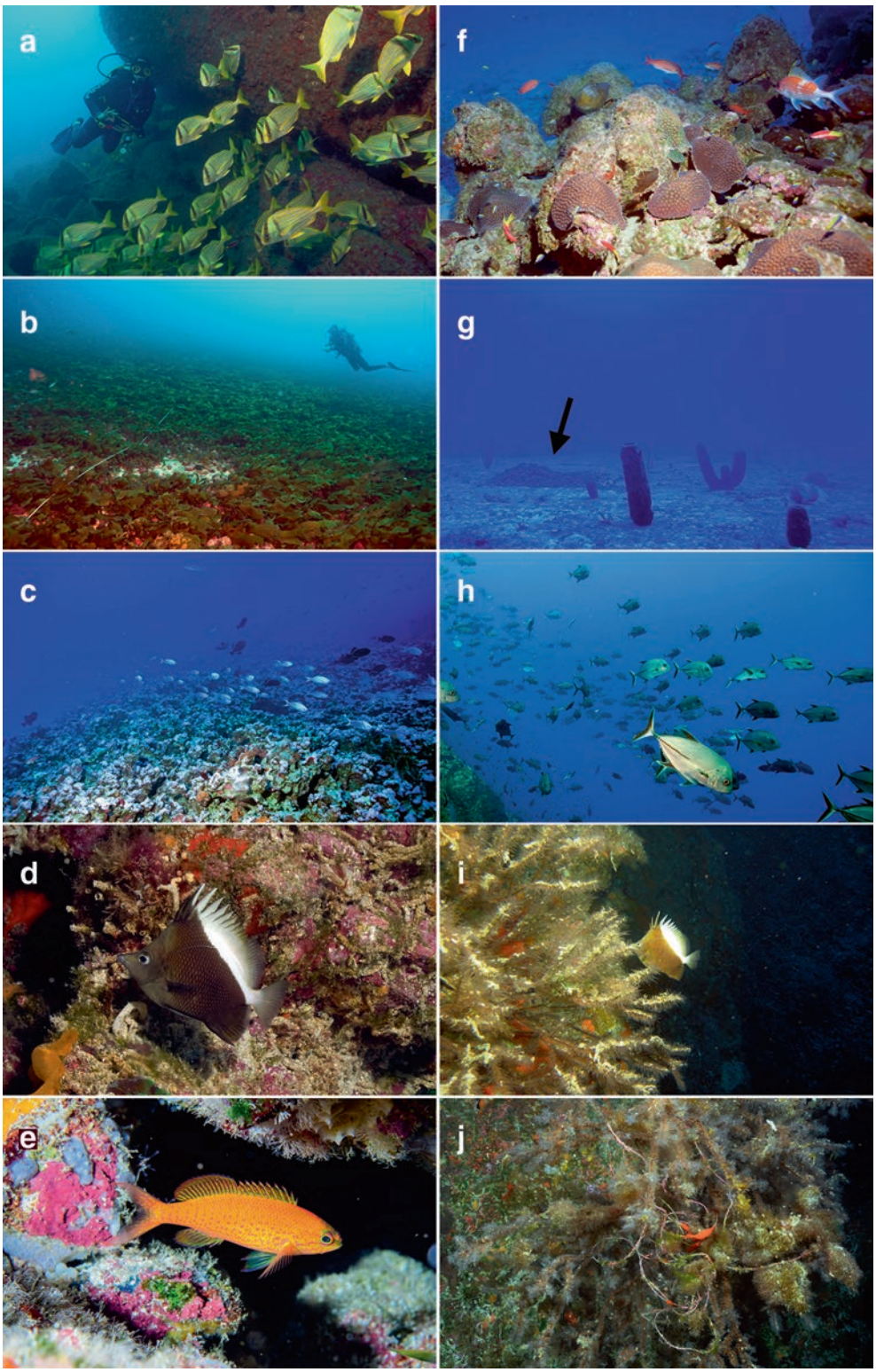

Fig. 10.2 MCEs in Brazil. (**a**) School of *Anisotremus virginicus* over a rocky reef in the upper mesophotic (~40 m) zone of southeast Brazil. (**b**) Rhodolith bed covered by fleshy macroalgae in the Abrolhos Bank (45 m). (**c**) A complex reef in the middle of a large rhodolith bed on the top of the Davis seamount, VTC (45 m), (**d**) *Prognathodes obliquus* (60 m) and (**e**) *Choranthias salmopunctatus* (75 m), both species endemic to the mesophotic zone of the SPSPA. (**f**) A deep reef in the Trindade Islands (83 m) dominated by the scleractinian coral *M. cavernosa* and fishes typical of Brazilian MCEs: *Bodianus pulchellus*, *Holocentrus adscensionis*, and *Paranthias furcifer*. (**g**) A rhodolith mound (black arrow) and tubular sponges over beach rock bottom off Paraíba State, NE Brazil (65 m). (**h**) School of the black jack *Caranx lugubris*, a piscivore and an important fishery resource in the upper mesophotic zone of the SPSPA (40 m). (**i**) *P. obliquus* seeking refuge in a branching black coral *Tanacetipathes* sp. (75 m) in the SPSPA. (**j**) Fishing line entangled in a branching black coral colony in the SPSPA (67 m). See details on the locations in Fig. 10.1. (Photo credits: CLB Francini (**a**, **b**); LA Rocha (**e**); RB Francini-Filho (**c**, **d**, **f**, **h**, **i**, **j**); MB Silva (**g**))

relatively low salinity due to the dilution of oceanic water by continental freshwater input (Piola et al. 2000). While shallow reefs of the southeast region are seasonally bathed by the warm surface waters of the BC that allows a typical tropical fauna to flourish, MCEs are continuously affected by the cold waters of the SAWC.

10.3 Habitat Description

Although described by Collette and Rutzler (1977), the Amazon Reef (northern limit of the Brazilian Province) was only recently characterized in detail (Cordeiro et al. 2015; Moura et al. 2016). Most of the reef occurs between 70 and 220 m, thus extending deeper than the traditional lower boundary (150 m) used to classify MCEs (Hinderstein et al. 2010; Kahng et al. 2010). A recent expedition recorded the first images of the Amazon Reef using a Dual DeepWorker two-person submarine (Francini-Filho et al. 2018). Results obtained showed high bottom complexity and a diversity of habitats, including rhodolith beds, sponges, soft corals, and black coral gardens over calcareous platforms built mainly by fused rhodoliths and living crustose calcareous algae (coralline algal frameworks; cf. Bosence 1983). Turbid waters and sediment accumulation seem to be the major factors limiting reef occurrence shallower than 70 m, while low-light levels and a lack of hard substrata determine the lower boundary of the Amazon Reef (i.e., 220 m). Light is a limiting factor for autotrophic reef organisms (coralline algae and zooxanthellate scleractinians), but not to heterotrophic ones, particularly sponges (e.g., *Aplysina lacunosa* and *Geodia neptuni*) and black corals (e.g., *Tanacetipathes* spp.; see Table 10.1).

Data for other sites in the north region were obtained by SCUBA in the upper mesophotic zone of the Manuel Luis Reefs (30 m; Amaral et al. 2007) and Ceará State (35–37 m; Soares et al. 2016) and by dredging (50–100 m) in the Ceará State (Coelho-Filho et al. 2004). Beach rock bottoms sparsely covered by the scleractinian *M. cavernosa* and massive sponges were recorded in Ceará (Soares et al. 2016), while more complex biogenic reefs (pinnacles) were recorded in the Manuel Luis Reefs (Moura et al. 1999).

Literature information, together with primary data, indicate that MCEs along most of the northeast and east outer continental shelfs are dominated by rhodolith beds densely covered by fleshy macroalgae over relatively flat bottoms (Amado-Filho et al. 2012b; Brasileiro et al. 2016; Fig. 10.2b) and by complex shelf-edge rocky reef formations (Olavo et al. 2011). The rhodolith beds are interspersed with more complex reefs (Fig. 10.2c) formed primarily by crustose coralline algae and covered by massive sponges and black corals. The shelf-edge rocky reefs in the northeast region, as described from in situ (Feitoza et al. 2005) and drop camera observations, have a steep profile and are mostly covered by coralline algae, massive sponges, black corals, and a few scleractinians (MBS, RSR, and RBFF, unpubl. data).

Data for the Fernando de Noronha seamount chain (FNC) was obtained by dredging, but results were pooled with sampling stations on the continental shelf of the north region (Ceará and Maranhão States; Coelho-Filho et al. 2009). Two dives performed between 40 and 75 m in one seamount of the FNC (Sueste) indicated the presence of extensive rhodolith beds and complex reef structures (RBFF, pers. obs.). Only dredging data is available for the Abrolhos Chain, and coralline algae appear as the major reef builders (Lavrado and Ignácio 2006). The tops of seamounts of the VTC (40–100 m) and the insular platform of Trindade Island (30–90 m) are dominated by rhodolith beds. The VTC also harbors large and more complex coralline reef structures (Pinheiro et al. 2014), while Trindade Island has rocky reefs up to 80 m depth (Pereira-Filho et al. 2012). Rhodolith beds are the predominant feature in mesophotic depths of the Abrolhos Bank, eastern Brazil (Amado-Filho et al. 2012b; Moura et al. 2013). Foster (2001) has already indicated the dominance of rhodolith beds in mesophotic depths along the entire Brazilian continental shelf. Recent studies of MCEs at oceanic sites indicate the widespread occurrence of rhodolith beds at the Fernando de Noronha Archipelago (Amado-Filho et al. 2012a) and Rocas Atoll (Amado-Filho et al. 2016). The SPSPA, formed by the uplifted mantle rock, is an exception because of its steep slope and lack of large horizontal platforms in depths <200 m, which accumulates few sediments and does not form rhodolith beds (Maia et al. 2016).

Below 21° S, MCEs of the southeast Brazilian Shelf (i.e., warm-temperate southwestern Atlantic region) are mostly unexplored by SCUBA. Bottom-trawl surveys along the shelf edge (~120 to 200 m) indicated the presence of several reef fishes, such as *Gymnothorax ocellatus*, *Pontinus rathbuni*, and *Serranus atrobranchus* (Haimovici et al. 1994). In situ observations indicate that rocky reefs consist of steep slopes up to 50 m depth, with rocky boulders extending along sand interfaces and isolated patch reefs of various dimensions (CELF and CLBF, pers. obs.).

10.4 Biodiversity

A total of 476 sessile benthic species are recorded for Brazilian MCEs, comprising 234 species of algae, 166 Porifera, and 76 anthozoan cnidarians. In addition, 25 elasmobranchs and 275 teleost fishes were recorded (Table 10.1). This is a conservative estimate, as only taxa identified to the species level and with reliable depth records were considered in this study, and most MCEs in Brazil still lack detailed taxonomic surveys. There is only sparse information for microbes (Cavalcanti et al. 2014; Meirelles et al. 2015) and several other invertebrate groups associated with Brazilian

Table 10.1 Species recorded in Brazilian MCEs

Family	Taxa	Locality	Depth range (m)	Reference
	Algae			
	Chlorophyta			
Anadyomenaceae	*Anadyomene lacerata* D.S. Littler & M.M. Littler 1991	AB, ABC, VTC	30–108	6, 19
	Anadyomene linkiana D.S. Littler & M.M. Littler 1991	AB, ABC, SS	71–106	6, 19
	Anadyomene pavonina (J. Agardh) Wille 1910	AB, ABC, SS, VTC	37–108	19
	Anadyomene saldanhae A.B. Joly & E.C. Oliveira 1969	AB, ABC, FNC–CS, SS, VTC	37–106	6, 19, 26
	Anadyomene stellata (Wulfen) C. Agardh 1823	AB, ABC, FNC–CS, SS, VTC	31–108	6, 19, 26
	Microdictyon agardhianum Decaisne 1841	SS	106	19
	Microdictyon calodictyon (Montagne) Kützing 1849	ABC, SS	50–106	19
	Microdictyon marinum Bory de Saint–Vincent 1825	AB, ABC	30–60	6, 19
	Microdictyon pseudohapteron A. Gepp & E.S. Gepp 1908	ABC	50	19
	Microdictyon umbilicatum (Velley) Zanardini 1862	ABC, SS, VTC	50–106	19
	Microdyction vanbosseae Setchell 1926	AB, FNC–CS, SS	50–106	19, 26
Boodleaceae	*Phyllodictyon anastomosans* (Harvey) Kraft & M.J. Wynne 1996	ABC	82	19
	Phyllodictyon pulcherrimum J.E. Gray 1866	ABC, SS	50–106	19
	Struvea elegans Børgesen 1912	ABC	50–55	19
Bryopsidaceae	*Bryopsis pennata* J.V. Lamouroux 1809	AB, SPSPA	30–60	6, 8
Caulerpaceae	*Caulerpa cupressoides* var. *serrata* (Kützing) Weber–van Bosse 1898	ABC, FNC–CS	50–100	19, 26
	Caulerpa kempfii A.B. Joly & S.M.B. Pereira 1975	ABC, FNC–CS, NECO, SS, VTC	50–100	19, 26
	Caulerpa lanuginosa J. Agardh 1873	ABC, NECO	50	19
	Caulerpa mexicana Sonder ex Kützing 1849	ABC, FNC–CS, VTC	50–108	19, 26
	Caulerpa murrayi Weber–van Bosse 1898	ABC, VTC	50–108	19
	Caulerpa prolifera (Forsskål) J.V. Lamouroux 1809	VTC	62	19
	Caulerpa pusilla (Kützing) J. Agardh 1873	ABC, FNC–CS, NECO, SS, VTC	40–106	19, 26
	Caulerpa racemosa (Forsskål) J. Agardh 1873	ABC, AMAZ, FNC–CS	50–100	13, 19, 26
	Caulerpa taxifolia (M. Vahl) C. Agardh 1817	NECO	50	19
	Caulerpa verticillata f. *charoides* Weber–van Bosse 1898	AB, ABC, VTC	41–108	6, 19
	Caulerpa webbiana Montagne 1837	VTC	52	19

(continued)

Table 10.1 (continued)

Family	Taxa	Locality	Depth range (m)	Reference
Cladophoraceae	*Cladophora brasiliana* G. Martens 1866	AB	30–70	6
	Cladophora catenata (Linnaeus) Kützing 1843	AB	30–60	6
	Cladophora longicellulata C. Hoek 1969	ABC	50	19
	Cladophora ordinata (Børgesen) C. Hoek 1982	AB	51–60	6
	Cladophora rupestris (Linnaeus) Kützing 1843	AB	31–40	6
Codiaceae	*Codium decorticatum* (Woodward) M. Howe 1911	ABC, SS, VTC	50–125	19
	Codium intertextum Collins & Hervey 1917	AB, SS	41–60	6, 19
	Codium isthmocladum Vickers 1905	AB, ABC, SS	30–72	6, 19
	Codium taylorii P.C. Silva 1960	ABC, SS, VTC	50–59	19
Dasycladaceae	*Dasycladus vermicularis* (Scopoli) Krasser in Beck & Zahlbruckner 1898	VTC	108	19
	Neomeris annulata Dickie 1874	AB	41–50	6
Dichotomosiphonaceae	*Avrainvillea longicaulis* (Kützing) G. Murray & Boodle 1889	FNC–CS	50–100	26
	Avrainvillea nigricans Decaisne 1842	VTC	108	19
Halimedaceae	*Halimeda discoidea* Decaisne 1842	AB, ABC, FNC–CS, SS, VTC	40–125	19, 26
	Halimeda gracilis Harvey ex J. Agardh 1887	AB, ABC, FNC–CS, SS, VTC	31–106	6, 19, 26
	Halimeda incrassata (J. Ellis) J.V. Lamouroux 1816	FNC–CS	50–100	26
	Halimeda opuntia (Linnaeus) J.V. Lamouroux 1816	FNC–CS	50–100	26
	Halimeda tuna (J. Ellis & Solander) J.V. Lamouroux 1816	ABC, FNC–CS	50–100	19, 26
Palmophyllaceae	*Palmophyllum crassum* (Naccari) Rabenhorst 1868	AB, ABC, SS, VTC	50–125	19
	Palmophyllum umbracola W.A. Nelson & K.G. Ryan 1986	AB, SS	69–106	19
	Verdigellas fimbriata D.L. Ballantine & J.N. Norris 1994	AB	>70	6
	Verdigellas peltata D.L. Ballantine & J.N. Norris 1994	AB, ABC, VTC	50–125	6,19
Pseudocodiaceae	*Pseudocodium floridanum* Dawes & Mathieson 1972	ABC	40–82	19
Rhipiliaceae	*Rhipilia crassa* A.J.K. Millar & Kraft 2001	ABC	100	19
	Rhipiliopsis peltata (J. Agardh) A. Gepp & E. Gepp 1911	VTC	52	19
Siphonocladaceae	*Chamaedoris peniculum* (J. Ellis & Solander) Kuntze 1898	AB, ABC, FNC–CS, VTC	30–108	6, 19, 26
	Dictyosphaeria cavernosa (Forsskål) Børgesen 1932	AB, ABC, VTC	31–108	6, 19
	Dictyosphaeria versluysii Weber–van Bosse 1905	FNC–CS	50–100	26

(continued)

Table 10.1 (continued)

Family	Taxa	Locality	Depth range (m)	Reference
Udoteaceae	*Boodleopsis pusilla* (F.S. Collins) W.R. Taylor A.B. Joly & Bernatowicz 1953	AB	>70	6
	Penicillus capitatus Lamarck 1813	FNC–CS	50–100	26
	Penicillus pyriformis A. Gepp & E.S. Gepp 1905	ABC	50	19
	Rhipidosiphon floridensis D.S. Littler & Littler 1990	ABC, VTC	50–55	19
	Udotea abbottiorum D.S. Littler & Littler 1990	NECO, VTC	50–108	19
	Udotea caribaea D.S. Littler & Littler 1990	AB	37	19
	Udotea cyathiformis Decaisne 1842	AB, ABC, VTC	41–108	6, 19
	Udotea flabellum (J. Ellis & Solander) M. Howe 1904	FNC–CS, SS, VTC	38–108	19, 26
	Udotea occidentalis A. Gepp & E.S. Gepp 1911	FNC–CS, SS	50–100	19, 26
Ulvaceae	*Pringsheimiella scutata* (Reinke) Marchewianka 1925	ABC	50	19
	Ulva fasciata Delile 1813	AB, ABC, VTC	50–108	19
	Ulva lactuca Linnaeus 1753	AB	>70	6
	Ulvella lens P. Crouan & H. Crouan 1859	ABC	50	19
Valoniaceae	*Valonia aegagropila* C. Agardh 1823	FNC–CS	50–100	26
	Valonia macrophysa Kützing 1843	ABC, FNC–CS, VTC	50–108	19, 26
	Valonia utricularis (Roth) C. Agardh 1823	SS	106	19
	Valonia ventricosa J. Agardh 1887	AB, ABC, FNC–CS	40–100	6, 19, 26
	Heterokontophyta			
Dictyotaceae	*Canistrocarpus cervicornis* (Kützing) De Paula & De Clerck 2006	AB	30–70	6
	Dictyopteris delicatula J.V. Lamouroux 1809	AB, FNC–CS, SS	50–106	6, 19, 26
	Dictyopteris jamaicensis W.R. Taylor 1960	SS	106	19
	Dictyopteris jolyana E.C. Oliveira & R.P. Furtado 1978	AB, ABC, FNC–CS	50–100	19, 26
	Dictyopteris justii J.V. Lamouroux 1809	AB, ABC, FNC–CS, NECO, VTC	40–100	6, 19, 26
	Dictyopteris plagiogramma (Montagne) Vickers 1905	ABC, FNC–CS, SS	40–106	19, 26
	Dictyota bartayresiana J.V. Lamouroux 1809	AB, ABC, VTC	41–108	6, 19
	Dictyota cervicornis Kützing 1859	ABC	50	19
	Dictyota ciliolata Sonder ex Kützing 1859	FNC–CS	50–100	26
	Dictyota menstrualis (Hoyt) Schnetter, Hörning & Weber–Peukert 1987	SPSPA	30–50	8
	Dictyota mertensii (Martius) Kützing 1859	AB, FNC–CS	30–100	6, 26
	Dictyota pfaffii Schnetter 1972	ABC	50	19
	Dictyota pulchella Hörnig & Schnetter 1988	AB, ABC	31–70	6, 19

(continued)

Table 10.1 (continued)

Family	Taxa	Locality	Depth range (m)	Reference
	Lobophora variegata (J.V. Lamouroux) Womersley ex E.C. Oliveira 1977	AB, ABC, AMAZ, FNC–CS, VTC	30–125	6, 13, 19, 26
	Padina gymnospora (Kützing) Sonder 1871	AB	30–70	6
	Padina profunda Earle 1969	AB, ABC	31–50	6, 19
	Spatoglossum schroederi (C. Agardh) Kützing 1859	AB, ABC	37–84	19
	Stypopodium zonale (J.V. Lamouroux) Papenfuss 1940	AB, ABC, FNC–CS, VTC	30–100	6, 26
	Zonaria tournefortii (J.V. Lamouroux) Montagne 1846	ABC	50–100	19
Laminariaceae	**Laminaria abyssalis* A.B. Joly & E.C. Oliveira 1967	AB, SS	65–100	6, 19
Sargassaceae	*Sargassum hystrix* var. *spinulosum* (Kützing) Grunow 1915	AB, FNC–CS	30–100	6, 26
Scytosiphonaceae	*Colpomenia sinuosa* (Mertens ex Roth) Derbès & Solier 1851	AB	30–50	6
	Rosenvingea intricata (Agardh) Børgesen 1914	AB	30–60	6
	Rosenvingea sanctae–crucis Børgesen 1914	AB	31–40	6
Sphacelariaceae	*Sphacelaria novae–hollandiae* Sonder 1845	AB	30–50	6
	Sphacelaria rigidula Kützing 1843	AB, SPSPA	30–60	6, 8
Sporochnaceae	*Carpomitra costata* (Stackhouse) Batters 1902	AB, ABC	65–82	19
	Nereia tropica (W.R. Taylor) W.R. Taylor 1955	AB, VTC	30–55	6, 19
	Sporochnus bolleanus Montagne 1856	ABC	50	19
	Ochrophyta			
Scytosiphonaceae	*Colpomenia sinuosa* (Mertens ex Roth) Derbès & Solier 1851	FNC–CS	50–100	26
	Rhodophyta			
Acrochaetiaceae	*Acrochaetium antillarum* Taylor 1942	AMAZ	40	13
	Acrochaetium liagorae Børgesen 1915	AB	41–50	6
Bonnemaisoniaceae	*Asparagopsis taxiformis* (Delile) Trevisan de Saint–Léon 1845	AB, SPSPA	30–60	6, 8
Ceramiaceae	*Acrothamnion butlerae* (F.S. Collins) Kylin 1956	AB	30–60	6
	Aglaothamnion halliae (Collins) Aponte, D.L. Ballantine & J.N. Norris 1997	VTC	106	19
	Aglaothamnion uruguayense (W.R. Taylor) N.E. Aponte, D.L. Ballantine & J.N. Norris 1994	VTC	106	19
	Antithamnion antillanum Børgesen 1917	AB	31–50	6
	Antithamnion cf. *decipiens* (J. Agardh) Athanasiadis 1996	AB	41–50	6
	Callithamnion tingitana Schousboe ex Bornet 1892	SS	106	19
	Centroceras clavulatum (C. Agardh) Montagne 1846	FNC–CS	50–100	26

(continued)

Table 10.1 (continued)

Family	Taxa	Locality	Depth range (m)	Reference
	Ceramium affine Setchell & N.L. Gardner 1930	SPSPA	30–40	8
	Ceramium tenerrimum (G. Martens) Okamura 1921	SS	46	19
	Ceramium vagans Silva 1987	AB	41–50	6
	Crouania attenuata (C. Agardh) J. Agardh 1842	AB	41–60	6
	Gayliella flaccida (Harvey ex Kützing) T.O. Cho & L.J. McIvor 2008	AB	30–60	6
	Gymnothamnion elegans (Schousboe ex C. Agardh) J. Agardh 1892	AB	41–50	6
	Haloplegma duperreyi Montagne 1842	AB	30–60	6
	Pterothamnion heteromorphum (J. Agardh) Athanasiadis & Kraft 1994	SS	106	19
	Spyridia filamentosa (Wulfen) Harvey 1833	AB	30–50	6
Champiaceae	*Champia parvula* (C. Agardh) Harvey 1853	SPSPA	30–60	8
Colaconemataceae	*Colaconema infestans* (M.A. Howe & Hoyt) Woelkerling 1973	AB	41–50	6
Corallinaceae	*Amphiroa beauvoisii* Lamouroux 1816	AB, FNC–CS	30–100	6, 26
	Amphiroa fragilissima (Linnaeus) Lamouroux 1816	AMAZ	60	13
	Amphiroa rigida J.V. Lamouroux 1816	FNC–CS	50–100	26
	Corallina officinalis Linnaeus 1758	FNC–CS	50–100	26
	Haliptilon cubense (Montagne ex Kützing) Garbary & H.W. Johansen 1982	AB, VTC	37–52	19
	Haliptilon subulatum (J.Ellis & Solander) H.W. Johansen 1970	VTC	55	19
	Harveylithon rupestre (Foslie) A. Rösler, Perfectti V. Peña & J.C. Braga 2016	AB, AMAZ, FNA, ROC	30–70	6, 12, 13, 27
	Jania adhaerens J.V. Lamouroux 1816	AB, AMAZ, SPSPA, SS	30–106	6, 8, 13, 19
	Jania capillacea Harvey 1853	FNC–CS, SPSPA, SS	30–100	8, 19, 26
	Jania cubensis Montagne ex Kützing 1849	AB, FNC–CS	51–100	6, 26
	Jania pumila J.V. Lamouroux 1816	FNC–CS	50–100	26
	Jania rubens (Linnaeus) J.V. Lamouroux 1816	SS	50	19
	Jania subulata (Ellis & Solander) Sonder 1848	AB, FNC–CS	51–100	6, 26
	Lithophyllum corallinae (P.L. Crouan & H.M. Crouan) Heydrich 1897	FNA	30–100	27
	Lithophyllum prototypum (Foslie) Foslie 1905	AB, VTC	41–70+	6, 9
	Lithophyllum stictaeforme (J.E. Areschoug) Hauck 1877	AB	30–60	6
	Lithothamnion crispatum Hauck 1878	FNA	30–100	27

(continued)

Table 10.1 (continued)

Family	Taxa	Locality	Depth range (m)	Reference
	Mesophyllum engelhartii (Foslie) W.H. Adey 1970	FNA	30–100	27
	Porolithon onkodes (Heydrich) Foslie 1909	VTC	40–71	9
	Sporolithon episporum (M. Howe) E.Y. Dawson 1960	FNA	30–100	27
	Sporolithon ptychoides Heydrich 1897	FNA	30–100	27
	Titanoderma pustulatum (J.V. Lamouroux) Nägeli 1858	AB	41–70+	6
Cystocloniaceae	*Craspedocarpus jolyi* (E.C. Oliviera) C.W. Schneider 1988	SS	59	19
	Hypnea musciformis (Wulfen) J.V. Lamouroux 1813	AB	61–70	6
	Hypnea spinella (C. Agardh) Kützing 1847	AB, FNC–CS	31–100	6, 26
Dasyaceae	*Dasya baillouviana* (S.G. Gmelin) Montagne 1841	AB	41–50	6
	Dasya ocellata (Grateloup) Harvey 1833	SS	106	19
	Dasya rigidula (Kützing) Ardissone 1878	AB, SS	41–106	6, 19
	Dictyurus occidentalis J. Agardh 1847	AB	41–50	6
	Heterosiphonia crispella (C. Agardh) M.J. Wynne 1985	AB	31–60	6
Delesseriaceae	*Acrosorium ciliolatum* (Harvey) Kylin 1924	SS	46–106	19
	Branchioglossum minutum C. W. Schneider 1975	VTC	60	19
	Cryptopleura ramosa (Hudson) L. Newton 1931	SS	58	19
	Frikkiella searlesii M. J. Wynne & C. W. Schneider 1996	VTC	60	19
	Hypoglossum hypoglossoides (Stackhouse) F.S. Collins & Hervey 1917	AB, SPSPA, SS	30–60	6, 8, 19
	Hypoglossum tenuifolium (Harvey) J. Agardh 1898	AB, AMAZ	41–83	6, 13
Delesseriaceae	*Nitophyllum wilkinsoniae* F.S. Collins & Hervey 1917	SPSPA	30–60	8
Erythrotrichiaceae	*Erythrotrichia carnea* (Dillwyn) J. Agardh 1883	AB, AMAZ	41–60	6, 13
	Sahlingia subintegra (Rosenvinge) Kornmann 1989	AB, AMAZ	30–109	6, 13
Faucheaceae	*Gloiocladia iyoensis* (Okamura) R.E. Norris 1991	AB, SPSPA	30–60	6, 8
Galaxauraceae	*Dichotomaria obtusata* (J. Ellis & Solander) Lamarck 1816	AB, FNC–CS	51–100	6, 26
	Tricleocarpa cylindrica (J. Ellis & Solander) Huisman & Borowitzka 1990	FNC–CS	50–100	26
Gelidiaceae	*Gelidium pusillum* (Stackhouse) Le Jolis 1863	AMAZ, SPSPA	30–60	8, 13

(continued)

Table 10.1 (continued)

Family	Taxa	Locality	Depth range (m)	Reference
Gracilariaceae	*Gracilaria cervicornis* (Turner) J. Agardh 1852	AB	30–60	6
	Gracilaria cuneata J.E. Areschoug 1854	FNC–CS	50–100	26
	Gracilaria mammillaris (Montagne) M.A. Howe 1918	AB	31–40	6
	Tricleocarpa fragilis (Linnaeus) Huisman & R.A. Townsend 1993	ABC, SS, VTC	50–100	19
Halymeniaceae	*Grateloupia filicina* (J.V. Lamouroux) C. Agardh 1822	AB	31–40	6
	Corynomorpha clavata (Harvey) J. Agardh 1872	AB	31–60	6
	Cryptonemia bengryi W.R. Taylor 1960	ABC	50	19
	Cryptonemia crenulata (J. Agardh) J. Agardh 1851	AB, SS	30–106	6, 19
	Cryptonemia delicatula Joly & Cordeiro 1966	AB, SS	61–106	6, 19
	Cryptonemia flabellifolia Pinheiro–Joventino & E.C. Oliveira 1977	AB, SS	38–106	19
	Cryptonemia limensis (Kützing) J.A. Lewis 1990	AB, ABC, SS, VTC	40–67	19
	Cryptonemia seminervis (C. Agardh) J. Agardh 1846	ABRO, SS, VTC	51–106	6, 19
	Halymenia elongata C. Agardh 1822	AB	41–60	6
	Halymenia floresii (Clemente) C. Agardh 1817	AB, AMAZ	30–55	6, 13
	Halymenia floridana J. Agardh 1892	AB	>70	6
	Halymenia rosea M. Howe & W.R. Taylor 1931	SS	60–106	19
	Halymenia vinacea M.A. Howe & W.R. Taylor 1931	AB, SS	41–67	6, 19
Hapalidiaceae	*Mesophyllum erubescens* (Foslie) Me. Lemoine 1928	AB	30–60	6
Hymenocladiaceae	*Asteromenia peltata* (W.R. Taylor) Huisman & A.J.K. Millar 1996	AB, SS	30–106	6, 19
Kallymeniaceae	*Callophyllis microdonta* (Greville) Falkenberg 1901	AB, SS, VTC	55–98	19
	Kallymenia limminghei Montagne 1861	AB, SPSPA	30–60	6, 8
Lithothamniaceae	*Lithothamnion crispatum* Hauck 1878	AB, AMAZ, ROC	30–70	6, 12, 13
	Phymatolithon masonianum Wilks & Woelkerling 1994	VTC	40–71	9
Peyssonneliaceae	*Peyssonnelia boergesenii* Weber–van Bosse in Børgesen 1916	ABC, SS, VTC	40–55	19
	Peyssonnelia inamoena Pilger 1911	AB	41–50	6
Phyllophoraceae	*Petroglossum undulatum* C.W. Schneider 1976	AB, SS	51–106	6, 19
	Stenogramma interruptum (C. Agardh) Montagne 1846	SS	59	19
Plocamiaceae	*Plocamium brasiliense* (Greville) M.A. Howe & W.R. Taylor 1931	AB, SS	52–65	6, 19
Pterocladiaceae	*Pterocladiella capillacea* (S.G. Gmelin) Santelices & Hommersand 1997	SS	106	19

(continued)

Table 10.1 (continued)

Family	Taxa	Locality	Depth range (m)	Reference
Rhodomelaceae	*Amansia multifida* Lamouroux 1809	AB	51–60	6
	Bryothamnion triquetrum (S.G. Gmelin) M.A. Howe 1915	AB	51–60	6
	Chondria dasyphylla (Woodward) C. Agardh 1817	AB	41–60	6
	Chondria platyramea Joly & Ugadim 1966	AB	51–60	6
	Dipterosiphonia dendritica (C. Agardh) F. Schmitz 1897	AB	30–60	6
	Dipterosiphonia reversa C.W. Schneider 1975	AB	30–60	6
	Halopithys schottii (W.R. Taylor) L.E. Phillips & De Clerck 2005	SS	82	19
	Herposiphonia bipinnata M.A. Howe 1920	AB	41–50	6
	Herposiphonia secunda (C. Agardh) Ambronn 1880	AB, AMAZ	30–70	6, 13
	Herposiphonia tenella (C. Agardh) Ambronn 1880	AB	30–60	6
	Heterodasya mucronata (Harvey) M.J. Wynne 2005	AB	30–70	6
	Murrayella periclados (C. Agardh) F. Schmitz 1893	AB	30–50	6
	Neosiphonia ferulacea (Suhr ex J. Agardh) S.M. Guimarães & M.T. Fujii 2004	ECS	45	19
	Neosiphonia gorgoniae (Harvey) S.M. Guimarães & M.T. Fujii 2004	AB	30–40	6
	Osmundaria melvillii (J. Agardh) R.E. Norris 1991	SS	46	19
	Osmundaria obtusiloba (C. Agardh) R.E. Norris 1991	AB, SS	46–60	6, 19
	Palisada furcata (Cordeiro–Marino & M.T. Fujii) Cassano & M.T. Fujii 2012	AB	41–60	6
	Periphykon delesserioides A.B. Joly, Ugadim & E.C. Oliveira 1967	AB	30–50	6
	Polysiphonia denudata (Dillwyn) Greville ex Harvey 1833	SPSPA	30–60	8
	Xiphosiphonia pennata (C. Agardh) Savoie & G.W. Saunders 2016	SS	106	19
	Wrightiella tumanowiczii (Gatty ex Harvey) F. Schmitz 1893	AB, SS, VTC	30–108	6, 19
Rhodymeniaceae	*Botryocladia bahamensis* Ballantine & Aponte 2002	AB	31–50	6
	Botryocladia occidentalis (Børgesen) Kylin 1931	AB	51–60	6
	Botryocladia pyriformis (Børgesen) Kylin 1931	SS	106	19
	Chrysymenia enteromorpha Harvey 1853	VTC	50	19
	Chrysymenia ventricosa (J.V. Lamouroux) J. Agardh 1842	AB	30–50	6
	Rhodymenia pseudopalmata (J.V. Lamouroux) P.C. Silva 1952	AB	51–60	6
Rhizophyllidaceae	*Ochtodes secundiramea* (Montagne) M. Howe 1920	ABC	50	19

(continued)

Table 10.1 (continued)

Family	Taxa	Locality	Depth range (m)	Reference
Schizymeniaceae	*Titanophora submarina* K.E. Bucher & J.N. Norris 1992	AB	30–50	6
	Platoma gelatinosum (M.A. Howe) C.W. Schneider, McDevit, G.W. Saunders & C.E. Lane 2011	AB	41–50	6
Solieriaceae	*Flahaultia tegetiformans* W.R. Taylor 1974	AB	41–50	6
	Wurdemannia miniata (Sprengel) Feldmann & G. Hamel 1934	AB	31–40	6
Sporolithaceae	*Sporolithon episporum* (M.A. Howe) E.Y. Dawson 1960	AB	30–50	6
	Sporolithon ptychoides Heydrich 1897	AB, AMAZ, ROC	41–60	6, 12, 13
	Sporolithon tenue R.G. Bahia, G.M. Amado–Filho, G.W. Maneveldt & W.H. Adey 2013	AB	30–40	6
Stylonemataceae	*Stylonema alsidii* (Zanardini) K.M. Drew 1956	AB	41–50	6
Wrangeliaceae	*Compsothamnion thuyoides* (Smith) Nägeli 1862	SS, VTC	46–60	19
	Diplothamnion tetrastichum A.B. Joly & Yamaguishi 1966	SS	106	19
	Griffithsia schousboei Montagne 1839	AB	41–60	6
	Pleonosporium polystichum E.C. Oliveira 1969	SS	91	19
	Porifera			
Acarnidae	*Acarnus nicoleae* van Soest, Hooper & Hiemstra 1991	AB, SS	60–75	35
	**Acarnus radovani* Boury–Esnault 1973	NECO, SS	51–59	35
	**Acarnus toxeata* Boury–Esnault 1973	AB, ABC	65	19, 35
Agelasidae	*Agelas clathrodes* Schmidt 1870	ABC, AMAZ, ROC, VTC	30–110	1, 12, 13,19
	Agelas conifera Schmidt 1870	AB, VTC	50–58	35
	Agelas dispar Duchassaing & Michelotti 1864	AB, AMAZ, CE, FNC–CS, NECO, ROC, VTC	30–270	12, 13, 19, 26, 35
	Agelas sceptrum Lamarck 1815	FNC–CS	72–100	35
	Agelas schmidti Wilson 1902	AB, ABC, ECS, FNC–CS, VTC	50–108	19, 35
	Agelas sventres Lehnert & van Soest 1996	AMAZ	55–79	13
	Agelas tubulata Lehnert & van Soest 1996	AB, ECS	50–83	35
	Agelas wiedenmayeri Alcolado 1984	FNC–CS	60–94	35
Amphoriscidae	*Leucilla uter* Poléjaeff 1883	ABC, CE, ECS, NECO, VTC	35–65	35
Ancorinidae	*Asteropus brasiliensis* Hajdu & van Soest 1992	NECO	75	35
	Jaspis johnstonii Schmidt 1862	SS	150	35
	Jaspis salvadori Boury–Esnault 1973	AB	49	35
	**Rhabdastrella virgula* Boury–Esnault 1973	NECO	45	35
	Stelletta anancora Sollas 1886	FNC–CS	50–100	26
	**Stelletta ruetzleri* Mothes & Silva 2002	SS	128–200	35
	Tribrachium schmidtii Weltner 1882	AMAZ, ECS	30–91	13, 35

(continued)

Table 10.1 (continued)

Family	Taxa	Locality	Depth range (m)	Reference
Aplysinidae	*Aiolochroia crassa* Hyatt 1875	AB, ABC, AMAZ, ECS, NECO, ROC, VTC	30–125	1, 12, 13,19, 35
	Aplysina cauliformis Carter 1882	ABC, AMAZ, ASS, ECS, VTC	30–270	1, 13, 35
	Aplysina fulva Pallas 1766	AMAZ, FNA, FNC–CS, NECO	30–166	13, 26, 35
	Aplysina lacunosa Lamarck 1814	AB, ABC, AMAZ, ECS, VTC	30–730	13, 19, 35
	**Aplysina orthoreticulata* Pinheiro, Hajdu & Custódio 2007	ECS	40	35
	**Aplysina pseudolacunosa* Pinheiro, Hajdu & Custódio 2007	AB, ECS, VTC	53–108	35
	Verongula gigantea Hyatt 1875	AB, ABC, ECS, ROC, VTC	30–90	12, 35
Axinellidae	*Dragmacidon lunaecharta* Ridley & Dendy 1886	AMAZ	40–80	1
	Dragmacidon reticulatum Ridley & Dendy 1886	AMAZ, ECS, FNC–CS	30–80	13, 35
Biemnidae	**Biemna microacanthosigma* Mothes, Hajdu, Lerner & van Soest 2004	AMAZ	76	35
	**Biemna spinomicroxea* Mothes, Campos, Lerner, Carraro & van Soest 2005	AMAZ	81	35
	**Biemna trisigmata* Mothes & Campos 2004	AMAZ	76	35
Callyspongiidae	**Callyspongia* (*Callyspongia*) *coppingeri* Ridley 1881	VTC	71	35
	Callyspongia (*Cladochalina*) *fibrosa* Ridley & Dendy 1886	ECS	30–36	35
	**Callyspongia pergamentacea* Ridley 1881	ABC, AMAZ	40–80	1, 35
	Callyspongia vaginalis Lamarck 1814	AMAZ, FNC–CS	30–160	13, 35
	Callyspongia villosa Lendenfeld 1887	AMAZ	40–80	1
Chalinidae	**Haliclona* (*Haliclona*) *catarinensis* Mothes & Lerner 1994	SS	80	35
	**Haliclona* (*Halichoclona*) *lernerae* Campos, Mothes, Eckert & van Soest 2005	FNC–CS	94	35
	**Haliclona* (*Haliclona*) *lilaceus* Mothes & Lerner 1994	SS	80	35
	**Haliclona* (*Haliclona*) *mammillaris* Mothes & Lerner 1994	SS	80	35
Chondrillidae	*Chondrilla nucula* Schmidt 1862	AMAZ, FNC–CS, NECO, ROC, VTC	32–100	1, 12, 26, 35
Chondrosiidae	*Chondrosia collectrix* Schmidt 1870	SPSPA	30–60	8
Clathrinidae	**Nicola tetela* Borojevic & Peixinho 1976	AB	47	35
Clionaidae	*Cliona carteri* Ridley 1881	VTC	71	35
	Cliona celata Grant 1826	SS	97–100	35
	**Cliona raphida* Boury–Esnault 1973	SS	39	35
	Cliona schmidtii Ridley 1881	AMAZ	30–75	13
	Pione carpenteri Hancock 1867	NECO	51	35
Coelosphaeridae	*Coelosphaera biclavata* Priest 1881	AMAZ	40–80	1
	**Forcepia* (*Forcepia*) *trilabis* Boury–Esnault 1973	NECO	45–48	35
	**Lissodendoryx* (*Anomodoryx*) *recife* Boury–Esnault, 1973	NECO	33–45	35
	**Lissodendoryx* (*Anomodoryx*) *tylota* Boury–Esnault 1973	NECO	34	35

(continued)

Table 10.1 (continued)

Family	Taxa	Locality	Depth range (m)	Reference
Corallistidae	**Corallistes bispiraster* Mothes & Silva 1999	SS	150	35
	Corallistes typus Schmidt1870	SS	150	35
Crambeidae	*Monanchora arbuscula* Duchassaing & Michelotti 1864	AMAZ, ABC, ECS, ROC	30–160	12, 13, 19, 35
Crellidae	**Crella brasiliensis* Moraes 2011	SPSPA	30–60	8
Darwinellidae	*Chelonaplysilla erecta* Row 1911	SPSPA	30–60	8
	Darwinella rosacea Hechtel 1965	SPSPA	30–60	8
Desmacididae	*Desmapsamma anchorata* Carter 1882	ECS	30–36	35
Dictyodendrillidae	*Igernella notabilis* Duchassaing & Michelotti 1864	NECO	38–52	35
Dictyonellidae	*Dictyonella* cf. *madeirensis* Topsent 1928	AMAZ	40–80	1
Dysideidae	*Dysidea etheria* de Laubenfels 1936	SPSPA	30–60	8
	Dysidea fragilis Montagu 1814	NECO	42–45	35
Geodiidae	*Erylus alleni* Laubenfels 1934	FNC–CS	43–165	35
	**Erylus corneus* Boury–Esnault 1973	NECO	45	35
	Erylus formosus Sollas 1886	CE, ECS, FNC–CS, NECO, SS	30–154	26, 35
	Geodia corticostylifera Hajdu, Muricy, Custodio, Russo & Peixinho 1992	AMAZ, SS	30–72	13, 35
	Geodia gibberosa Lamarck 1815	AMAZ, NECO	30–77	13, 35
	**Geodia glariosa* Sollas 1888	ECS	30–46	35
	Geodia neptuni Sollas 1886	AMAZ, FNC–CS, NECO	30–640	1, 13, 26, 35
	**Penares anisoxia* Boury–Esnault 1973	NECO	50	35
	**Penares chelotropa* Boury–Esnault 1973	NECO	42	35
	Penares mastoidea Schmidt 1880	FNC–CS	50–100	26
Grantiidae	**Grantia atlantica* Ridley 1881	VTC	65–70	35
	**Grantia kempfi* Borojevic & Peixinho 1976	ABC, NECO	30–73	35
	Leucandra armata Urban 1908	AB, AMAZ, CE, NECO, VTC	36–90	35
	Leucandra barbata Duchassaing & Michelotti 1864	AB, VTC	47–65	35
	**Leucandra crassior* Ridley 1881	NECO	70–80	35
Halichondriidae	*Topsentia ophiraphidites* de Laubenfels 1934	AMAZ, FNC–CS	30–370	13, 35
Heteropiidae	**Grantessa anisactina* Borojevic & Peixinho 1976	NECO	42	35
	**Sycettusa flamma* Poléjaeff 1883	AMAZ	106	35
	Vosmaeropsis sericata Ridley 1881	AB, FNA, FNC–CS, NECO, ROC	30–65	35
Heteroxyidae	*Didiscus oxeata* Hechtel 1983	SPSPA, FNC–CS	30–60	8, 35
	Didiscus verdensis Hiemstra & van Soest 1991	AMAZ	30–95	13
	Myrmekioderma rea de Laubenfels 1934	FNC–CS	80	35
Hymedesmiidae	**Hemimycale insularis* Moraes 2011	SPSPA	30–60	8
	**Phorbas ramosus* Hechtel1983	ECS	60	35
Esperiopsidae	**Ulosa longimycalostylifera* Mothes, Hajdu, Lerner & van Soest 2004	FNC–CS	56	35

(continued)

Table 10.1 (continued)

Family	Taxa	Locality	Depth range (m)	Reference
Irciniidae	*Ircinia campana* Lamarck 1814	NECO	33	35
	Ircinia delicata Mothes 1996	FNC–CS	50–100	26
	Ircinia felix Duchassaing & Michelotti 1864	ROC	50–65	12
	**Ircinia pauciarenaria* Boury–Esnault 1973	NECO	51	35
	Ircinia ramosa Keller 1889	ECS	34–37	35
	Ircinia strobilina Lamarck 1816	AMAZ, ROC	30–730	1, 12, 13
Isodictyidae	*Isodictya grandis* Ridley & Dendy 1886	AMAZ	40–80	1
Iotrochotidae	*Iotrochota birotulata* Higgin 1877	ECS, NECO	30–57	35
Leucaltidae	*Ascandra ascandroides* Borojevic 1971	AMAZ	75	35
	Ascandra atlantica Thacker 1908	CE, FNC–CS, NECO, VTC	45–70	35
	Leucaltis clathria Haeckel 1872	AMAZ, CE, FNC–CS, NECO, ROC, VTC	47–93	35
Leucascidae	*Ascaltis reticulum* Schmidt 1862	AMAZ, VTC	65–75	35
	Leucascus simplex Dendy 1892	AMAZ	75	35
Leucettidae	*Leucetta floridana* Haeckel 1872	AB, AMAZ, CE, FNC–CS, NECO, ROC, VTC	31–90	35
Microcionidae	*Clathria calla* de Laubenfels 1934	AMAZ, NECO, SPSPA	30–60	8, 13, 35
	Clathria echinata Alcolado 1984	AMAZ	30–80	13
	**Clathria nicoleae* Barros, Garcia & Pinheiro 2013	AMAZ	30–55	13
	Clathria (*Thalysias*) *procera* Ridley 1884	ECS	30–36	35
	**Clathria* (*Wilsonella*) *nigra* Boury–Esnault 1973	NECO	75	35
Mycalidae	**Mycale* (*Mycale*) *beatrizae* Hajdu & Desqueyroux–Faúndez1994	SS	136	35
	Mycale (*Mycale*) *laevis* Carter 1882	ECS	31	35
	**Mycale* (*Mycale*) *quadripartita* Boury–Esnault 1973	AMAZ, ECS, FNC–CS, SS	31–60	35
Myxillidae	*Myxilla* (*Ectyomyxilla*) *chilensis* Thiele 1905	SS	97–100	35
Niphatidae	*Amphimedon caribica* Pulitzer–Finali 1986	FNC–CS	31	35
	Amphimedon aff. *compressa* Duchassaing & Michelotti 1864	AMAZ	30–75	13
	Niphates alba Van Soest 1980	AMAZ, FNC–CS	50–100	26, 35
	Niphates erecta Duchassaing & Michelotti 1864	AMAZ, FNC–CS	30–100	13, 26, 35
	Niphates lutea Lehnert & van Soest 1999	FNC–CS	72	35
Petrosiidae	*Neopetrosia proxima* Duchassaing & Michelotti 1864	AMAZ, FNC–CS	31–94	35
	Neopetrosia subtriangularis Duchassaing 1850	FNC–CS	72–94	35
	Xestospongia muta Schmidt 1870	AMAZ, FNC–CS, ROC	30–160	1, 12, 13, 35
Phloeodictyidae	*Oceanapia bartschi* de Laubenfels 1934	AMAZ, FNC–CS	30–160	1, 13, 35
	Oceanapia nodosa George & Wilson 1919	FNC–CS	63	35

(continued)

Table 10.1 (continued)

Family	Taxa	Locality	Depth range (m)	Reference
Placospongiidae	*Placospongia carinata* Bowerbank 1858	AMAZ	31	35
	Placospongia melobesioides Gray 1867	AMAZ	76	35
Plakinidae	*Plakina trilopha* Schulze 1880	NECO	75	35
	**Plakinastrella globularis* Domingos, Moraes & Muricy 2013	AMAZ	55–270	13
	Plakinastrella microspiculifera Moraes & Muricy 2003	SPSPA	30–50	35
	Plakinastrella onkodes Uliczka 1929	NECO, FNC–CS	50–100	26, 35
	Plakortis angulospiculatus Carter 1879	NECO	34	35
	Plakortis halichondrioides Wilson 1902	AMAZ, FNC–CS	40–100	1, 26
Polymastiidae	**Polymastia janeirensis* Boury–Esnault 1973	SS	39	35
Raspailiidae	**Echinodictyum dendroides* Hechtel 1983	AMAZ	30–75	13
	Ectyoplasia ferox Duchassaing & Michelotti 1864	ROC	50–65	12
	Raspailia (*Raspailia*) *tenuis* Ridley & Dendy 1886	ECS	30–36	35
	Thrinacophora funiformis Ridley & Dendy 1886	AMAZ	40–80	1
Scopalinidae	*Scopalina ruetzleri* Wiedenmayer 1977	ROC, SPSPA	30–65	8, 12
Siphonidiidae	*Gastrophanella implexa* Schmidt 1879	SS	150	35
	Siphonidium ramosum Schmidt 1870	SS	150	35
Spirastrellidae	*Diplastrella megastellata* Hechtel 1965	AB, ECS	65–83	19, 35
	Spirastrella coccinea Duchassaing & Michelotti 1864	FNC–CS	50–100	26
	Spirastrella hartmani Boury–Esnault, Klautau, Bézac, Wulff & Solé–Cava 1999	ROC, SPSPA	30–65	8, 12
Spongiidae	*Hippospongia lachne* Laubenfels 1936	NECO	30–33	35
	Hyattella cavernosa Pallas 1766	AB, ABC, AMAZ, ECS, FNC–CS, NECO, TMVIG, VTC	30–100	13, 19, 26, 35
Stylocordylidae	*Stylocordyla borealis* Lovén 1868	ECS	30–36	35
Suberitidae	*Aaptos bergmanni* de Laubenfels 1950	NECO	75	35
	Suberites caminatus Ridley & Dendy 1886	SS	54–63	35
	Suberites carnosus Johnston 1842	SS	45	35
	Terpios belindae Rützler & Smith 1993	AMAZ	56	35

(continued)

Table 10.1 (continued)

Family	Taxa	Locality	Depth range (m)	Reference
Tedaniidae	*Tedania ignis* Duchassaing & Michelotti 1864	AMAZ	30–80	13
	**Tedania* (*Tedania*) *brasiliensis* Mothes, Hajdu & van Soest 2000	FNC–CS, SS	51–54	35
	Tedania (*Tedania*) *ignis* Duchassaing & Michelotti 1864	NECO, SS	33–80	35
	**Tedania* (*Trachytedania*) *biraphidora* Boury–Esnault 1973	SS	48	35
	Tedania (*Trachytedania*) *spinata* Ridley1881	SS	45	35
Tetillidae	**Acanthotetilla walteri* Peixinho, Fernandez, Oliveira, Caires & Hajdu 2007	NECO	30–35	35
	Cinachyrella alloclada Uliczka 1929	FNC–CS, NECO	50–100	26, 35
	Cinachyrella kuekenthali Uliczka 1929	ABC, AMAZ, ECS, NECO, VTC	30–270	1, 13, 19, 35
	**Craniella corticata* Boury–Esnault 1973	NECO	75	35
Tethyidae	**Halicometes minuta* Sarà & de Rosa–Barbosa 1995	SS	133–147	35
	Tethya japonica Sollas 1888	NECO	45	35
Theonellidae	*Discodermia dissoluta* Schmidt 1880	SPSPA	50–60	8
	Theonella atlantica van Soest & Stentoft 1988	AMAZ	100–153	13
Thorectidae	*Fasciospongia* cf. *Turgida* (Lamarck, 1814)	AMAZ	40–80	1
	**Thorecta cinctus* Boury–Esnault 1973	NECO	75	35
Thrombidae	*Thrombus kittonii* Carter 1874	ECS	62	35
Timeidae	**Timea bioxyasterina* Mothes, Santos & Campos 2004	FNC–CS	36	35
	Timea cumana Pulitzer–Finali, 1977	AB	65	35
	Timea stellifasciata Sarà & Siribelli 1960	NECO	32–75	35
	Cnidaria			
	Antipatharia			
Antipathidae	*Antipathes atlantica* Gray 1857	AMAZ, NECO	48–300	18, 19
	Antipathes furcata Gray 1857	AMAZ, SS, VTC	100–300	13, 19
	Stichopathes occidentalis Gray 1860	NECO	48	18
Myriopathidae	*Tanacetipathes hirta* Gray 1857	AB, SPSPA, SS	50–417	8, 11, 19
	Tanacetipathes tanacetum Pourtalès 1880	AB, AMAZ, SS, VTC	60–417	19
	Tanacetipathes thamnea Warner 1981	AB, SS, SPSPA, VTC	50–110	8, 11, 19
	Hydrozoa			
Milleporidae	**Millepora braziliensis* Verrill 1868	AMAZ, PM	30	7, 20
	**Millepora laboreli* Amaral 2008	AMAZ	108	13
Stylasteridae	*Stylaster roseus* Pallas 1766	PM	30	20
	Octocorallia			
Acanthogorgiidae	*Acanthogorgia aspera* Pourtalès 1867	AB, AMAZ	60–417	7, 19
	Acanthogorgia schrammi Duchassaing & Michelotti 1864	AB, AMAZ	60	7, 19
Anthothelidae	*Iciligorgia schrammi* Duchassaing 1870	AMAZ	67–125	7

(continued)

Table 10.1 (continued)

Family	Taxa	Locality	Depth range (m)	Reference
Chrysogorgiidae	**Stephanogorgia rattoi* Castro, Medeiros & Loiola 2010	AB	30–239	21
	**Trichogorgia brasiliensis* Castro, Medeiros & Loiola 2010	AB, AMAZ	30–117	7, 21
Clavulariidae	*Carijoa riisei* Duchassaing & Michelotti 1860	AMAZ, SPSPA, SS, VTC	30–103	7, 8, 19, 21
Ellisellidae	*Ellisella elongata* Pallas 1766	AMAZ, SS, TMVIG, VTC	30–706	7, 19, 21
	Nicella guadalupensis Duchassaing & Michelotti 1860	AB, AMAZ, VTC	30–417	7, 19
Gorgoniidae	*Leptogorgia euryale* Bayer 1952	AMAZ	30–77	7
	Leptogorgia miniata Milne–Edwards & Haime 1857	AMAZ	30–125	7, 13
	**Leptogorgia pseudogracilis* Castro, Medeiros & Loiola 2010	AB, SS	66–180	21
	Leptogorgia punicea Milne–Edwards & Haime 1857	AB, AMAZ, SS	30–117	7, 21
	Leptogorgia setacea Pallas 1766	AMAZ, SS	30–60	7, 19
	Leptogorgia stheno Bayer 1952	AMAZ	30–66	7, 22
	**Leptogorgia violacea* Pallas 1766	SS	57–60	19, 21
	**Olindagorgia gracilis* Verrill 1868	AMAZ, VTC	30–100	7, 19
	**Phyllogorgia dilatata* Esper 1806	ROC	50–65	12
Keroeididae	*Thelogorgia studeri* Bayer 1991	AMAZ	30–117	7, 22
Nephtheidae	**Neospongodes atlantica* Kükenthal 1903	FNC–CS	50–100	26
Nidaliidae	*Nidalia occidentalis* Gray 1835	AMAZ	30–118	7
Plexauridae	*Bebryce cinerea* Deichmann 1936	AB, SS	60–180	19, 24
	Bebryce parastellata Deichmann 1936	AB, AMAZ, SS	100–497	7, 19, 24
	**Heterogorgia uatumani* Castro 1990	AB, AMAZ	45–200	7, 19, 24
	Muricea atlantica Riess in Kükenthal 1919	SS	39–75	24
	**Muricea flamma* Marques & Castro 1995	AB	60–417	19, 21, 24
	Muricea laxa Verrill 1864	SS	39–50	24
	Muricea midas Bayer 1959	AMAZ, SS	150–200	24
	Muriceopsis cf. *petila* Bayer 1961	AMAZ	90	7
	Muriceopsis flavida Lamarck 1815	AMAZ, NECO	32–75	22
	**Muriceopsis metaclados* Castro, Medeiros & Loiola 2010	AB, NECO, SS, VTC	40–91	21
	Placogorgia atlantica Wright & Studer 1889	AMAZ, SPSPA	100–150	24
	Scleracis guadalupensis Duchassaing & Michelotti 1860	AB, ABC, AMAZ, SS	60–390	7, 19, 24
	Swiftia exserta Ellis & Solander 1786	AMAZ, VTC	34–110	7, 19, 24
	**Thesea bicolor* Deichmann 1936	AB, ABC, AMAZ, ECS, SS, VTC	36–180	7, 19, 24
	**Thesea gracilis* Gray 1868	AMAZ, SS	60–118	7, 24
	Villogorgia nigrescens Duchassaing & Michelotti 1860	AB, AMAZ, SS, VTC	47–417	19, 24
Primnoidae	**Primnoella delicatissima* Kükenthal 1909	AMAZ	30–160	7
Renillidae	*Renilla muelleri* Kölliker 1872	SS	57–60	19
	Renilla reniformis Pallas 1766	SS	57–60	19
Spongiodermidae	*Diodogorgia nodulifera* Hargitt & Rogers 1901	AMAZ	36–180	7
Virgulariidae	*Acanthoptilum* cf. *agassizi* Kölliker 1872	AB	66–68	19
	Scleractinia			

(continued)

Table 10.1 (continued)

Family	Taxa	Locality	Depth range (m)	Reference
Astrocoeniidae	*Madracis asperula* Milne Edwards & Haime 1849	NECO, VTC	45–166	19, 23
	Madracis brueggemanni Ridley 1881	ECS, SS, VTC	45–110	19
	Madracis decactis Lyman 1859	AB, ABC, AMAZ, ASS, FNA, ECS, SPSPA, TMVIG, VTC	30–300	7, 8, 13, 19, 28
Siderastreidae	**Siderastrea stellata* Verrill 1868	AB, ABC, AMAZ, CE, FNA, NECO, ROC, VTC	30–90	3, 7, 9, 12, 15, 19, 28
Poritidae	*Porites astreoides* Lamarck 1816	FNA, ROC, VTC	50–65	12, 19, 28
	Porites branneri Rathbun 1888	NECO, VTC	50–60	3, 19
Deltocyathidae	*Deltocyathus calcar* Pourtalès 1874	ECS	91	19
	Deltocyathus moseleyi Cairns 1979	VTC	120–520	19
Caryophylliidae	*Caryophyllia berteriana* Duchassaing 1850	VTC	120–520	19
	Phyllangia americana Milne Edwards & Haime 1849	AMAZ	30–180	7
	Polycyathus senegalensis Chevalier 1966	SPSPA	30	23
	Rhizosmilia maculata Pourtalès 1874	AMAZ, VTC	30–508	7, 19
	Solenosmilia variabilis Duncan 1873	ECS, TMVIG, VTC	50–520	19
Turbinoliidae	*Sphenotrochus auritus* Pourtalès 1874	SS	50	19
Agariciidae	*Agaricia fragilis* Dana 1848	ABC, AMAZ, FNA, NECO, TMVIG	30–102	3, 5, 7, 19, 28
	Agaricia humilis Verrill 1901	AB, AMAZ, FNA, VTC	50–85	13, 19, 28
Meandrinidae	*Meandrina brasiliensis* Milne–Edwards & Haime 1848	AB, ABC, AMAZ, NECO, ROC, ECS, SS, VTC	30–247	3, 7, 12, 13, 19
Faviidae	*Montastraea cavernosa* Linnaeus 1767	AB, ABC, AMAZ, CE, FNA, NECO, ROC, ECS, TMVIG, VTC	35–180	3, 5, 9, 12, 13, 15, 19, 28
Rhizangiidae	*Astrangia rathbuni* Vaughan 1906	AMAZ, SS	57–60	13, 19
	Astrangia solitaria Le Sueur 1818	AMAZ, SPSPA	30–51	7, 23
Mussidae	**Favia gravida* Verrill 1868	AMAZ, ROC	30–80	12, 13
	**Mussismilia braziliensis* Verrill 1868	TMVIG	45–60	19
	**Mussismilia harttii* Verrill 1868	ECS, VTC	40–55	19
	**Mussismilia hispida* Verrill 1901	AB, ABC, AMAZ, FNA, ROC, TMVIG, VTC	30–65	5, 7, 9, 12, 19, 28
	Scolymia wellsii Laborel 1967	AB, ABC, AMAZ, NECO, SPSPA, TMVIG, VTC	30–100	3, 5, 7, 8, 19
incertae sedis	*Cladocora debilis* Milne, Edwards & Haime 1849	AB, SS	57–180	19
	Elasmobranchii			
Ginglymostomatidae	*Ginglymostoma cirratum* Bonnaterre 1788	AB, AMAZ, CE, FNA, NECO, ROC, TMVIG, VTC	30–130	3, 10, 12, 13, 14, 25, 28
Alopiidae	*Alopias superciliosus* Lowe 1841	VTC	56	10
Lamnidae	*Isurus oxyrinchus* Rafinesque 1810	NECO, VTC	41–170	10, 25
	Isurus paucus Guitart 1966	VTC	41–66	10
Triakidae	*Mustelus canis* Mitchill 1815	VTC	72–350	10

(continued)

Table 10.1 (continued)

Family	Taxa	Locality	Depth range (m)	Reference
Carcharhinidae	*Carcharhinus acronotus* Poey 1860	CE, NECO	30–43	25
	Carcharhinus falciformis Müller & Henle 1839	NECO, TMVIG, VTC	30–160	10, 25
	Carcharhinus leucas Valenciennes 1839	NECO	39	25
	Carcharhinus longimanus Poey 1861	NECO	57–217	25
	Carcharhinus perezi Poey 1876	FNA, TMVIG	30–35	10, 28
	Carcharhinus porosus Ranzani 1839	NECO	36	25
	Carcharhinus plumbeus Nardo 1827	TMVIG, VTC	56	10
	Carcharhinus signatus Poey 1868	NECO, VTC	56–216	10, 25
	Galeocerdo cuvier Péron & Lesueur 1822	CE, NECO, TMVIG, VTC	60–144	10, 25
	Prionace glauca Linnaeus 1758	NECO, TMVIG, VTC	50–264	10, 25
	Rhizoprionodon porosus Poey 1861	CE, NECO	40–50	3, 25
Sphyrnidae	*Sphyrna lewini* Griffith & Smith 1834	NECO, TMVIG, VTC	30–70	3, 10, 25
	Sphyrna zygaena Linnaeus 1758	VTC	45–71	10
Squalidae	*Squalus mitsukurii* Jordan & Snyder 1903	VTC	246	10
Dasyatidae	*Bathytoshia centroura* Mitchil 1815	VTC	45	10
	Hypanus americanus Hildebrand & Schroeder 1928	AMAZ, CE, NECO	30–60	3, 13, 15, 25
	Hypanus guttatus Bloch & Schneider 1801	CE, NECO, VTC	30–60	10, 25
	**Hypanus marianae* Gomes Rosa & Gadig 2000	NECO	35–57	3
	Pteroplatytrygon violacea Bonaparte 1832	NECO, VTC	48–224	10, 25
Aetobatidae	*Aetobatus narinari* Euphrasen 1790	CE, FNA, TMVIG, VTC	30–55	10, 15, 28
	Teleostei			
Albulidae	*Albula vulpes* Linnaeus 1758	NECO	30–60	25
Chlopsidae	*Chlopsis bicolor* Rafinesque 1810	TMVIG	60	10
Muraenidae	*Anarchias similis* Lea 1913	AB	70	14
	Channomuraena vittata Richardson 1845	TMVIG, VTC	63	10
	Enchelycore carychroa Böhlke & Böhlke 1976	TMVIG, VTC	30–65	10
	Enchelycore nigricans Bonnaterre 1788	TMVIG	30–35	10
	Gymnothorax funebris Ranzani 1839	FNA, NECO, VTC	35–81	3, 10, 28
	Gymnothorax maderensis Johnson 1862	VTC	85–285	10
	Gymnothorax miliaris Kaup 1856	TMVIG, VTC	30–71	10
	Gymnothorax moringa Cuvier 1829	AB, FNA, NECO, ECS, TMVIG, VTC	35–189	3, 4, 10, 28
	Gymnothorax ocellatus Agassiz 1831	AB, AMAZ, VTC	37–160	1, 4, 10, 13
	Gymnothorax polygonius Poey 1875	AB, TMVIG, VTC	50–354	4, 10
	Gymnothorax vicinus Castelnau 1855	AB, AMAZ, NECO, ECS, VTC	35–186	1, 3, 4, 10, 13
	Monopenchelys acuta Parr 1930	TMVIG, VTC	30–81	10
	**Muraena pavonina* Richardson 1845	FNA, SPSPA	30–90	11, 28
Ophichthidae	*Ophichthus gomesi* Castelnau 1855	VTC	50–100	10
	Ophichthus ophis Linnaeus 1758	AB, TMVIG, VTC	30–70	10, 14
	**Pseudomyrophis frio* Jordan & Davis 1891	VTC	100	10
Muraenesocidae	*Cynoponticus savanna* Bancroft 1831	VTC	50–63	10

(continued)

Table 10.1 (continued)

Family	Taxa	Locality	Depth range (m)	Reference
Congridae	**Ariosoma opisthophthalmum* Ranzani 1839	VTC	50	10
	**Heteroconger camelopardalis* Lubbock 1980	FNA, NECO	35–40	3, 28
	Heteroconger cf. *longissimus* Günther 1870	NECO	50–60	3
Clupeidae	*Opisthonema oglinum* LeSueur 1817	NECO	30–60	3
Gonostomatidae	*Diplophos taenia* Günther 1873	VTC	49–68	10
	Manducus maderensis Johnson 1890	VTC	49	10
Synodontidae	*Synodus foetens* Linnaeus 1766	VTC	33–105	10
	Synodus intermedius Spix & Agassiz 1829	AMAZ, VTC	85–320	10, 13
	Synodus synodus Linnaeus 1758	NECO, TMVIG, VTC	30–57	3, 10
	Trachinocephalus myops Forster 1801	TMVIG	30–35	10
Polymixiidae	*Polymixia lowei* Günther 1859	VTC	103–437	10
Batrachoididae	**Porichthys porosissimus* Cuvier 1829	VTC	34–217	10
Ogcocephalidae	*Ogcocephalus vespertilio* Linnaeus 1758	AB	70	14
Holocentridae	*Holocentrus adscensionis* Osbeck 1771	AB, AMAZ, CE, FNA, NECO, ROC, ECS, TMVIG, VTC	30–228	1, 3, 4, 5, 10, 12, 13, 14, 25, 28
	Myripristis jacobus Cuvier 1829	AMAZ, CE, FNA, NECO, ROC, SPSPA, TMVIG, VTC	30–90	1, 3, 10, 11, 12, 15, 28
	Plectrypops retrospinis Guichenot 1853	TMVIG, VTC	45	10
	Sargocentron bullisi Woods 1955	AB, TMVIG, VTC	30–70	5, 10, 14
Zeniontidae	*Zenion hololepis* Goode & Bean 1896	VTC	52	10
Syngnathidae	*Hippocampus reidi* Ginsburg 1933	VTC	65	10
Aulostomidae	*Aulostomus strigosus* Wheeler 1955	AMAZ, CE, SPSPA, TMVIG, VTC	30–100	10, 11, 13, 15
Dactylopteridae	*Dactylopterus volitans* Linnaeus 1758	TMVIG, VTC	30–65	10
Scorpaenidae	*Pontinus longispinis* Goode & Bean 1896	TMVIG, VTC	283–362	10
	**Pontinus nigropunctatus* Günther 1868	SPSPA	130–600	29
	Pontinus rathbuni Goode & Bean 1896	VTC	52–315	10
	Scorpaena brachyptera Eschmeyer 1965	TMVIG, VTC	45	10
	Scorpaena dispar Longley & Hildebrand 1940	AB, VTC	60–105	10, 14
	Scorpaena isthmensis Meek & Hildebrand 1928	AB	70	14
	Scorpaena plumieri Bloch 1789	AB, TMVIG	30–70	10, 14
	Scorpaenodes caribbaeus Meek & Hildebrand 1928	AB, NECO	36–70	3, 14
	Scorpaenodes tredecimspinosus Metzelaar 1919	AB, NECO, VTC	53–70	3, 10, 14

(continued)

Table 10.1 (continued)

Family	Taxa	Locality	Depth range (m)	Reference
Serranidae	**Acanthistius brasilianus* (Cuvier, 1828)	SS	30–60	34
	**Anthias menezesi* Anderson & Heemstra 1980	VTC	120	10
	**Anthias asperilinguis* Günther 1859	SPSPA	114–393	16
	Cephalopholis fulva Linnaeus 1758	AB, AMAZ, CE, FNA, NECO, ROC, ECS, TMVIG, VTC	30–220	1, 2, 3, 4, 5, 10, 12, 13, 14, 15, 25, 28
	**Choranthias salmopunctatus* Lubbock & Edwards 1981	SPSPA	35–55	17
	Dermatolepis inermis Valenciennes 1833	AB, FNA, TMVIG, VTC	30–315	4, 10, 28
	Diplectrum bivittatum Valenciennes 1828	AMAZ	40–140	1, 13
	Dules auriga Cuvier, 1829	SS	30–135	34
	Epinephelus adscensionis Osbeck 1765	NECO, TMVIG	30–189	3, 4, 10, 25
	Epinephelus itajara Lichtenstein 1822	AMAZ, CE, FNA, NECO, VTC	30–100	3, 10, 13, 25, 28
	Epinephelus marginatus Lowe 1834	AB, NECO	30–128	4, 14, 25
	Epinephelus morio Valenciennes 1828	AB, AMAZ, CE, NECO, ECS	40–300	1, 4, 13, 25
	Gonioplectrus hispanus Cuvier 1828	TMVIG, VTC	35–155	10
	Hyporthodus mystacinus Poey 1851	NECO, TMVIG, VTC	100–354	10, 25
	Hyporthodus nigritus Holbrook 1855	AB, AMAZ, CE, NECO, VTC	30–525	10, 13, 14, 25
	Hyporthodus niveatus Valenciennes 1828	AMAZ, CE, NECO, VTC	30–400	10, 13, 25
	Liopropoma carmabi Randall 1963	NECO, VTC	53–62	3, 10
	Mycteroperca acutirostris Valenciennes 1828	AB	70	14
	Mycteroperca bonaci Poey 1860	AB, CE, FNA, NECO, TMVIG, ECS, VTC	30–128	3, 4, 10, 14, 15, 25, 28
	Mycteroperca interstitialis Poey 1860	AB, NECO, TMVIG, VTC	30–136	3, 4, 10, 14, 25
	Mycteroperca tigris Valenciennes 1833	NECO, ECS, VTC	33–135	4, 10, 25
	Mycteroperca venenosa Linnaeus 1758	AB, NECO, TMVIG, VTC	30–262	4, 5, 10, 25
	Paranthias furcifer Valenciennes 1828	AB, AMAZ, FNA, NECO, ECS, TMVIG, VTC	30–119	1, 3, 4, 5, 10, 13, 14, 25, 28
	Pronotogrammus martinicensis Guichenot 1868	AB, VTC, SS	30–300	10, 14, 30
	Pseudogramma gregoryi Breder 1927	AB, AMAZ, TMVIG, VTC	45–85	10, 13, 14
	Rypticus saponaceus Schneider 1801	AB, FNA, NECO, SPSPA, TMVIG, VTC	30–90	3, 10, 11, 14, 28
	**Serranus aliceae* Carvalho, Filho & Ferreira 2013	AB	30–70	14, 31
	Serranus annularis Günther 1880	NECO, TMVIG, VTC	51–71	3, 10
	Serranus atrobranchus Cuvier 1829	AB, AMAZ	62–220	1, 13, 14
	Serranus baldwini Evermann & Marsch 1900	NECO, VTC	35–65	3, 10
	Serranus phoebe Poey 1851	AB, AMAZ, TMVIG, VTC	40–400	1, 10 13, 14

(continued)

Table 10.1 (continued)

Family	Taxa	Locality	Depth range (m)	Reference
Grammatidae	**Gramma brasiliensis* Sazima, Gasparini & Moura 1998	CE	35	15
Opistognathidae	**Opistognathus* aff. *aurifrons* Jordan & Thompson 1905	FNA	30–65	28
	**Opistognathus thionyi* Smith-Vaniz, Tornabene & Macieira 2018	TMVIG, VTC	30–35	10
	**Opistognathus brasiliensis* Smith–Vaniz 1997	NECO	20–69	3
Priacanthidae	*Heteropriacanthus cruentatus* Lacépède 1801	TMVIG, VTC	30–65	10
	Priacanthus arenatus Cuvier 1829	AB, AMAZ, NECO	30–200	1, 13, 14, 25
Apogonidae	**Apogon americanus* Castelnau 1855	AB, NECO, TMVIG, VTC	30–70	3, 10, 14
	Apogon pseudomaculatus Longley 1932	AB, AMAZ, NECO, VTC	30–100	1, 3, 10, 13, 14,
	Apogon quadrisquamatus Longley 1934	NECO	35–54	3
	Apogon robbyi Gilbert 1997	NECO	53–54	3
	Astrapogon puncticulatus Poey 1867	NECO	35–57	3
	Paroncheilus affinis Poey 1875	AB	70	14
	Phaeoptyx pigmentaria Poey 1860	TMVIG, VTC	30–55	10
Malacanthidae	**Lopholatilus villarii* Miranda Ribeiro 1915	VTC	100–500	10
	Malacanthus plumieri Bloch 1786	CE, FNA, NECO, TMVIG, VTC	30–131	3, 5, 10, 25, 28
Coryphaenidae	*Coryphaena equiselis* Linnaeus 1758	NECO	61–135	25
	Coryphaena hippurus Linnaeus 1758	NECO, TMVIG, VTC	30–238	10, 25
Rachycentridae	*Rachycentron canadum* Linnaeus 1766	AMAZ, CE, NECO	30–128	3, 15, 25
Echeneidae	*Echeneis naucrates* Linnaeus 1758	NECO, TMVIG	30–40	3, 10
Carangidae	*Alectis cilliaris* Bloch 1787	CE, NECO	30–120	25
	Carangoides bartholomaei Cuvier 1833	CE, FNA, NECO, ROC, TMVIG, VTC	30–135	3, 10, 12, 15, 25, 28
	Caranx crysos Mitchill 1815	AB, CE, FNA, NECO, ECS, TMVIG, VTC	30–128	3, 4, 10, 25, 28
	Caranx hippos Linnaeus 1766	CE, FNA, NECO, ROC	30–128	12, 25, 28
	Caranx latus Agassiz 1831	AMAZ, CE, FNA, NECO, ECS, TMVIG, VTC	30–140	3, 4, 10, 13, 25, 28
	Caranx lugubris Poey 1860	CE, FNA, NECO, ROC, SPSPA, TMVIG, VTC	30–280	3, 4, 5, 10, 11, 12, 25, 28
	Caranx ruber Bloch 1793	AB, CE, NECO, TMVIG, VTC	30–119	3, 4, 10, 25
	Decapterus macarellus Cuvier 1833	NECO, TMVIG, VTC	30–65	3, 10
	Decapterus tabl Berry 1968	NECO, VTC	30–68	3, 10
	Elagatis bipinnulata Quoy & Gaimard 1825	CE, FNA, NECO, TMVIG, VTC	30–128	3, 10, 25, 28
	Selar crumenophthalmus Bloch 1793	CE, NECO	30–128	3, 25
	Selene setapinnis Mitchill 1815	CE, NECO	30–33	25
	Selene vomer Linnaeus 1758	NECO	35–40	3, 25
	Seriola dumerili Risso 1810	AB, CE, FNA, NECO, ECS, TMVIG, VTC	30–135	3, 4, 10, 14, 15, 25, 28
	Seriola fasciata Bloch 1793	AB, VTC	49–100	4, 10
	Seriola lalandi Valenciennes 1833	VTC	59	10
	Seriola rivoliana Valenciennes 1833	AB, FNA, NECO, ECS, TMVIG, VTC	30–340	3, 4, 10, 14, 25, 28
	Seriola zonata Mitchill 1815	VTC	35	10

(continued)

Table 10.1 (continued)

Family	Taxa	Locality	Depth range (m)	Reference
	Trachinotus falcatus Linnaeus 1758	CE, NECO	35–66	3, 15, 25
	Trachinotus goodei Jordan & Evermann 1896	NECO	30–40	3
	Uraspis secunda Poey 1860	NECO	48–116	25
Emmelichthyidae	*Erythrocles monodi* Poll & Cadenat 1954	VTC	45	10
Lutjanidae	*Etelis oculatus* Valenciennes 1828	NECO, TMVIG, VTC	43–340	10, 25
	**Lutjanus alexandrei* Moura & Lindeman 2007	CE	35	15
	Lutjanus analis Cuvier 1828	ABRO, CE, NECO, ECS, VTC	30–135	3, 4, 10, 25
	Lutjanus apodus Walbaum 1792	CE, NECO	30–128	3, 25
	Lutjanus buccanella Cuvier 1828	AB, NECO	30–128	3, 14, 25
	Lutjanus cyanopterus Cuvier 1828	AB, NECO	30–128	3, 14, 25
	Lutjanus jocu Bloch & Schneider 1801	CE, FNA, NECO, ECS, TMVIG, VTC	30–135	3, 4, 10, 15, 25, 28
	Lutjanus purpureus Poey 1867	AMAZ, CE, FNA, NECO	31–340	1, 3, 13, 25,
	Lutjanus synagris Linnaeus 1758	AMAZ, CE, NECO, ECS	30–400	1, 3, 4, 13, 25
	Lutjanus vivanus Cuvier 1828	AB, CE, NECO, ECS, VTC	30–280	3, 4, 25
	Ocyurus chrysurus Bloch 1791	AB, AMAZ, CE, FNA, NECO, ECS, VTC	30–128	1, 3, 4, 10, 13, 14, 15, 25, 28
	Pristipomoides aquilonaris Goode & Bean 1896	AMAZ	40–370	1, 13
	Rhomboplites aurorubens Cuvier 1829	AB, AMAZ, CE, NECO, VTC	30–300	1, 3, 4, 10, 13, 14, 25
Lobotidae	*Lobotes surinamensis* Bloch 1790	CE, NECO	60–145	25
Haemulidae	*Anisotremus surinamensis* Bloch 1791	AB, FNA, NECO, TMVIG	30–70	3, 10, 14, 25, 28
	Anisotremus virginicus Linnaeus 1758	AB, CE, NECO	30–70	3, 14, 15, 25
	Haemulon aurolineatum Cuvier 1830	AB, AMAZ, CE, NECO	30–70	1, 3, 13, 14, 15, 25
	Haemulon boschmae Metzelaar 1919	AMAZ	40–80	1
	Haemulon chrysargyreum Gunther 1859	FNA, NECO	30–42	25, 28
	Haemulon melanurum Linnaeus 1758	CE, NECO	35–60	3, 15
	Haemulon parra Desmarest 1823	CE, NECO	30–60	3, 25
	Haemulon plumieri Lacepède 1801	AB, AMAZ, CE, FNA, NECO, ECS	30–100	1, 3, 4, 13, 15, 25, 28
	Haemulon squamipinna Rocha & Rosa 1999	NECO	35–40	3
	Haemulon steindachneri Jordan & Gilbert 1882	AMAZ	40–80	1, 13
	Haemulon striatum Linnaeus 1758	NECO	66–70	3
Sparidae	*Calamus penna* Valenciennes 1830	NECO	30–128	25
	Calamus pennatula Guichenot 1868	AB, NECO, ECS	30–100	3, 4, 25
	Pagrus pagrus Linnaeus 1758	AB	50–100	4, 14

(continued)

Table 10.1 (continued)

Family	Taxa	Locality	Depth range (m)	Reference
Sciaenidae	*Equetus lanceolatus* Linnaeus 1758	AMAZ, NECO, VTC	40–60	1, 3, 10, 13
	Pareques acuminatus Bloch & Schneider 1801	AB, NECO, VTC	35–70	3, 10, 14
Mullidae	*Mulloidichthys martinicus* Cuvier 1829	AMAZ, FNA, NECO, TMVIG, VTC	30–80	1, 3, 5, 10, 13, 28
	Pseudupeneus maculatus Bloch 1793	AB, AMAZ, NECO, TMVIG, VTC	30–90	1, 3, 10, 13, 14, 25
	Upeneus parvus Poey 1852	NECO	53–54	3
Kyphosidae	*Kyphosus sectatrix* Linnaeus 1758	NECO, TMVIG, VTC	30–55	3, 10
Chaetodontidae	*Chaetodon ocellatus* Bloch 1787	AMAZ, CE, FNA, NECO	35–73	1, 3, 15, 28
	Chaetodon sedentarius Poey 1860	AMAZ, TMVIG, VTC	45–92	1, 10, 13
	Chaetodon striatus Linnaeus 1758	AB, FNA, NECO, SPSPA, TMVIG, VTC	30–90	3, 10, 11, 14
	**Prognathodes brasiliensis* Burgess 2001	AB, TMVIG, VTC	30–70	5, 10, 14
	Prognathodes guyanensis Durand 1960	VTC	65	10
	**Prognathodes obliquus* Lubbock & Edwards 1980	SPSPA	30–90	11
Cirrhitidae	*Amblycirrhitus pinos* Mowbray 1927	NECO, TMVIG, VTC	30–66	2, 3, 10
Pomacentridae	*Abudefduf saxatilis* Linnaeus 1758	CE, FNA, SPSPA, VTC	30–60	10, 11, 15, 28
	**Centropyge aurantonotus* Burgess 1974	AB, FNA, NECO, TMVIG, VTC	30–85	3, 10, 14, 28
	Chromis enchrysura Jordan & Gilbert 1882	AB, SPSPA, VTC	30–120	10, 11, 14
	**Chromis flavicauda* Günther 1880	AB, NECO, TMVIG, VTC	35–120	3, 5, 10, 14
	**Chromis jubauna* Moura 1995	AB, NECO, TMVIG, VTC	40–71	3, 5, 10, 14
	Chromis multilineata Guichenot 1853	AMAZ, CE, FNA, NECO, ROC, SPSPA, TMVIG, VTC	30–90	1, 3, 10 ,11, 12, 13, 15, 28
	Microspathodon chrysurus Cuvier 1830	TMVIG, VTC	30–62	10
	**Stegastes trindadensis* Gasparini, Moura & Sazima 1999	TMVIG, VTC	30–55	10
	**Stegastes pictus* Castelnau 1855	AB, AMAZ, CE, FNA, NECO, TMVIG, VTC	30–85	2, 3, 5, 10, 13, 14, 15, 28
	**Stegastes rocasensis* Emery 1972	ROC, FNA	30–60	12, 28
	**Stegastes sanctipauli* Lubbock & Edwards 1981	SPSPA	30–90	11
	**Stegastes variabilis* Castelnau 1855	CE	35	15
Pomacanthidae	*Holacanthus ciliaris* Linnaeus 1758	AMAZ, CE, FNA, NECO, SPSPA, VTC	30–120	1, 3, 10, 11, 13, 15, 28
	Holacanthus tricolor Bloch 1795	AB, CE, NECO, TMVIG, VTC	30–80	3, 5, 10, 14, 15
	Pomacanthus arcuatus Linnaeus 1758	AB, AMAZ, NECO	30–62	1, 3, 13, 14
	Pomacanthus paru Bloch 1787	AMAZ, CE, NECO, ROC, SPSPA	30–100	1, 3, 11, 12, 13, 15

(continued)

Table 10.1 (continued)

Family	Taxa	Locality	Depth range (m)	Reference
Labridae	*Bodianus insularis* Gomon & Lubbock 1980	SPSPA	30–90	11
	Bodianus pulchellus Poey 1860	AB, FNA, NECO, TMVIG, VTC	30–90	3, 5, 10, 14, 28
	Bodianus rufus Linnaeus 1758	AB, CE, FNA, NECO, TMVIG, VTC	30–70	3, 10, 14, 15, 28
	**Clepticus brasiliensis* Heiser, Moura & Robertson 2001	AB, FNA, NECO, TMVIG, VTC	30–70	3, 5, 10, 14, 28
	Cryptotomus roseus Cope 1871	AMAZ, NECO, TMVIG, VTC	30–66	3, 10, 13
	Halichoeres bivittatus Bloch 1791	NECO	35–54	3
	**Halichoeres brasiliensis* Bloch 1791	NECO, TMVIG	30–60	3, 10
	**Halichoeres dimidiatus* Agassiz 1831	AMAZ, FNA, NECO, ROC, VTC	30–71	2, 3, 10, 12, 13, 28
	**Halichoeres penrosei* Starks 1913	CE, NECO, TMVIG, VTC	30–66	3, 10, 15
	Halichoeres poeyi Steindachner 1867	AB, NECO, TMVIG, VTC	30–71	3, 10, 14
	Halichoeres radiatus Linnaeus 1758	FNA, ROC, SPSPA	30–90	11, 12, 28
	Halichoeres rubrovirens Rocha, Pinheiro & Gasparini 2010	TMVIG, VTC	30–84	10
	**Halichoeres sazimai* Luiz, Ferreira & Rocha 2009	AB, SS	70	14, 33
	**Scarus trispinosus* Valenciennes 1840	NECO	35–60	3
	**Scarus zelindae* Moura, Figueiredo & Sazima 2001	CE, NECO, VTC	30–55	3, 10, 15
	**Sparisoma amplum* Ranzani 1841	CE, NECO, TMVIG, VTC	30–57	3, 10, 15
	**Sparisoma axillare* Steindachner 1878	AB, NECO, ROC, TMVIG	30–70	3, 10, 12, 14
	**Sparisoma frondosum* Agassiz 1831	AB, AMAZ, FNA, NECO, VTC	30–80	3, 10, 13, 14, 28
	Sparisoma radians Valenciennes 1840	VTC	62–71	10
	**Sparisoma rocha* Pinheiro, Gasparini & Sazima 2010	TMVIG, VTC	30–85	10
	**Sparisoma tuiupiranga* Gasparini, Joyeux & Floeter 2003	TMVIG, VTC	45–71	10
	**Thalassoma noronhanum* Boulenger 1890	FNA, NECO, TMVIG, VTC	30–85	2, 3, 10, 28
	**Xyrichtys incandescens* Edwards & Lubbocks, 1981	FNA	30–60	28
	Xyrichtys martinicensis Valenciennes 1840	NECO	36–40	3
	Xyrichtys novacula Linnaeus 1758	TMVIG, VTC	30–48	10
	Xyrichtys splendens Castelnau 1855	AMAZ, NECO	35–90	3, 13
Pinguipedidae	**Pinguipes brasilianus* Cuvier 1829	SS	60–150	32
Tripterygiidae	*Enneanectes altivelis* Rosenblatt 1960	TMVIG, VTC	30–45	10
Blenniidae	**Hypleurochilus brasil* Pinheiro Gasparini & Rangel 2013	TMVIG, VTC	30–45	10
	**Ophioblennius trinitatis* Miranda–Ribeiro 1919	SPSPA	30–90	11
Labrisomidae	**Malacoctenus* aff. *triangulatus* Springer 1958	NECO	35–40	3
Chaenopsidae	**Emblemariopsis* cf. *signifer* Ginsburg 1942	NECO, TMVIG, VTC	30–55	3, 10
Callionymidae	*Callionymus bairdi* Jordan 1888	NECO	53–54	3

(continued)

Table 10.1 (continued)

Family	Taxa	Locality	Depth range (m)	Reference
Gobiidae	*Coryphopterus dicrus* Böhlke & Robins 1960	NECO	50–54	3
	Coryphopterus eidolon Böhlke & Robins 1960	NECO	51–54	3
	Coryphopterus glaucofraenum Gill 1863	FNA, NECO	35–40	3, 28
	Coryphopterus thrix Böhlke & Robins 1960	NECO, TMVIG, VTC	30–85	3, 10
	Cryptopsilotris cf. *batrachodes* Böhlke 1963	NECO	54–55	3
	Ctenogobius saepepallens Gilbert & Randall 1968	NECO	35–40	3
	**Elacatinus figaro* Sazima, Moura & Rosa 1997	NECO	30–70	2, 3
	**Elacatinus pridisi* Guimarães, Gasparini & Rocha 2004	TMVIG, VTC	84	10
	**Elacatinus phthirophagus* Sazima, Carvalho–Filho & Sazima 2008	FNA	30–60	28
	Gnatholepis thompsoni Jordan 1904	NECO, TMVIG, VTC	30–85	3, 10
	**Lythrypnus brasiliensis* Greenfield 1988	NECO	50–54	3
	**Priolepis dawsoni* Greenfield 1989	AB, NECO, TMVIG, VTC	30–70	2, 3, 10, 14
	Risor ruber Rosén 1911	NECO, VTC	30–65	2, 3, 10
Microdesmidae	**Ptereleotris randalli* Gasparini, Rocha & Floeter 2001	AB, NECO	35–70	3, 14
Ephippidae	*Chaetodipterus faber* Broussonet 1782	CE, NECO	30–40	3, 25
Acanthuridae	**Acanthurus bahianus* Castelnau 1855	AB, FNA, NECO, TMVIG, VTC	30–80	3, 10, 14, 28
	Acanthurus chirurgus Bloch 1787	AMAZ, CE, FNA, NECO, VTC	30–70	1, 3, 10, 13, 15, 28
	Acanthurus coeruleus Bloch & Schneider 1801	CE, FNA, NECO, TMVIG, VTC	30–71	3, 10, 15, 28
Sphyraenidae	*Sphyraena barracuda* Walbaum 1792	CE, FNA, NECO, ROC, TMVIG, VTC	30–128	3, 10, 12, 15, 25, 28
	Sphyraena guachancho Curvier 1829	NECO	30–128	25
Gempylidae	*Lepidocybium flavobrunneum* Smith 1843	VTC	45–94	10
Scombridae	*Acanthocybium solandri* Cuvier 1832	CE, FNA, NECO, TMVIG, VTC	30–256	3, 10, 25, 28
	Auxis thazard Lacepède 1800	NECO	30–90	25
	Euthynnus alletteratus Rafinesque 1810	CE, NECO	30–128	3, 25
	Katsuwonus pelamis Linnaeus 1758	CE, NECO	30–120	25
	Scomberomorus brasiliensis Collete, Russo & Zavala–Camin 1978	CE, NECO	30–128	25
	Scomberomorus cavalla Cuvier 1829	CE, NECO	30–57	3
	Scomberomorus regalis Bloch 1793	NECO	30–51	3, 25
	Thunnus alalunga Bonaterre 1788	NECO	61–228	25
	Thunnus albacares Bonaterre 1788	CE, NECO	60–263	25
	Thunnus atlanticus Lesson 1839	CE, NECO	30–135	25
	Thunnus obesus Lowe 1839	CE, NECO	30–231	3, 25
Xiphiidae	*Xiphias gladius* Linnaeus 1758	NECO, TMVIG, VTC	50–224	10, 25
Istiophoridae	*Istiophorus alpbicans* Latreille 1804	CE, NECO	56–224	25
	Makaira nigricans Lacepède 1802	NECO, TMVIG, VTC	56–224	10, 25
Ariommatidae	*Ariomma bondi* Fowler 1930	VTC	49	10

(continued)

Table 10.1 (continued)

Family	Taxa	Locality	Depth range (m)	Reference
Bothidae	*Bothus lunatus* Linnaeus 1758	AMAZ, TMVIG	40–120	1, 10, 13
	Bothus ocellatus Agassiz 1831	AMAZ, NECO	40–120	1, 13, 25
Cynoglossidae	*Symphurus* aff. *rhytisma* Böhlke 1961	AB	70	14
Balistidae	*Balistes capriscus* Gmelin 1789	CE, NECO, TMVIG, VTC	30–60	10, 25
	Balistes vetula Linnaeus 1758	AB, AMAZ, CE, NECO, ECS, TMVIG, VTC	30–128	1, 3, 4, 10, 13, 25
	Melichthys niger Bloch 1786	CE, FNA, ROC, ECS, SPSPA, TMVIG, VTC	30–100	3, 4, 10, 11, 12, 14, 25, 28
	Xanthichthys ringens Linnaeus 1758	FNA, NECO, VTC	60–70	3, 10,28
Monacanthidae	*Aluterus monoceros* Linnaeus 1758	AMAZ, NECO, VTC	30–72	1, 3, 10, 13
	Aluterus schoepfii Walbaum 1792	VTC	71	10
	Aluterus scriptus Osbeck 1765	NECO, TMVIG, VTC	30–62	3, 10
	Cantherhines macrocerus Hollard 1854	TMVIG, VTC	30–65	10
	Cantherhines pullus Ranzani 1842	AMAZ, TMVIG, VTC	30–57	1, 10, 13
	Canthidermis sufflamen Mitchill 1815	FNA, NECO, SPSPA, VTC	30–300	3, 5, 10, 11, 28
	**Canthigaster figueiredoi* Moura & Castro 2002	AB, NECO, TMVIG, VTC	30–70	3, 10, 14
	Monacanthus ciliatus Mitchill 1818	NECO	35–50	3
	Monacanthus setifer Bennett 1831	NECO	35–40	3
	Stephanolepis hispidus Linnaeus 1766	AMAZ, NECO, VTC	33–293	1, 3, 10, 13
Ostraciidae	*Acanthostracion polygonius* Poey 1876	AMAZ, NECO, TMVIG, VTC	30–80	1, 3, 10, 13
	Acanthostracion quadricornis Linnaeus 1758	AMAZ, NECO, TMVIG	30–73	1, 3, 10
	Lactophrys trigonus Linnaeus 1758	NECO	35–40	3
Diodontidae	*Chilomycterus antennatus* Cuvier 1816	AMAZ	40–80	1
	Chilomycterus antillarum Jordan & Rutter 1897	AMAZ	40–80	1
	Chilomycterus reticulatus Linnaeus 1758	AMAZ, TMVIG, VTC	30–100	1, 10, 13
	**Chilomycterus spinosus* Linnaeus 1758	AB	70	14
	Diodon holocanthus Linnaeus 1758	AB, NECO, TMVIG, VTC	30–72	3, 10, 14
	Diodon hystrix Linnaeus 1758	NECO	35–40	3
Molidae	*Mola mola* Linnaeus 1758	VTC	41–56	10

Localities, depth range, and references are given. Only sessile benthic organisms and fishes were considered. Depth range includes only records from 30 m and greater in depth. Localities (see Fig. 10.1): *AMAZ* Amazon Reef, *PM* Manoel Luis Reefs, *CE* Ceará State continental shelf, *FNC–CS* Northern and Fernando de Noronha seamount chains plus the north continental shelf (Ceará and Maranhão States), *NECO* northeastern region (Rio Grande do Norte and Paraíba States), *SPSPA* Saint Peter and Saint Paul Archipelago, *ROC* Rocas Atoll, *FNA* Fernando de Noronha Archipelago, *ECS* eastern continental shelf (from Sergipe State to the northern portion of the Abrolhos Bank), *ABC* Abrolhos Seamount Chain, *AB* Abrolhos Bank, *VTC* Vitória-Trindade Seamount Chain, *TMVIG* Trindade and Martin Vaz Insular Complex, *ASS* Almirante Saldanha Seamount, *SS* southeastern/southern region (Rio de Janeiro and São Paulo States). Brazilian endemic species are denoted by an asterisk

References: (1) Collette and Rutzler (1977), (2) Rocha et al. (2000), (3) Feitoza et al. (2005), (4) Martins et al. (2007), (5) Pereira-Filho et al. (2011), (6) Brasileiro et al. (2016), (7) Cordeiro et al. (2015), (8) Magalhães et al. (2015), (9) Meirelles et al. (2015), (10) Pinheiro et al. (2015), (11) Rosa et al. (2016), (12) Amado-Filho et al. (2016), (13) Moura et al. (2016), (14) Simon et al. (2016), (15) Soares et al. (2016), (16) Anderson et al. (2017), (17) Luiz et al. (2007), (18) Cordeiro et al. (2012b), (19) Lavrado and Ignacio (2006), (20) Amaral et al. (2007), (21) Castro et al. (2010), (22) Pérez et al. (2011), (23) Cordeiro et al. (2012a), (24) Medeiros and Castro (1999), (25) Nóbrega et al. (2009), (26) Coelho-Filho (2004), (27) Amado-Filho et al. (2012a), (28) RBFF, pers. obs. (~25 h of technical dives between 30 and 60 m between 1998 and 2017), (29) Nunes et al. (2016), (30) Carvalho-Filho et al. (2009), (31) Carvalho-Filho and Ferreira (2013), (32) Rosa and Rosa (1997), (33) Luiz et al. (2009), (34) Figueiredo and Menezes (1980), (35) Muricy et al. (2011)

MCEs, such as bryozoans and decapod crustaceans (Vieira et al. 2012; Tavares and Carvalho 2017).

10.4.1 Macroalgae

A total of 234 algae species (133 Rhodophyta, 71 Chlorophyta, 29 Heterokontophyta, and 1 Ochrophyta) are currently recognized for Brazilian MCEs. Mesophotic algae are known to occur from 30 to 125 m depth, with the deepest record being *Lobophora variegata* at the Amazon Reef. The most speciose algae families are Corallinaceae (22 species), Rhodomelaceae (21), Dictyotaceae (19), and Ceramiaceae (16). The most speciose area is the Abrolhos Bank (133 species), followed by the southeastern/southern region (62), the Abrolhos Chain (60), and the VTC (51). Only one endemic species is known from Brazilian MCEs: *Laminaria abyssalis* in the Abrolhos Bank (Brasileiro et al. 2016). At Rocas Atoll, the rhodolith-forming alga taxa *Hydrolithon rupestre*, *Lithothamnion crispatum*, and *Sporolithon ptychoides* are the most abundant taxa in the mesophotic zone (Amado-Filho et al. 2016). In the SPSPA, crustose coralline algae dominate in depths between 30 and 60 m (Magalhães et al. 2015). On the seamounts of the VTC, the coralline algae *Porolithon onkodes* and *Phymatolithon masonianum* are the most abundant in the rhodolith beds (Meirelles et al. 2015). Several species are restricted to MCEs in a single region, such as the fleshy macroalgae *Canistrocarpus cervicornis*, which is recorded only at the Abrolhos Bank. Other species show a broader geographical distribution within Brazil, such as *Sporolithon ptychoides*, *Lithothamnion crispatum*, and *Hydrolithon rupestre*, which occur from the Amazon Reef to the Abrolhos Bank (Brasileiro et al. 2016; Magalhães et al. 2015; Amado-Filho et al. 2016; Moura et al. 2016; Table 10.1). However, caution is needed when drawing biogeographical patterns for algae, as few detailed taxonomic studies have been performed in Brazilian MCEs. For example, only four algal species were recorded for the northeastern Brazilian region, and no records are available for the TMVIG, where algae are prevalent at mesophotic depths.

10.4.2 Anthozoans

A total of 76 species of anthozoans (41 octocorals, 26 scleractinians, 6 black corals, and 3 calcified Hydrozoa) are recorded for Brazilian MCEs, including 20 endemic species (13 octocorals, 5 scleractinians, and 2 fire corals). The most speciose areas also contain the highest number of endemic species: Amazon Reef (46 species, 11 endemics), Abrolhos Bank (28 species, 9 endemics), and VTC (27 species, 6 endemics). While zooxanthellate scleractinian corals are most frequently recorded in the upper mesophotic zone (<70 m depth), octocorals, black corals, and azooxanthellate corals dominate the lower mesophotic zone (80–150 m). Scleractinians with the broadest geographic distribution, including continental and insular MCEs, are *M. cavernosa*, *Madracis decactis*, *Mussismilia hispida*, *Scolymia wellsi*, and *Siderastrea stellata*. *Montastraea cavernosa* is by far the most abundant species in the MCEs of three oceanic archipelagos (Fernando de Noronha, Trindade, and Rocas Atoll) and several sites along the continental shelf of the east and northeast regions (Table 10.1).

10.4.3 Sponges

A total of 166 sponge species are currently recorded for Brazilian MCEs. Most species have a wide bathymetric distribution from mesophotic to aphotic reefs (e.g., *Agelas dispar*, *Aplysina cauliformis*, and *Geodia neptuni*; Collette and Rutzler 1977; Amado-Filho et al. 2016; Moura et al. 2016), with the deepest record (730 m) for *Aplysina lacunosa* in the Amazon Reef. The most speciose sponge families are Geodiidae (10 species), Agelasidae (8), Ancorinidae (7), and Aplysinidae (7; Table 10.1). The most speciose mesophotic area is by far the Amazon Reef (57 species), followed by the northeastern region (47), the Northern and Fernando de Noronha seamount chains plus the north continental shelf, Ceará and Maranhão States (40), and eastern continental shelf from Sergipe State to the northern portion of the Abrolhos Bank (28). A total of 49 Brazilian endemics are recorded, most of them for the northeastern region (16 species), followed by the southeastern/south region (10), the Amazon Reef (9), and the eastern continental shelf (9). Species with broadest geographic distribution, including oceanic and continental locations, are *Aiolochroia crassa*, *Agelas dispar*, *Hyattella cavernosa*, and *Leucetta floridana* (Table 10.1). Major sampling gaps are evident as no records are available for areas where sponges are prevalent, such as the VTC and the TMVIG.

10.4.4 Fishes

A total of 25 elasmobranchs and 275 teleost species are currently recognized for Brazilian MCEs. The most speciose fish families are Serranidae (31 species), Labridae (26), Carangidae (20), Gobiidae (15), and Muraenidae (15; Table 10.1). The most speciose areas are the VTC (168 species), northeastern region (150), TMVIG (114), and the Abrolhos Bank (80). Fifty-six Brazilian endemic species were recorded, five of them occurring almost exclusively in MCEs: *Chromis flavicauda* (Pereira-Filho et al. 2011; Pinheiro et al. 2015), the oblique butterflyfish *Prognathodes obliquus* (Fig. 10.2d) and *Choranthias salmopunctatus*

(Fig. 10.2e) from the SPSPA (Luiz et al. 2007; Rosa et al. 2016), the Trindade parrotfish *Sparisoma rocha* from the VTC (Pinheiro et al. 2015), and Thiony's goby *Pinnichthys aimoriensis* from the Abrolhos Bank (Simon et al. 2016; Tornabene et al. 2016). Most Brazilian endemics are small in size and shallow-water specialists (Luiz et al. 2012), with the highest proportions of endemics (38.5–44.4%) recorded for tidepools of oceanic islands (Andrades et al. 2017). This contrasts with findings from other MCEs such as in the Northwestern Hawaiian Islands, where the highest proportion of endemic fishes (46%) occur at mesophotic depths (Kane et al. 2014). Other fish species widely distributed in the Atlantic, but restricted to MCEs in Brazil, include *Anthias asperilinguis* (Anderson et al. 2017), *Anthias menezesi* (Pinheiro et al. 2015), *Chromis enchrysura* (Rosa et al. 2016), *Lutjanus vivanus*, *Mycteroperca venenosa* (Olavo et al. 2011; Pereira-Filho et al. 2011), *Pontinus nigropunctatus*, *Pontinus rathbuni* (Lessa 2008; Olavo et al. 2011), and *Xanthichthys ringens* (Feitoza et al. 2005; Pinheiro et al. 2015). The most abundant fish species on MCEs in Brazil have wide bathymetric distribution, including both shallow and mesophotic reefs, such as *Bodianus pulchellus*, *Canthidermis sufflamen*, *Caranx lugubris*, *Cephalopholis fulva*, *Chromis multilineata*, *Holacanthus tricolor*, *Holocentrus adscensionis*, *Malacanthus plumieri*, *Melichthys niger*, *Paranthias furcifer*, and *Stegastes pictus* (Feitoza et al. 2003; Pereira-Filho et al. 2011; Rosa et al. 2016).

In MCEs of southeast Brazil, the fish fauna includes some Brazilian endemics (e.g., *Halichoeres sazimai* and *Serranus aliceae*), warm-temperate fishes with distribution extending into the Argentinian Province (e.g., *Dules auriga*, *Pinguipes brasilianus*, *Acanthistius brasilianus*), and subtropical/tropical deep-associated species widely distributed across the Brazilian and Caribbean Provinces (e.g., *Pronotogrammus martinicensis* and *Chromis enchrysura*) (Carvalho-Filho et al. 2009; Luiz et al. 2009; Carvalho-Filho and Ferreira 2013). MCEs of the subtropical coast are also refuge for commercially important top predator species (e.g., *Epinephelus marginatus*, *Mycteroperca acutirostris*, and *Hyporthodus niveatus*; Figueiredo and Menezes 1980; Nóbrega et al. 2009).

10.5 Ecology

The main biogenic reef builders in Brazilian MCEs are coralline algae (both encrusting and free-living nodules). Important scleractinian reef builders on shallow reefs from the Brazilian endemic genus *Mussismilia* are nearly absent from mesophotic depths, except for *Mussismilia hispida*, which is common on Brazilian MCEs (RBFF, pers. obs.). The scleractinian coral *M. cavernosa* dominates MCEs of oceanic islands and seamounts (except for the SPSPA; Fig. 10.2f) and along the continental shelf of the northeast and east regions (Pereira-Filho et al. 2011; Francini-Filho et al. 2013). The importance of *Montastraea* reefs in the Caribbean has been highlighted previously (Chollett and Mumby 2012); however, little information on their distribution and conservation status in Brazil is available.

Rhodolith mounds built by the sand tilefish *M. plumieri* to serve as nests are widespread in Brazilian MCEs (Fig. 10.2g). These nests are known to aggregate biodiversity and provide habitat for several invertebrates and reef fishes (Pereira-Filho et al. 2015). Like many MCEs globally, fish assemblages in Brazilian MCEs are dominated by planktivorous fish, mainly *C. enchrysura*, *C. multilineata*, *S. pictus*, and *P. furcifer* (Feitoza et al. 2005; Pereira-Filho et al. 2011; Rosa et al. 2016). The predominance of planktivores in mesophotic depths in Brazil and elsewhere may be explained by the fact that their food supply (zooplankton) is not directly influenced by light and may be more abundant in the relatively cold waters of mesophotic depths. In addition, planktivores may be less vulnerable to predators at MCEs due to low-light levels (Bridge et al. 2016). Piscivores may be also abundant in some areas, such as the black jack *C. lugubris* in the SPSPA (Rosa et al. 2016; Fig. 10.2h). Other abundant and widely distributed mesopredators in Brazilian MCEs (Table 10.1) are *Holocentrus adscensionis* and *Cephalopholis fulva*, both known to consume juveniles of several reef fish species and adults of relatively small fish species (Beets 1997; Coelho et al. 2012).

Branching black corals (e.g., *Tanacetipathes* spp.) provide tridimensional habitat that is clearly used as shelter by several reef fishes (e.g., *C. enchrysura*, *P. obliquus*, and juveniles of *B. insularis*) in the SPSPA (Fig. 10.2i). *Prognathodes obliquus*, which is endemic to the SPSPA, was recorded grazing over black coral colonies (Rosa et al. 2016). Juveniles of *B. insularis* and *B. pulchellus* are among the most important cleaner fishes in Brazilian MCEs. Both species show ontogenetic shifts in habitat use, with juveniles nearly exclusively associated with MCEs and adults inhabiting shallower zones (Sazima et al. 2010; Rosa et al. 2016). Several species of *Bodianus* are recognized as having juveniles mostly or exclusively associated with mesophotic habitats (Lobel 1981; Randall and Chen 1985; Sazima et al. 2010).

Brazilian MCEs are very important for ecological connectivity between provinces and ecoregions. For instance, the Amazon Reef has been hypothesized to facilitate species dispersal between Caribbean and Brazilian Provinces (Rocha 2003). Most Brazilian endemics are small fishes and shallow-water inhabitants that cannot utilize this corridor (Floeter and Gasparini 2001; Luiz et al. 2012). MCEs found at the edge of the Brazilian continental shelf also connect subtropical and tropical ecosystems (Olavo et al. 2011). Feitoza et al. (2005) found many subtropical species on MCEs along the tropical northeast Brazilian regions.

Recently, Simon et al. (2016) found strong differences in the fish composition between northern and southern sites of the Abrolhos Bank. Northern sites supported more shallow-water species, while the southern sites supported more subtropical fishes, suggesting the presence of a biogeographic boundary for mesophotic reef fauna in the Abrolhos Bank. Water temperature and clarity seem to be important determinants of species composition in Brazilian MCEs (Simon et al. 2016). An unexpectedly high diversity of shallow-water species was found on MCEs in the VTC. The most plausible explanation of this pattern is the high temperature and water clarity of the VTC compared to the northeast Brazilian shelf (Pinheiro et al. 2015). In contrast, low temperature explains subtropical species on MCEs (Feitoza et al. 2005) and the presence of mesophotic species in shallow and colder subtropical reefs on the northeast Brazilian shelf (Carvalho-Filho et al. 2009). Some mesophotic habitats on the seamounts and islands of the VTC support palaeoendemic fishes that originated a long time ago in evolutionary time scales (Pinheiro et al. 2017). The environment on these mesophotic isolated sites seems to be more stable across geological time than those on the continental shelf (Pinheiro et al. 2017). Thus, while many lineages and species have become extinct on the mainland, those relict species appear able to persist on MCEs on seamounts and oceanic islands. Consequently, these habitats likely have particularly high conservation value.

Many new records and new species are still being discovered on Brazilian MCEs. Simon et al. (2016) found new records for the southwest Atlantic, as well as completely new, undescribed species when exploring Abrolhos MCEs, some of which have not yet been collected. Pinheiro et al. (2015) also found new species exploring the seamounts of the VTC.

10.6 Threats and Conservation Issues

Overfishing is the main threat to Brazilian MCEs, with high trophic groups such as groupers, snappers, jacks, and sharks, as well as lobsters, among the most targeted species (Pinheiro et al. 2010; Olavo et al. 2011). Two oceanic archipelagos encompassing extensive MCEs (SPSPA and the VTC) are partially protected with limited fisheries regulations. Local extinction of top predators that forage on deep reefs, such as the Galapagos shark *Carcharhinus galapagensis* in the SPSPA, may alter trophic food webs, with unknown consequences for the region's MCEs (Luiz and Edwards 2011). Mining also represents an imminent threat to Brazilian MCEs, and several projects are underway to exploit coralline algae from rhodolith beds aimed at extracting micronutrients and correcting soil acidity for sugarcane plantations (Wilkinson et al. 2016). Marine gas and oil exploration also threaten MCEs along the entire Brazilian shelf (Moura et al. 2013, 2016). Land-based pollution is another important threat, particularly near large cities. Even in the small and isolated SPSPA, trash is commonly recorded at mesophotic depths: about 10% of black coral colonies are entangled with fishing lines, which may facilitate the proliferation of coral diseases (Lamb et al. 2018; Fig. 10.2j).

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