Neotropical Ichthyology

Review article

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Ichthyofauna of Paraíba State, Brazil: diversity patterns, knowledge gaps, and challenges for fish conservation and sustainable use

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The ichthyofauna of Paraíba State (Northeastern Brazil) comprises freshwater, estuarine, and marine species, providing human communities with a source of food, income, and cultural value. We characterize trends in scientific production and patterns of fish diversity, shedding light on critical knowledge gaps and identifying research priorities for conservation and the economic use of species. A broad compilation of articles published and zoological collections data, reveals that taxonomic and ecological studies are the key drivers of an exponential growth of knowledge on the fishes of Paraíba State. Our assessment identified 565 valid species, across marine, estuarine, and freshwater habitats. These species numbers are conservative, as many taxonomic issues remain unresolved and localities such as small coastal basins and deep-sea areas remain poorly sampled. Several anthropic pressures have left some species under threat. In the marine environment, 41 species are classified as threatened, while only two freshwater species are listed as threatened. Despite substantial advances in knowledge, we highlight the need for additional taxonomic research, sampling in under-surveyed areas and region-wide inventories. Finally, we recommend promoting environmental education,

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community engagement and training, as central elements in the conservation and management of fishes in Paraíba State.

Keywords: Elasmobranchs, Northeast Brazil, Research priorities, Scientometric, Teleosts.

A ictiofauna do estado da Paraíba (Nordeste do Brasil) abrange espécies de água doce, estuarinas e marinhas, fornecendo as comunidades humanas uma fonte de alimento, renda, e de valor cultural. Caracterizamos tendências da produção científica e os padrões de diversidade de peixes, evidenciando lacunas críticas no conhecimento e identificando prioridades de pesquisa para a conservação e o aproveitamento econômico das espécies. Uma ampla compilação de artigos e de dados de coleções zoológicas indica que os estudos taxonômicos e ecológicos são os principais responsáveis pelo crescimento exponencial do conhecimento sobre os peixes no estado da Paraíba. Nossa avaliação identificou 565 espécies válidas, em habitats marinhos, estuarinos, e de água doce. Esses números de espécies são conservadores, já que diversas questões taxonômicas ainda não foram resolvidas, e algumas áreas, como pequenas bacias costeiras e regiões marinhas profundas continuam pouco amostradas. Diversas pressões antrópicas têm ameaçado algumas dessas espécies. No ambiente marinho, 41 espécies são classificadas como ameaçadas, enquanto apenas duas espécies de água doce se enquadram nessa categoria. Apesar dos avanços substanciais no conhecimento, destacamos a necessidade de pesquisas taxonômicas adicionais, amostragens direcionadas em áreas pouco exploradas, e inventários em escala regional. Por fim, recomendamos a promoção da educação ambiental, bem como o fortalecimento e capacitação comunitária como elementos centrais na conservação e gestão das espécies de peixes no estado da Paraíba.

Palavras-chave: Cientometria, Elasmobrânquios, Nordeste do Brasil, Prioridades de pesquisa, Teleósteos.

INTRODUCTION

Aquatic ecosystems in the State of Paraíba, Brazil, hold over 560 fish species, a number resulting from the interplay of ecological gradients, biogeographical history, habitat heterogeneity, and anthropogenic processes (Márquez Velásquez *et al*., 2025). Freshwater fishes inhabit waters that drain two contrasting biomes: (i) the semiarid Caatinga, part of the Mid-Northeastern Caatinga Ecoregion (MNCE, *sensu* Rosa *et al*., 2003b), and (ii) the Atlantic Forest, being part of its highly threatened Pernambuco Endemism Centre (PEC; Silva, Casteleti, 2003), a global biodiversity hotspot (Myers *et al*., 2000). The Caatinga has a dense network of intermittent rivers that exhibit high fish endemism (Rosa *et al*., 2003b, 2004; Albert *et al*., 2011), and the Atlantic Forest

includes PEC's largest remaining forest fragments and small coastal streams flowing into the Atlantic. These biomes create unique conditions for faunal overlaps and transitions related to ecological and hydrological connectivity, which are intensified by anthropogenic processes.

Marine fishes of Paraíba occur in vast array of habitats, including tide pools, estuaries, shallow and deep reefs, and oceanic environments. Among these, coral reefs are particularly important, forming part of the richest coral reef system in the southwestern Atlantic (Leão *et al*., 2010), a biodiversity hotspot shaped by biogeographic and oceanographic processes. Locally, reefs are typically sandstone formations on the inner continental shelf (Leão *et al*., 2003), often forming long beachrock lines (Laborel, 1970). In these habitats, the ichthyofauna supports key socioeconomic activities, such as tourism and fishing (Costa *et al*., 2007; Paulo Júnior *et al*., 2012), with artisanal fishing comprising over 80% of the catches (IBAMA, 2008). The high fish diversity in this region is result of vicariance events, such as those associated with the final closure of the Isthmus of Panama (Coates, Obando, 1996); the presence of major dispersal barriers, such as the Amazon-Orinoco plume, which limits dispersal and contribute to the divergence between Brazilian and Caribbean assemblages (Rocha *et al*., 2005; Floeter *et al*., 2008). Additionally, the heavy sediment load in the Brazilian Northeastern Ecoregion of the Southwestern Atlantic (*sensu* Spalding *et al*., 2007) further isolates the northeastern and eastern portions of the coast (Leão *et al*., 2003).

Initial efforts to describe fish species in Northeastern Brazil began in the mid-17th century, with the publication of Historia Naturalis Brasiliae (Piso, Marcgrave, 1648), which documented the diversity of fishs from the São Francisco River to the state of Maranhão (Medeiros, Albuquerque, 2014; Alcantara-Rodriguez *et al*., 2019). This work presents detailed illustrations of marine and freshwater species (Willemsen, 2023). Later, at the end of the 19th century, the Geological Commission of the Empire conducted fish surveys in Paraíba, whose collected specimens are currently in the National Museum of Rio de Janeiro (Sanjad, 2004). Beaurepaire-Rohan (1911) compiled a list of Paraíba's fishes by their common names and Miranda Ribeiro (1937, 1939) described several regional marine fish species in existing collections. Moreover, Starks (1913) surveyed the mouth of the Mamanguape River, while Fowler (1941, 1948, 1954) advanced systematic descriptions of freshwater species. Furthermore, the Technical Commission for Fish Farming in Northeast Brazil initiated its work in 1933, reinforcing pioneering studies of Paraíba fishes (Canan, 2011).

Over the last decades, ichthyology in the Paraíba State transitioned from a taxonomic focus to more multidisciplinary approaches, including ecology, reproduction, ethnobiology, parasitology, and fisheries management. This research has largely concentrated on major perennial and intermittent water courses, such as the Paraíba and Piranhas rivers, along with their respective coastal areas and basins (Rosa *et al*., 2003b; Honório *et al*., 2010; Xavier *et al*., 2012). However, other coastal rivers with ecological and socioeconomic relevance, such as the Jacu and Guaju rivers, remain poorly studied (Márquez Velásquez *et al*., 2025). In marine environments, research has focused mostly in coastal ecosystems, including estuaries and mangroves (*e.g*., Xavier *et al*., 2012; Medeiros *et al*., 2018, Ramos *et al*., 2019), intertidal zones (*e.g*., Rosa *et al*., 1997; Silva Nascimento, Ramos 2024), and coral reefs (*e.g*., Rocha *et al*., 1998; Souza *et al*., 2007).

Despite consistent growth of research in both freshwater (Lima *et al*., 2017; Oliveira-Silva *et al*., 2018, Ramos *et al*., 2018a,b, 2019; Marinho *et al*., 2023) and marine environments (Rosa *et al*., 1997; Honório *et al*., 2010; Silva *et al*., 2021; Marceniuk *et al*., 2023; Rosa *et al*., 2023), data remains uneven across time, space, habitats, and research fields, with most data available in grey literature. Scientometric methods can shed light on these imbalances and contribute with public policies and strategies that promote both basic and applied research. Although it is not biologically meaningful to use geopolitical borders to study biodiversity patterns, it is essential for policy-making to understand how knowledge trends vary across them (Beddington *et al*., 2007; Hortal *et al*., 2015). Data-driven strategies are critically lacking to guide policies promoting the conservation and sustainable use of aquatic biodiversity and ecosystems across spatial scales (Pullin, Stewart, 2006; Dallimer, Strange, 2015; Olawumi, Chan, 2018).

In this paper, we compiled data from published papers related to the ichthyofauna in the Paraíba State and data from specimens in relevant ichthyological collections. We combine these data with taxonomic and geographical analyses to suggest future directions for ichthyological research by (a) reviewing the development of ichthyological research over time in the Paraíba State, (b) exploring the temporal and disciplinary trends in research topics, (c) assessing gaps in current coverage of habitat types and geographical areas, and (d) describing trends and biases in the current coverage of taxonomic groups.

MATERIAL AND METHODS

Data sources. We performed a literature search in Web of Science (WoS) (https://www.webofscience.com) and Google Scholar (www.google.com) including publications up to September 2024, using the search strings: ((fish* OR Ichth* OR pisces OR Osteichthyes OR Chondrichthyes OR Elasmobranchii) AND (Coast* OR Estuar* OR Marine OR Reef OR Freshwater OR Oceanic OR mangrove OR Freshwater* OR lake*) AND (Paraíba AND Northeast* AND Brazil*)). We performed searches in both English and Portuguese, encompassing titles, abstracts, keywords, and methods. We focused on indexed journal articles and scientific or technical books and excluded grey literature to benefit from the transparency and replicability ensured by peer-reviewed sources (Tab. **S1**).

We employed a snowball method (Wohlin, 2014) to identify additional publications from the reference lists that met our search criteria. After manually screening titles, abstracts, and methodologies, and excluding articles that did not report data from Paraíba State, we found 198 publication records. We used the open-source software Zotero (www.zotero.org) to organize all bibliographical information. From each selected publication, we extracted the following data: (i) title; (ii) year of publication; (iii) authors (iv) journal; (v) type of article (primary research or review); (vi) sampled locations; (vii) habitat (marine, estuarine, freshwater); (viii) river basin, for continental fishes, according to the Brazilian National Water Agency (ANA, 2015); (ix) research topics; and (x) species or taxonomic group(s). Here, freshwater encompasses lakes, streams, creeks, ponds, wetlands, marshes, and reservoirs, while estuaries are considered a separate category. Additionally, we compiled data from five Brazilian ichthyological collections that holds relevant material from the Paraíba State: Universidade Federal

da Paraíba, João Pessoa (UFPB), Museu de Zoologia da Universidade de São Paulo, São Paulo (MZUSP), Universidade Federal de Rio Grande do Norte, Natal (UFRN), Museu Nacional, Rio de Janeiro (MNRJ), and Pontifícia Universidade Católica do Rio Grande do Sul, Porto Alegre (PUCRS), focusing only on voucher specimens that were georeferenced or clearly linked to Paraíba State. This data compilation is available at the DATAPB repository (Márquez Velásquez *et al.*, 2025, https://datapb.ccae.ufpb.br/).

Temporal trends. We analysed scientific production by year and habitat, categorising the habitats into three types: (a) freshwater, (b) marine, and (c) estuarine. When a study encompassed multiple habitats, we included it in each relevant habitat. We classified the papers into research topics (see Tab. **S1**) based on titles and keywords, but verifying also the abstract if the theme remained unclear. If a study covered multiple topics, we counted each one separately. Our classification followed a controlled vocabulary developed to cover the diversity of ecological, taxonomic, and applied themes (Tab. 1). We used these categories to describe temporal trends and thematic focus in research efforts.

Geographical trends. We gathered the geographical coordinates of the sampling sites from each relevant publication. When studies provided coordinates, we use them directly. For studies that did not provide coordinates, we inferred the locations from suitably georeferenced maps using WebPlotDigitizer (https://automeris.io/WebPlotDigitizer/). We then created a distribution map in QGIS software v. 2.18.

TABLE 1 | Research topic categories and their descriptions, used for classifying and assessing temporal trends of the compiled studies.

Topics	Description
Taxonomy, systematics, evolution	Species lists, inventories, descriptions of new species, updates on systematics and taxonomy, evolutionary history, phylogenetic systematics, and genetics.
Anatomy and morphology	Analysis and descriptions of anatomy and morphology.
Distribution and biogeography	Geographical distributions, occurrence, new records, biogeographic and phylogeographic patterns.
Trophic ecology	Diet, feeding habits, and trophic interactions.
Ecology	Species interactions, effects of abiotic variables on populations or communities, pollution, ecomorphology, and migration.
Ethnoecology	Local communities' knowledge, management of natural resources, and cultural practices.
Physiology	Mechanical, physical, and biochemical functions; ecotoxicological analyses.
Reproduction	Reproductive biology, ontogeny, age and growth, weight-length and length-age relationships, demography.
Parasitology	Parasites, their hosts, and the interactions between them.
Fisheries	Landing data, description of catches, fishing effort, fishing gears, fish processing, marketing, and consumption.
Conservation and management	Vulnerability assessment, demographic analysis, population decline, design of closed areas, invasive species, and ecotourism.
Others	Papers not classified in any of the topics mentioned above, such as Palaeontology, and fish farming.

Furthermore, we analysed the number of published papers, categorising them by the main hydrographic basins of Paraíba State (http://www.aesa.pb.gov.br/). This basin-level spatial resolution enabled us to identify sampling imbalances and underrepresented river systems.

Taxonomic trends. We classified species by family, order, and class, and verified their taxonomic status in Eschmeyer's Catalogue of Fishes (Fricke *et al*., 2025). Whenever possible, we verified and reported fish habits using sampling locations from collections (Camargo, Isaac, 2001; Morais, 2016; Vendel *et al*., 2022). We broadly defined estuarine species as those that use estuarine habitats at any life-stage, regardless of whether they primarily inhabit freshwater or marine environments. For each species, we considered human uses: commercial, local consumption, medicinal, aquaculture, and recreational fishing (Pimentel Rocha *et al*., 2008; Almeida *et al*., 2014; Marceniuk *et al*., 2023). We also reported global conservation status based on the IUCN Red List (IUCN, 2025) and national status according to the Sistema de Avaliação do Risco de Extinção da Biodiversidade – SALVE (ICMBio, 2026). We classified extinction risk following IUCN categories: Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT), Least Concern (LC), Data Deficient (DD), and Not Evaluated (NE).

We reported species endemic to the Northeastern Caatinga and Coastal Drainages ecoregion (NCCD) *sensu* Abell *et al*., 2008, and to the Northeastern Brazil Marine ecoregion (NBM) *sensu* Spalding *et al*., 2007. The NCCD encompasses all river basins located between the Parnaíba and São Francisco rivers. A large portion of this ecoregion is located within the Brazilian semi-arid region (Rosa *et al*., 2003b; Lima *et al*., 2017). Most of its tributaries, predominantly intermittent, drain areas of the Caatinga (Rosa *et al*., 2003b). In the easternmost portion of this ecoregion are small coastal rivers that lie entirely or largely under the influence of the Atlantic Forest and are distributed from southern Rio Grande do Norte to Alagoas (Rosa *et al*., 2003b; Lima *et al*., 2017). The NBM ecoregion, located between Piauí and Sergipe states, is nested within the Tropical South-western Atlantic Province (Northeastern and Eastern Brazil ecoregions) (Spalding *et al*., 2007). Additionally, we identified potentially undescribed or cryptic species in collections. For illustrative images of fish, we used figures from Phylopic.org (Keesey, 2024).

RESULTS

Temporal trends. Our search identified 198 scientific publications (Tabs. **S1**, **S2**). Research articles comprised the majority (n = 184; 93%), while book or book sections accounted for only 14 (7%) of the total (Tabs. **S1**, **S2**). The first ichthyological study on Paraíba State documented the ichthyofauna of the estuarine waters in the Brazilian northeastern region during the 1970s (Oliveira, 1972). Advancements in taxonomy and ecology arose later, founded on investigations into shark fisheries biology (Lima, Ferreira, 1975) and preliminary surveys of marine fishes (Rosa, 1980a,b) (Fig. 1; Tab. **S1**).

A temporal increase in the number of publications across research topics was detected over the studied period, with ecological studies rising sharply over the last 20 years, followed by Taxonomy and Systematics, Reproduction, Ethnoecology, and Fisheries

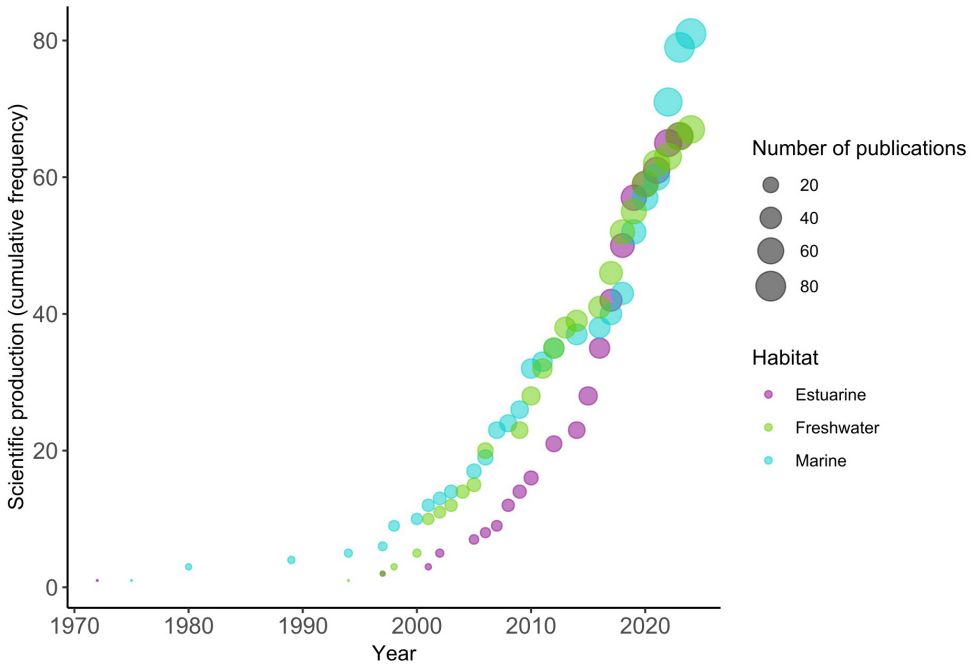

FIGURE 1 | Temporal distribution of scientific publications for fish species of Paraíba State, Brazil, between 1972 and 2024, based on their habitats.

research (Fig. 2A). The most common research topic in the dataset was Ecology (n = 57, 29%), followed by Taxonomy (45, 23%) and Trophic Ecology (28, 14.14%). Together, these categories comprised more than 50% of the dataset. Other areas included Reproduction (21, 10.60%), Distribution/Biogeography (20, 10.10%), Ethnoecology (19, 9.60%), and Fisheries (17, 8.60%). Studies on Parasitology and Anatomy appear in the dataset, though to a lesser extent (6, 3% each). Only 2% (n = 4) of these studies focused on Conservation and Management (Fig. 2A).

Overall, a clear upward trend in publications was evident over the last twenty years, particularly since 2000, driven by increases in Ecology, Taxonomy, and Trophic ecology research (Fig. 2B). In contrast, when considering habitat types, the predominant research topics in marine and estuarine environments, the most frequent research topics were Ecology, followed by Taxonomy/Systematics/Evolution and Trophic Ecology, respectively. In freshwater habitats, Taxonomy/Systematics/Evolution was the most prevalent topic, followed by Ecology and Reproduction (Fig. 2B). For freshwater habitats, Taxonomy/Systematics/Evolution emerged as the most common topic, followed by Ecology and Reproduction (Fig. 2B; Tab. **S1**).

Representation of habitats and locations in scientific production. The Paraíba River basin had the highest number of studies (n = 61; 42.10%), followed by the Mamanguape basin (49; 33.80%) and the Piranhas River basin (11; 7.60%). The Curimatau (3, 2.10%), Camaratuba (2; 1.40%) and Miriri River basins (1; 0.70%) had much fewer studies (Figs. 3A, B). Notably, there were no publications for the interstate basins of the Jacu, Guaju and Trairi Rivers, all located in northern Paraíba State along the border with Rio Grande do Norte State. Although studies exist for the Trairi River

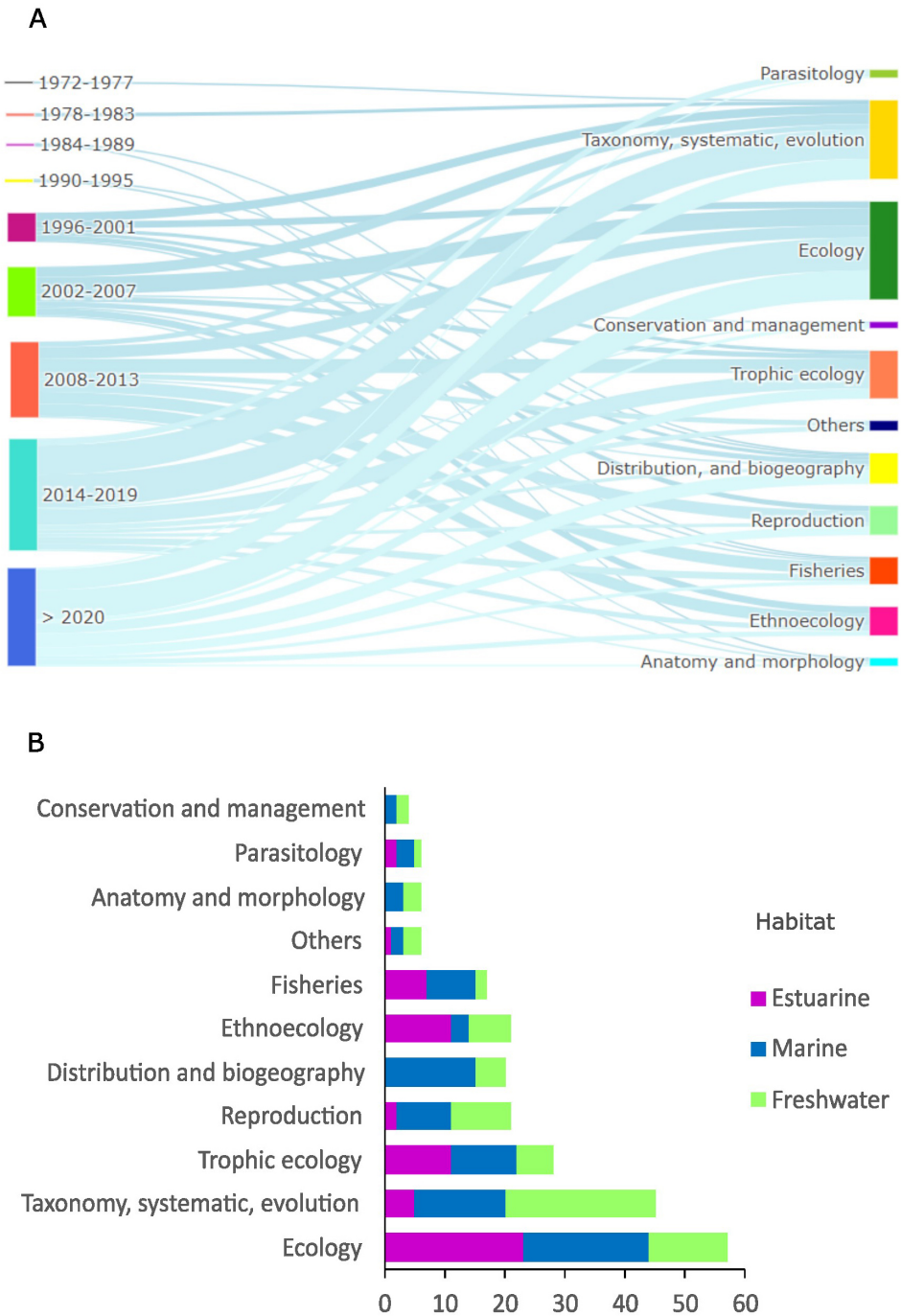

FIGURE 2 | **A.** A network summarizing temporal research trends in the scientific knowledge of the ichthyofauna of Paraíba State, Brazil, from 1972 to 2024. **B.** Number of research production during the same period, categorized by habitat.

basin, they report exclusively on species recorded in the portion of the basin situated within the State of Rio Grande do Norte. The Tracunhaém River, part of the Goiana River basin (Pernambuco), lies between the states of Paraíba and Pernambuco, with no records available for this drainage in Paraíba. Of the total studies, 70 included the estuarine area, with the Mamanguape River estuary having most of the studies (n = 41, 58.6%), followed by the Paraíba River estuary (20, 28.60%), Abiaí (5, 7.14%), and the Gramame and Camaratuba River estuaries (2, 2.90%).

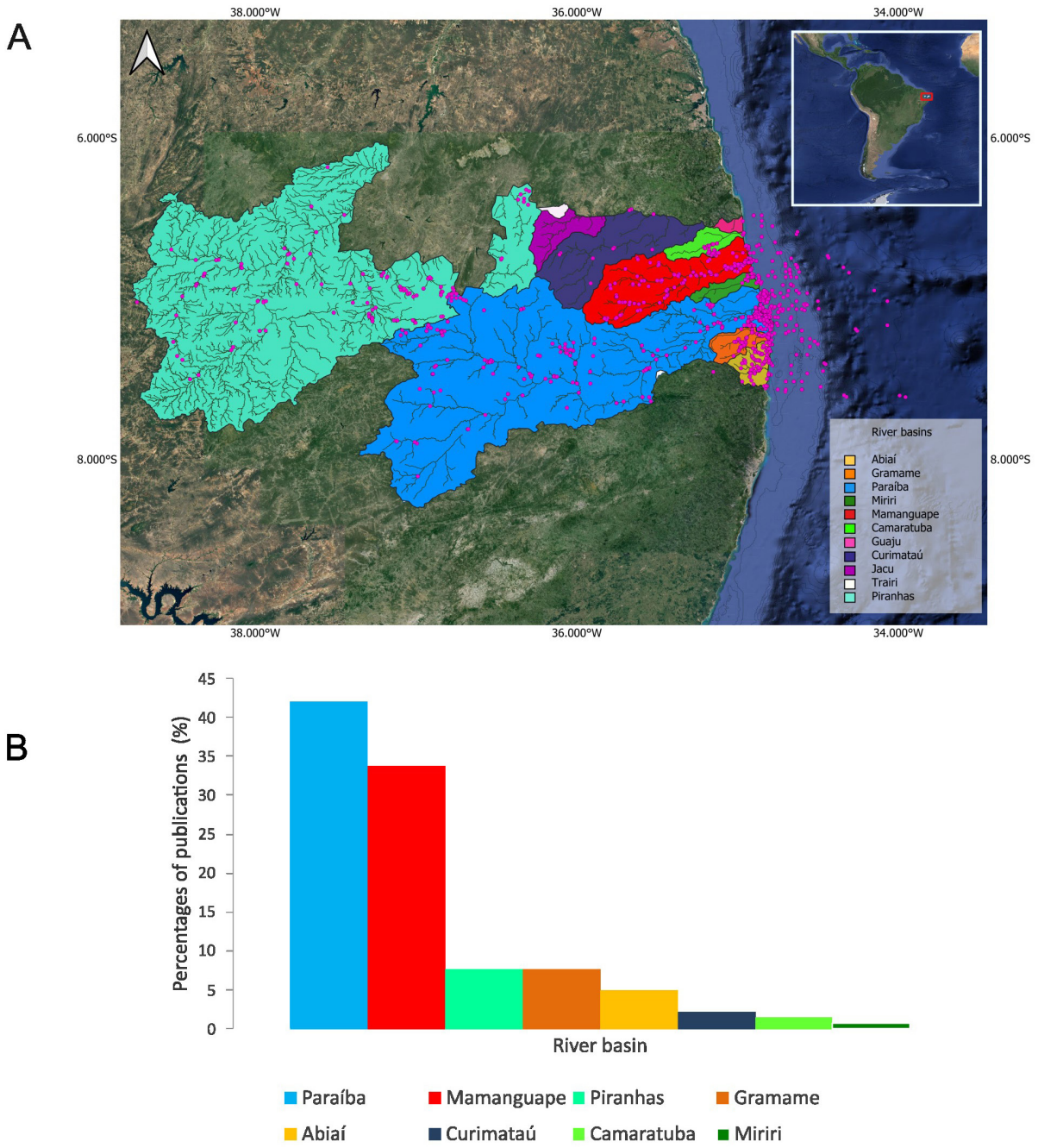

FIGURE 3 | Distribution pattern of sampling and scientific knowledge on the ichthyofauna of Paraíba State, Brazil, from 1972 to 2024. **A.** The purple points on the map represent the sampling locations across the state. **B.** The data is categorized by the main river basins, showing an uneven distribution of research efforts among them.

In marine regions, the coastal area accounted for nearly 40% of the published studies (Fig. 3A). While estuaries and shallow coastal zones are well studied, deep-sea and shelf-edge areas remain largely underexplored. The distribution of lots within hydrographic basins exhibits a similar pattern, with the Paraíba River basin having the largest number of lots (n = 2,161), followed by Mamanguape (n = 1,458) and Piranhas Rivers (n = 700). Abiaí (478), Gramame (369), Miriri (97), Curimataú (71), and Camaratuba Rivers (33) are less represented. There are no recorded lots for the Jacu, Guaju, and Trairi River basins in Paraíba territory. Marine records dominate the dataset, comprising a total of 2,909 lots, highlighting the research emphasis along the coast.

Scientific production by taxa. This assessment includes 565 valid species, comprising teleost and elasmobranch fishes found in freshwater and marine/estuarine environments. These species belong to 39 orders and 132 families (Tab. 2; Fig. 4). To ensure the accuracy of the diversity patterns presented, we excluded questionable records that may have resulted from misidentifications.

TABLE 2 | Fish species found in Paraíba State, Northeastern Brazil, with non-native species indicated by asterisk. The symbol (?) denotes species whose occurrence is reported in biological collections but are possibly misidentifications. Endemic species to the Northeastern Caatinga and Coastal Drainages ecoregion (NCCD) are highlighted in bold. The IUCN status reflects the global assessment, and the BR status refers to the Sistema de Avaliação do Risco de Extinção da Biodiversidade – SALVE (ICMBio, 2026). NE: Not Evaluated, NA: Not Applicable. Species uses: Co: commercial, Or: ornamental in aquariums, F: food, Lc: local consumption, Me: medicinal, Aq: aquaculture, Rf: recreational fishing. Source: Li, Literature; ichthyological collections where the species is deposited (Tabs. **S1**, **S2**). [a] Endemic to the Mamanguape River, Paraíba, [b] Endemic to the Paraíba River, Paraíba, [c] Endemic to the Northeastern Brazil Marine ecoregion (NBM).

Class/Order	Family	Species	Habit	IUCN	BR	Use	Source
Elasmobranchii							
Hexanchiformes	Hexanchidae	*Hexanchus griseus* (Bonnaterre, 1788)	Marine	NT	LC		Li
Orectolobiformes	Rhincodontidae	*Rhincodon typus* Smith, 1828	Marine	EN	VU		Li
Orectolobiformes	Ginglymostomatidae	*Ginglymostoma cirratum* (Bonnaterre, 1788)	Marine	VU	VU	Lc	CIUFPB, Li
Lamniformes	Lamnidae	*Isurus oxyrinchus* Rafinesque, 1810	Marine	EN	CR		Li
Carcharhiniformes	Scyliorhinidae	*Scyliorhinus haeckelii* (Miranda Ribeiro, 1907)	Marine	DD	LC		CIUFPB, Li
Carcharhiniformes	Triakidae	*Mustelus higmani* Springer & Lowe, 1963	Marine	EN	DD		CIUFPB, Li
Carcharhiniformes	Triakidae	*Pseudotriakis microdon* Capello, 1868	Marine	LC	LC		Li
Carcharhiniformes	Carcharhinidae	*Carcharhinus acronotus* (Poey, 1860)	Marine	EN	VU		CIUFPB, Li
Carcharhiniformes	Carcharhinidae	*Carcharhinus plumbeus* (Nardo, 1827)	Marine	EN	CR		CIUFPB, Li
Carcharhiniformes	Carcharhinidae	*Carcharhinus falciformis* (Bibron, 1839)	Marine	VU	CR		Li
Carcharhiniformes	Carcharhinidae	*Carcharhinus leucas* (Valenciennes, 1839)	Marine-Estuary	VU	VU		Li
Carcharhiniformes	Carcharhinidae	*Carcharhinus limbatus* (Valenciennes, 1839)	Marine-Estuary	VU	NT		Li
Carcharhiniformes	Carcharhinidae	*Carcharhinus obscurus* (Lesueur, 1818)	Marine-Estuary	EN	EN		Li
Carcharhiniformes	Carcharhinidae	*Carcharhinus perezi* (Poey, 1876)	Marine	EN	VU		Li
Carcharhiniformes	Carcharhinidae	*Carcharhinus porosus* (Ranzani, 1839)	Marine-Estuary	CR	CR	Lc	CIUFPB, Li
Carcharhiniformes	Carcharhinidae	*Prionace glauca* (Linnaeus, 1758)	Marine	NT	NT		Li
Carcharhiniformes	Carcharhinidae	*Rhizoprionodon lalandii* (Valenciennes, 1839)	Marine	VU	DD	Co, Lc	CIUFPB, Li
Carcharhiniformes	Carcharhinidae	*Rhizoprionodon porosus* (Poey, 1861)	Marine-Estuary	VU	DD	Co	CIUFPB, Li
Carcharhiniformes	Galeocerdonidae	*Galeocerdo cuvier* (Péron & Lesueur, 1822)	Marine	NT	NT		CIUFPB, Li
Carcharhiniformes	Sphyrnidae	*Sphyrna lewini* (Griffith & Smith, 1834)	Marine-Estuary	CR	CR		CIUFPB, Li

TABLE 2 | (Continued)

Class/Order	Family	Species	Habit	IUCN	BR	Use	Source
Carcharhiniformes	Sphyrnidae	*Sphyrna mokarran* (Rüppell, 1837)	Marine-Estuary	CR	CR		Li
Carcharhiniformes	Sphyrnidae	*Sphyrna* aff. *tiburo* (Linnaeus, 1758)	Marine-Estuary	EN	CR		CIUFPB, Li
Carcharhiniformes	Sphyrnidae	*Sphyrna zygaena* (Linnaeus, 1758)	Marine-Estuary	VU	CR		CIUFPB, Li
Torpediniformes	Narcinidae	*Narcine brasiliensis* (Olfers, 1831)	Marine	NT	VU		CIUFPB, Li
Rhinopristiformes	Rhinobatidae	*Pseudobatos horkelii* (Müller & Henle, 1841)	Marine	CR	CR		CIUFPB, Li
Rhinopristiformes	Rhinobatidae	*Pseudobatos percellens* (Walbaum, 1792)	Marine	EN	VU	Co	CIUFPB, Li
Myliobatiformes	Dasyatidae	*Hypanus americanus* (Hildebrand & Schroeder, 1928)	Marine	NT	VU		CIUFPB, Li
Myliobatiformes	Dasyatidae	*Hypanus berthalutzae* Petean, Naylor & Lima, 2020	Marine	VU	VU		Li
Myliobatiformes	Dasyatidae	*Hypanus guttatus* (Bloch & Schneider, 1801)	Marine	NT	LC		CIUFPB, Li
Myliobatiformes	Dasyatidae	*Hypanus marianae* (Gomes, Rosa & Gadig, 2000)	Marine	EN	VU		CIUFPB, Li
Myliobatiformes	Urotrygonidae	*Urotrygon microphthalmum* Delsman, 1941	Marine	CR	VU	Lc	CIUFPB, Li
Myliobatiformes	Gymnuridae	*Gymnura micrura* (Bloch & Schneider, 1801)	Marine-Estuary	NT	DD		CIUFPB, Li
Myliobatiformes	Aetobatidae	*Aetobatus narinari* (Euphrasen, 1790)	Marine	EN	DD	Lc, Me	CIUFPB, Li
Myliobatiformes	Rhinopteridae	*Rhinoptera bonasus* (Mitchill, 1815)	Marine-Estuary	VU	DD		CIUFPB, Li
Myliobatiformes	Mobulidae	*Mobula birostris* (Walbaum, 1792)	Marine	EN	VU		Li
Actinopterygii							
Elopiformes	Elopidae	*Elops smithi* McBride, Rocha, Ruiz-Carus & Bowen, 2010	Marine-Estuary	DD	LC		CIUFPB, Li
Elopiformes	Megalopidae	*Megalops atlanticus* Valenciennes, 1847	Marine-Estuary	VU	VU	Co, Lc, Me	CIUFPB, Li
Albuliformes	Albulidae	*Albula nemoptera* (Fowler, 1911)	Marine	DD	DD		Li
Albuliformes	Albulidae	*Albula vulpes* (Linnaeus, 1758)	Marine	NT	DD		CIUFPB, Li
Anguilliformes	Chlopsidae	*Chilorhinus suensonii* Lütken, 1852	Marine	LC	LC		CIUFPB, Li
Anguilliformes	Moringuidae	*Moringua edwardsi* (Jordan & Bollman, 1889)	Marine-Estuary	LC	LC		Li
Anguilliformes	Muraenesocidae	*Cynoponticus savanna* (Bancroft, 1831)	Marine	LC	LC		Li
Anguilliformes	Muraenidae	*Echidna catenata* (Bloch, 1795)	Marine	LC	LC		Li
Anguilliformes	Muraenidae	*Enchelycore nigricans* (Bonnaterre, 1788)	Marine	LC	LC		Li
Anguilliformes	Muraenidae	*Gymnothorax funebris* Ranzani, 1839	Marine-Estuary	LC	DD	Co	CIUFPB, Li
Anguilliformes	Muraenidae	*Gymnothorax miliaris* (Kaup, 1856)	Marine	LC	LC		Li
Anguilliformes	Muraenidae	*Gymnothorax moringa* (Cuvier, 1829)	Marine	LC	DD		CIUFPB, Li
Anguilliformes	Muraenidae	*Gymnothorax nigromarginatus* (Girard, 1858)	Marine	LC	Ne		Li
Anguilliformes	Muraenidae	*Gymnothorax ocellatus* Agassiz, 1828	Marine	LC	DD		CIUFPB, Li
Anguilliformes	Muraenidae	*Gymnothorax vicinus* (Castelnau, 1855)	Marine	LC	DD		CIUFPB, MZUSP, Li
Anguilliformes	Muraenidae	*Muraena pavonina* Richardson, 1845	Marine	LC	LC		Li
Anguilliformes	Muraenidae	*Uropterygius macularius* (Lesueur, 1825)	Marine	LC	LC		CIUFPB, Li
Anguilliformes	Ophichthidae	*Ahlia egmontis* (Jordan, 1884)	Marine	LC	LC		CIUFPB, Li
Anguilliformes	Ophichthidae	*Bascanichthys paulensis* Storey, 1939	Marine	LC	DD		CIUFPB, Li
Anguilliformes	Ophichthidae	*Callechelys bilinearis* Kanazawa, 1952	Marine	LC	LC		Li
Anguilliformes	Ophichthidae	*Myrichthys breviceps* (Richardson, 1848)	Marine	LC	LC		CIUFPB, Li
Anguilliformes	Ophichthidae	*Myrichthys ocellatus* (Lesueur, 1825)	Marine	LC	LC	Co(Or)	CIUFPB, Li
Anguilliformes	Ophichthidae	*Myrophis platyrhynchus* Breder, 1927	Marine-Estuary	LC	LC		CIUFPB, Li
Anguilliformes	Ophichthidae	*Myrophis punctatus* Lütken, 1852	Marine-Estuary	LC	LC		CIUFPB, Li
Anguilliformes	Ophichthidae	*Ophichthus cylindroideus* (Ranzani, 1839)	Marine-Estuary	LC	LC		CIUFPB, Li
Anguilliformes	Ophichthidae	*Ophichthus ophis* (Linnaeus, 1758)	Marine	LC	LC		CIUFPB, Li

TABLE 2 | (Continued)

Class/Order	Family	Species	Habit	IUCN	BR	Use	Source
Anguilliformes	Congridae	*Heteroconger camelopardalis* (Lubbock, 1980)	Marine	LC	DD		Li
Anguilliformes	Congridae	*Heteroconger longissimus* Günther, 1870	Marine	LC	DD		Li
Anguilliformes	Congridae	*Paraconger caudilimbatus* (Poey, 1867)	Marine	LC	Ne		CIUFPB, Li
Clupeiformes	Engraulidae	*Anchoviella vaillanti* (Steindachner, 1908)*	Freshwater	LC	LC		Li
Clupeiformes	Engraulidae	*Anchoa filifera* (Fowler, 1915)	Marine-Estuary	LC	LC		CIUFPB, Li
Clupeiformes	Engraulidae	*Anchoa hepsetus* (Linnaeus, 1758)	Marine-Estuary	LC	LC		Li
Clupeiformes	Engraulidae	*Anchoa januaria* (Steindachner, 1879)	Marine-Estuary	LC	LC		CIUFPB, Li
Clupeiformes	Engraulidae	*Anchoa lyolepis* (Evermann & Marsh, 1900)	Marine	LC	LC		CIUFPB, Li
Clupeiformes	Engraulidae	*Anchoa spinifer* (Valenciennes, 1848)	Marine-Estuary	LC	LC		CIUFPB, MNRJ, Li
Clupeiformes	Engraulidae	*Anchoa tricolor* (Spix & Agassiz, 1829)	Marine-Estuary	LC	LC	Co	CIUFPB, Li
Clupeiformes	Engraulidae	*Anchovia clupeoides* (Swainson, 1839)	Marine-Estuary	LC	LC		CIUFPB, Li
Clupeiformes	Engraulidae	*Anchoviella brevirostris* (Günther, 1868)	Marine-Estuary	LC	LC		Li
Clupeiformes	Engraulidae	*Anchoviella lepidentostole* (Fowler, 1911)	Marine-Estuary-Freshwater	LC	LC		CIUFPB, Li
Clupeiformes	Engraulidae	*Cetengraulis edentulus* (Cuvier, 1829)	Marine-Estuary	LC	LC	Co	CIUFPB, Li
Clupeiformes	Engraulidae	*Engraulis anchoita* Hubbs & Marini, 1935	Marine	LC	LC		CIUFPB, Li
Clupeiformes	Engraulidae	*Lycengraulis grossidens* (Spix & Agassiz, 1829)	Marine-Estuary	LC	LC	Lc	CIUFPB, Li
Clupeiformes	Pristigasteridae	*Chirocentrodon bleekerianus* (Poey, 1867)	Marine-Estuary	LC	LC		CIUFPB, Li
Clupeiformes	Pristigasteridae	*Odontognathus mucronatus* Lacepède, 1800	Marine-Estuary-Freshwater	LC	LC		CIUFPB, Li
Clupeiformes	Pristigasteridae	*Pellona harroweri* (Fowler, 1917)	Marine-Estuary	LC	LC		CIUFPB, Li
Clupeiformes	Dorosomatidae	*Harengula clupeola* (Cuvier, 1829)	Marine-Estuary	LC	LC	Co	CIUFPB, Li
Clupeiformes	Dorosomatidae	*Lile piquitinga* (Schreiner & Miranda Ribeiro, 1903)	Marine-Estuary	LC	LC		CIUFPB, Li
Clupeiformes	Dorosomatidae	*Opisthonema oglinum* (Lesueur, 1818)	Marine-Estuary	LC	LC	Co, Lc	CIUFPB, UFRN, Li
Clupeiformes	Dorosomatidae	*Rhinosardinia amazonica* (Steindachner, 1879)	Marine-Estuary-Freshwater	LC	LC		CIUFPB
Clupeiformes	Dorosomatidae	*Rhinosardinia bahiensis* (Steindachner, 1879)	Marine-Estuary	LC	LC		CIUFPB, Li
Clupeiformes	Dorosomatidae	*Sardinella aurita* Valenciennes, 1847	Marine-Estuary	DD	DD	Co, Lc	CIUFPB, Li
Cypriniformes	Cyprinidae	*Cyprinus carpio* Wu, Yang, Yue & Huang, 1963*	Freshwater-Estuary	LC	Ne	Co(Aq)	UFRN, Li
Gymnotiformes	Gymnotidae	*Gymnotus carapo* Linnaeus, 1758	Freshwater	LC	LC		CIUFPB, UFRN, Li
Characiformes	Crenuchidae	*Characidium bimaculatum* Fowler, 1941	Freshwater	LC	LC		CIUFPB, MZUSP, PUCRS, UFRN , Li
Characiformes	Erythrinidae	*Erythrinus erythrinus* (Bloch & Schneider, 1801)	Freshwater	LC	LC		CIUFPB, PUCRS, UFRN, Li
Characiformes	Erythrinidae	*Hoplerythrinus unitaeniatus* (Spix & Agassiz, 1829)	Freshwater	LC	LC		CIUFPB, Li
Characiformes	Erythrinidae	*Hoplias malabaricus* (Bloch, 1794)	Freshwater	LC	LC	Co, Lc, Me	CIUFPB, PUCRS, UFRN, Li
Characiformes	Parodontidae	*Apareiodon davisi* Fowler, 1941	Freshwater	LC	LC		CIUFPB, UFRN, Li
Characiformes	Serrasalmidae	*Colossoma macropomum* (Cuvier, 1816)*	Freshwater	NT	NT	Aq	CIUFPB, UFRN, Li
Characiformes	Serrasalmidae	*Metynnis lippincottianus* (Cope, 1870)	Freshwater	LC	LC		CIUFPB, Li
Characiformes	Serrasalmidae	*Pygocentrus nattereri* Kner, 1858	Freshwater	LC	LC		UFRN
Characiformes	Serrasalmidae	*Serrasalmus* cf. *brandtii* Lütken, 1875	Freshwater	LC	LC		CIUFPB

TABLE 2 | (Continued)

Class/Order	Family	Species	Habit	IUCN	BR	Use	Source
Characiformes	Serrasalmidae	*Serrasalmus rhombeus* (Linnaeus, 1766)	Freshwater	LC	LC		UFRN
Characiformes	Anostomidae	*Leporinus piau* Fowler, 1941	Freshwater	LC	LC	Co	CIUFPB, MZUSP, PUCRS, UFRN , Li
Characiformes	Anostomidae	*Arhinolemur elongatus* (Valenciennes, 1850)	Freshwater	LC	Ne		CIUFPB
Characiformes	Curimatidae	*Curimatella lepidura* (Eigenmann & Eigenmann, 1889)	Freshwater	LC	LC		UFRN
Characiformes	Curimatidae	*Psectrogaster rhomboides* Eigenmann & Eigenmann, 1889	Freshwater	LC	LC	Co, Lc	CIUFPB, PUCRS, UFRN, Li
Characiformes	Curimatidae	*Steindachnerina notonota* (Miranda Ribeiro, 1937)	Freshwater	LC	LC		CIUFPB, MNRJ, PUCRS, UFRN, Li
Characiformes	Prochilodontidae	*Prochilodus brevis* Steindachner, 1875	Freshwater	LC	LC	Co, Lc, Me	CIUFPB, MNRJ, PUCRS, UFRN, Li
Characiformes	Triportheidae	***Triportheus signatus*** (Garman, 1890)	Freshwater	LC	LC	Co, Lc	CIUFPB, PUCRS, UFRN, Li
Characiformes	Characidae	*Cheirodon jaguaribensis* Fowler, 1941	Freshwater	DD	LC		CIUFPB, MZUSP, UFRN
Characiformes	Characidae	*Compsura heterura* Eigenmann, 1915	Freshwater	LC	LC		CIUFPB, PUCRS, UFRN, Li
Characiformes	Characidae	***Phenacogaster calverti*** (Fowler, 1941)	Freshwater	LC	LC		PUCRS, UFRN, MZUSP
Characiformes	Characidae	*Serrapinnus heterodon* (Eigenmann, 1915)	Freshwater	LC	LC		CIUFPB, PUCRS, UFRN, Li
Characiformes	Characidae	*Serrapinnus piaba* (Lütken, 1875)	Freshwater	LC	LC		CIUFPB, PUCRS, UFRN, Li
Characiformes	Acestrorhamphidae	*Astyanax bimaculatus* (Linnaeus, 1758)	Freshwater	LC	LC	Lc	CIUFPB, MZUSP, PUCRS, UFRN , Li
Characiformes	Acestrorhamphidae	*Ctenobrycon kennedyi* (Eigenmann, 1903)	Freshwater	LC	LC		CIUFPB, PUCRS, MZUSP
Characiformes	Acestrorhamphidae	*Ctenobrycon spilurus* (Valenciennes, 1850)	Freshwater	LC	LC		UFRN
Characiformes	Acestrorhamphidae	*Hemigrammus marginatus* Ellis, 1911	Freshwater	LC	LC		CIUFPB, MZUSP, PUCRS, UFRN , Li
Characiformes	Acestrorhamphidae	*Hemigrammus rodwayi* Durbin, 1909	Freshwater	LC	Ne		CIUFPB, PUCRS, UFRN, Li
Characiformes	Acestrorhamphidae	*Hemigrammus unilineatus* (Gill, 1858)	Freshwater	LC	LC		CIUFPB, PUCRS, UFRN, Li
Characiformes	Acestrorhamphidae	*Hyphessobrycon piabinhas* Fowler, 1941	Freshwater	DD	LC		CIUFPB
Characiformes	Acestrorhamphidae	*Moenkhausia costae* (Steindachner, 1907)*	Freshwater	LC	LC		CIUFPB, UFRN, Li
Characiformes	Acestrorhamphidae	*Psalidodon fasciatus* (Cuvier, 1819)	Freshwater	LC	LC		CIUFPB, UFRN, MZUSP, Li

TABLE 2 | (Continued)

Class/Order	Family	Species	Habit	IUCN	BR	Use	Source
Siluriformes	Callichthyidae	***Brochis* cf. *garbei*** (Ihering, 1911)	Freshwater	LC	LC		*To be cataloged*
Siluriformes	Callichthyidae	*Callichthys callichthys* (Linnaeus, 1758)	Freshwater	LC	LC		CIUFPB, PUCRS
Siluriformes	Callichthyidae	*Hoplosternum littorale* (Hancock, 1828)	Freshwater	LC	LC		*To be cataloged*
Siluriformes	Callichthyidae	*Megalechis thoracata* (Valenciennes, 1840)	Freshwater	LC	LC		CIUFPB, Li
Siluriformes	Loricariidae	*Hypostomus pusarum* Starks, 1913	Freshwater	LC	LC	Co, Lc	CIUFPB, PUCRS, UFRN, Li
Siluriformes	Loricariidae	***Parotocinclus cearensis*** Garavello, 1977	Freshwater	LC	LC		UFRN, PUCRS
Siluriformes	Loricariidae	***Parotocinclus jacksoni*** Ramos, Lustosa-Costa, Barros-Neto & Barbosa, 2021[a]	Freshwater	Ne	Ne		CIUFPB, MNRJ, Li
Siluriformes	Loricariidae	*Parotocinclus jumbo* Britski & Garavello, 2002	Freshwater	LC	LC		CIUFPB, MNRJ, MZUSP, PUCRS, UFRN, Li
Siluriformes	Loricariidae	***Parotocinclus seridoensis*** Ramos, Barros-Neto, Britski & Lima, 2013	Freshwater	LC	EN		CIUFPB, PUCRS, UFRN, Li
Siluriformes	Loricariidae	*Parotocinclus spilosoma* (Fowler, 1941)[b]	Freshwater	LC	EN		CIUFPB, PUCRS, UFRN, Li
Siluriformes	Loricariidae	***Pseudancistrus papariae*** Fowler, 1941	Freshwater	Ne	Ne		UFRN
Siluriformes	Loricariidae	***Pseudancistrus genisetiger*** Fowler, 1941	Freshwater	LC	LC		CIUFPB, PUCRS
Siluriformes	Auchenipteridae	*Trachelyopterus galeatus* (Linnaeus, 1766)	Freshwater	LC	LC	Co	ANSP-Ichthyology, Li, UFRN
Siluriformes	Heptapteridae	***Pimelodella enochi*** Fowler, 1941	Freshwater	LC	LC		ANSP-Ichthyology, UFRN, Li
Siluriformes	Heptapteridae	*Rhamdia quelen* (Quoy & Gaimard, 1824)	Freshwater	LC	LC		CIUFPB, UFRN, Li
Siluriformes	Ariidae	*Bagre bagre* (Linnaeus, 1766)	Marine-Estuary	LC	NT	Co	CIUFPB, Li
Siluriformes	Ariidae	*Bagre filamentosus* (Swainson, 1839)	Marine	Ne	LC	Co	CIUFPB
Siluriformes	Ariidae	*Cathorops agassizii* (Eigenmann & Eigenmann, 1888)	Marine-Estuary	LC	LC		CIUFPB, Li
Siluriformes	Ariidae	*Cathorops arenatus* (Valenciennes, 1840)	Marine-Estuary	LC	LC		Li
Siluriformes	Ariidae	*Cathorops spixii* (Agassiz, 1829)	Marine-Estuary	Ne	LC		CIUFPB, Li
Siluriformes	Ariidae	*Notarius luniscutis* (Valenciennes, 1840)	Marine-Estuary	LC	LC		CIUFPB
Siluriformes	Ariidae	*Notarius parmocassis* (Valenciennes, 1840)	Marine-Estuary	Ne	DD		Li
Siluriformes	Ariidae	*Sciades herzbergii* Bloch, 1794	Marine-Estuary	LC	LC		CIUFPB, Li
Siluriformes	Ariidae	*Sciades proops* (Valenciennes, 1840)	Marine-Estuary	Ne	DD		CIUFPB, Li
Stomiiformes	Gonostomatidae	*Diplophos taenia* Günther, 1873	Marine	LC	LC		Li
Stomiiformes	Gonostomatidae	*Gonostoma atlanticum* Norman, 1930	Marine	LC	LC		Li
Stomiiformes	Gonostomatidae	*Sigmops elongatus* (Günther, 1878)	Marine	LC	LC		Li
Stomiiformes	Gonostomatidae	*Zaphotias pedaliotus* (Goode & Bean, 1896)	Marine	LC	Ne		Li
Stomiiformes	Sternoptychidae	*Argyropelecus aculeatus* Valenciennes, 1850	Marine	LC	LC		Li
Stomiiformes	Sternoptychidae	*Argyropelecus affinis* Garman, 1899	Marine	LC	LC		Li
Stomiiformes	Sternoptychidae	*Sternoptyx diaphana* Hermann, 1781	Marine	LC	LC		Li
Stomiiformes	Sternoptychidae	*Sternoptyx pseudobscura* Baird, 1971	Marine	LC	LC		Li
Stomiiformes	Phosichthyidae	*Ichthyococcus polli* Blache, 1964	Marine	LC	Ne		Li

TABLE 2 | (Continued)

Class/Order	Family	Species	Habit	IUCN	BR	Use	Source
Stomiiformes	Phosichthyidae	*Vinciguerria nimbaria* (Jordan & Williams, 1895)	Marine	LC	LC		Li
Stomiiformes	Stomiidae	*Aristostomias tittmanni* Welsh, 1923	Marine	LC	Ne		Li
Stomiiformes	Stomiidae	*Astronesthes similus* Parr, 1927	Marine	LC	Ne		Li
Stomiiformes	Stomiidae	*Chauliodus sloani* Bloch & Schneider, 1801	Marine	LC	LC		Li
Stomiiformes	Stomiidae	*Melanostomias bartonbeani* Parr, 1927	Marine	LC	Ne		Li
Stomiiformes	Stomiidae	*Melanostomias tentaculatus* (Regan & Trewavas, 1930)	Marine	LC	LC		Li
Aulopiformes	Giganturidae	*Gigantura indica* Brauer, 1901	Marine	LC	Ne		Li
Stomiiformes	Stomiidae	*Photonectes achirus* Regan & Trewavas, 1930	Marine	LC	Ne		Li
Stomiiformes	Stomiidae	*Stomias danae* Ege, 1933	Marine	LC	LC		Li
Aulopiformes	Scopelarchidae	*Rosenblattichthys hubbsi* Johnson, 1974	Marine	LC	LC		Li
Aulopiformes	Scopelarchidae	*Scopelarchus guentheri* Alcock, 1896	Marine	LC	LC		Li
Aulopiformes	Synodontidae	*Synodus bondi* Fowler, 1939	Marine	LC	LC		Li
Aulopiformes	Synodontidae	*Synodus foetens* (Linnaeus, 1766)	Marine-Estuary	LC	LC		CIUFPB, Li
Aulopiformes	Synodontidae	*Synodus intermedius* (Agassiz, 1829)	Marine	LC	LC		CIUFPB, Li
Aulopiformes	Synodontidae	*Synodus synodus* (Linnaeus, 1758)	Marine	LC	LC		CIUFPB, Li
Aulopiformes	Synodontidae	*Trachinocephalus myops* (Forster, 1801)	Marine	LC	LC		CIUFPB, Li
Gadiformes	Stylephoridae	*Stylephorus chordatus* Shaw, 1791	Marine	LC	Ne		Li
Beryciformes	Holocentridae	*Holocentrus adscensionis* (Osbeck, 1765)	Marine	LC	LC	Lc	CIUFPB, MZUSP, Li
Beryciformes	Holocentridae	*Holocentrus rufus* (Walbaum, 1792)	Marine	LC	LC		CIUFPB, Li
Beryciformes	Holocentridae	*Myripristis jacobus* Cuvier, 1829	Marine	LC	LC	Lc	CIUFPB, Li
Beryciformes	Holocentridae	*Plectrypops retrospinis* (Guichenot, 1853)	Marine	LC	LC		CIUFPB, Li
Ophidiiformes	Ophidiidae	*Lepophidium brevibarbe* (Cuvier, 1829)	Marine	LC	DD		Li
Batrachoidiformes	Batrachoididae	*Amphichthys cryptocentrus* (Valenciennes, 1837)	Marine-Estuary	LC	LC		OBIS_BR, Li
Batrachoidiformes	Batrachoididae	*Batrachoides surinamensis* (Bloch & Schneider, 1801)	Marine-Estuary	LC	LC		Li
Batrachoidiformes	Batrachoididae	*Porichthys kymosemeum* Gilbert, 1968	Marine	LC	LC		CIUFPB, Li
Batrachoidiformes	Batrachoididae	*Porichthys plectrodon* Jordan & Gilbert, 1882	Marine	LC	LC		Li
Batrachoidiformes	Batrachoididae	*Thalassophryne nattereri* Steindachner, 1876	Marine-Estuary	LC	LC		CIUFPB, Li
Batrachoidiformes	Batrachoididae	*Thalassophryne punctata* Steindachner, 1936	Marine-Estuary	LC	LC		CIUFPB, Li
Gobiiformes	Apogonidae	*Apogon americanus* Castelnau, 1855	Marine	LC	LC		CIUFPB, MZUSP, Li
Gobiiformes	Apogonidae	*Apogon pseudomaculatus* Longley, 1932	Marine	LC	LC		CIUFPB, Li
Gobiiformes	Apogonidae	*Apogon quadrisquamatus* Longley, 1934	Marine	LC	LC		CIUFPB, Li
Gobiiformes	Apogonidae	*Apogon robbyi* Gilbert & Tyler, 1997	Marine	LC	LC		CIUFPB, Li
Gobiiformes	Apogonidae	*Astrapogon puncticulatus* (Poey, 1867)	Marine	LC	LC		CIUFPB, Li
Gobiiformes	Apogonidae	*Astrapogon stellatus* (Cope, 1867)	Marine	DD	Ne		CIUFPB, Li
Gobiiformes	Apogonidae	*Phaeoptyx pigmentaria* (Poey, 1860)	Marine	LC	LC		CIUFPB, Li
Gobiiformes	Eleotridae	*Eleotris pisonis* (Gmelin, 1789)	Marine-Estuary-Freshwater	LC	LC		CIUFPB, MNRJ, PUCRS, UFRN, Li
Gobiiformes	Eleotridae	*Erotelis smaragdus* (Valenciennes, 1837)	Marine-Estuary	LC	LC		CIUFPB, Li
Gobiiformes	Eleotridae	*Dormitator maculatus* (Bloch, 1792)	Marine-Estuary-Freshwater	LC	LC		CIUFPB, Li
Gobiiformes	Eleotridae	*Guavina guavina* (Valenciennes, 1837)	Marine-Estuary-Freshwater	LC	LC		CIUFPB, Li

TABLE 2 | (Continued)

Class/Order	Family	Species	Habit	IUCN	BR	Use	Source
Gobiiformes	Oxudercidae	*Awaous tajasica* (Lichtenstein, 1822)	Freshwater-Estuary-Marine	LC	LC		CIUFPB, Li
Gobiiformes	Oxudercidae	*Ctenogobius apogonus* Pezold, 2022	Marine	Ne	Ne		Li
Gobiiformes	Oxudercidae	*Ctenogobius boleosoma* (Jordan & Gilbert, 1882)	Marine-Estuary-Freshwater	LC	LC		CIUFPB, Li
Gobiiformes	Oxudercidae	*Ctenogobius saepepallens* (Gilbert & Randall, 1968)	Marine	LC	LC		CIUFPB, Li
Gobiiformes	Oxudercidae	*Ctenogobius shufeldti* (Jordan & Eigenmann, 1887)	Marine-Estuary-Freshwater	LC	LC		CIUFPB, Li
Gobiiformes	Oxudercidae	*Ctenogobius smaragdus* (Valenciennes, 1837)	Marine-Estuary-Freshwater	LC	LC		CIUFPB, Li
Gobiiformes	Oxudercidae	*Ctenogobius stigmaticus* (Poey, 1860)	Marine-Estuary	LC	LC		CIUFPB, Li
Gobiiformes	Oxudercidae	*Evorthodus lyricus* (Girard, 1858)	Marine-Estuary-Freshwater	LC	LC		CIUFPB, Li
Gobiiformes	Oxudercidae	*Gnatholepis thompsoni* Jordan, 1904	Marine	LC	LC		CIUFPB, Li
Gobiiformes	Oxudercidae	*Gobioides broussonnetii* Lacepède, 1800	Marine-Estuary-Freshwater	LC	DD		CIUFPB, Li
Gobiiformes	Oxudercidae	*Gobionellus oceanicus* (Pallas, 1770)	Marine-Estuary	LC	LC		CIUFPB, Li
Gobiiformes	Oxudercidae	*Gobionellus stomatus* Starks, 1913	Marine-Estuary	LC	LC		CIUFPB, Li
Gobiiformes	Gobiidae	*Barbulifer ceuthoecus* (Jordan & Gilbert, 1884)	Marine	LC	LC		CIUFPB, Li
Gobiiformes	Gobiidae	*Barbulifer* cf. *enigmaticus* Joyeux, Van Tassell & Macieira, 2009	Marine	DD	LC		CIUFPB
Gobiiformes	Gobiidae	*Bathygobius geminatus* Tornabene, Baldwin & Pezold, 2010	Marine	DD	LC		Li
Gobiiformes	Gobiidae	*Bathygobius soporator* (Valenciennes, 1837)	Marine-Estuary-Freshwater	LC	LC	Lc	CIUFPB, MNRJ, MZUSP, Li
Gobiiformes	Gobiidae	*Coryphopterus dicrus* Böhlke & Robins, 1960	Marine	LC	LC		CIUFPB, Li
Gobiiformes	Gobiidae	*Coryphopterus* aff. *eidolon* Böhlke & Robins, 1960	Marine	VU	Ne		CIUFPB
Gobiiformes	Gobiidae	*Coryphopterus glaucofraenum* Gill, 1863	Marine	LC	LC		CIUFPB, Li
Gobiiformes	Gobiidae	*Coryphopterus thrix* Böhlke & Robins, 1960	Marine	VU	LC		CIUFPB
Gobiiformes	Gobiidae	*Elacatinus figaro* Sazima, Moura & Rosa, 1997	Marine	VU	EN		CIUFPB, Li
Gobiiformes	Gobiidae	*Gobiosoma alfiei* Joyeux & Macieira, 2015	Marine	LC	LC		CIUFPB, Li
Gobiiformes	Gobiidae	*Gobiosoma spilotum*? (Ginsburg, 1939)	Marine	EN	Ne		CIUFPB
Gobiiformes	Gobiidae	*Gobulus myersi* Ginsburg, 1939	Marine	LC	LC		CIUFPB, Li
Gobiiformes	Gobiidae	*Lythrypnus brasiliensis*? Greenfield, 1988	Marine	Ne	LC		CIUFPB
Gobiiformes	Gobiidae	*Microdesmus bahianus* Dawson, 1973	Marine	LC	LC		CIUFPB, Li
Gobiiformes	Gobiidae	*Microdesmus longipinnis* (Weymouth, 1910)	Marine	LC	LC		CIUFPB, Li
Gobiiformes	Gobiidae	*Microgobius carri* Fowler, 1945	Marine	LC	LC		CIUFPB, Li
Gobiiformes	Gobiidae	*Microgobius meeki* Evermann & Marsh, 1899	Marine	LC	LC		CIUFPB, Li
Gobiiformes	Gobiidae	*Priolepis dawsoni* Greenfield, 1989	Marine	LC	LC		CIUFPB, Li
Gobiiformes	Gobiidae	*Psilotris* cf. *alepis* Ginsburg, 1953	Marine	LC	Ne		CIUFPB
Gobiiformes	Gobiidae	*Ptereleotris randalli* Gasparini, Rocha & Floeter, 2001	Marine	LC	LC		CIUFPB, Li
Gobiiformes	Gobiidae	*Risor ruber* (Rosén, 1911)	Marine	LC	LC		CIUFPB, Li
Syngnathiformes	Dactylopteridae	*Dactylopterus volitans* (Linnaeus, 1758)	Marine	LC	LC		CIUFPB, Li
Syngnathiformes	Mullidae	*Mulloidichthys martinicus* (Cuvier, 1829)	Marine	LC	LC	Co	Li
Syngnathiformes	Mullidae	*Pseudupeneus maculatus* (Bloch, 1793)	Marine	LC	LC	Co	CIUFPB, Li
Syngnathiformes	Mullidae	*Upeneus parvus* (Cuvier, 1829)	Marine	LC	LC	Co	Li
Syngnathiformes	Callionymidae	*Callionymus bairdi* Jordan, 1888	Marine	LC	LC		CIUFPB, Li
Syngnathiformes	Aulostomidae	*Aulostomus strigosus* Wheeler, 1955	Marine	LC	LC	Co	Li

TABLE 2 | (Continued)

Class/Order	Family	Species	Habit	IUCN	BR	Use	Source
Syngnathiformes	Fistulariidae	*Fistularia petimba* Lacépède, 1803	Marine	LC	LC	Co	CIUFPB, Li
Syngnathiformes	Fistulariidae	*Fistularia tabacaria* Linnaeus, 1758	Marine	LC	LC	Co	CIUFPB, Li
Syngnathiformes	Syngnathidae	*Bryx dunckeri* (Metzelaar, 1919)	Marine	LC	LC		CIUFPB, Li
Syngnathiformes	Syngnathidae	*Cosmocampus elucens* (Poey, 1868)	Marine	LC	LC		CIUFPB, Li
Syngnathiformes	Syngnathidae	*Halicampus crinitus* (Jenyns, 1842)	Marine	Ne	LC		CIUFPB, Li
Syngnathiformes	Syngnathidae	*Hippocampus* aff. *erectus* Perry, 1810	Marine	VU	VU	Co(Or)	OBIS_BR
Syngnathiformes	Syngnathidae	*Hippocampus reidi* Ginsburg, 1933	Marine	NT	VU	Co(Or), Me	CIUFPB, Li
Syngnathiformes	Syngnathidae	*Microphis lineatus* (Kaup, 1856)	Marine-Estuary-Freshwater	Ne	Ne		CIUFPB, Li
Syngnathiformes	Syngnathidae	*Syngnathus folletti* Herald, 1942	Marine-Estuary	LC	LC		Li
Syngnathiformes	Syngnathidae	*Syngnathus pelagicus* Linnaeus, 1758	Marine	LC	LC		CIUFPB, Li
Scombriformes	Stromateidae	*Peprilus crenulatus* Cuvier, 1829	Marine-Estuary	LC	DD	Co	CIUFPB, Li
Scombriformes	Pomatomidae	*Pomatomus saltatrix* (Linnaeus, 1766)	Marine-Estuary	VU	LC		Li
Scombriformes	Nomeidae	*Nomeus gronovii* (Gmelin, 1789)	Marine	LC	LC		Li
Scombriformes	Scombridae	*Acanthocybium solandri* (Cuvier, 1832)	Marine	LC	LC	Co	Li
Scombriformes	Scombridae	*Auxis thazard* (Lacepède, 1800)	Marine	LC	LC	Co	Li
Scombriformes	Scombridae	*Euthynnus alletteratus* (Rafinesque, 1810)	Marine	LC	LC	Co	Li
Scombriformes	Scombridae	*Scomberomorus brasiliensis* Collette, Russo & Zavala-Camin, 1978	Marine	LC	NT	Co	CIUFPB, Li
Scombriformes	Scombridae	*Scomberomorus cavalla* (Cuvier, 1829)	Marine	LC	NT	Co	CIUFPB, Li
Scombriformes	Scombridae	*Scomberomorus regalis* (Bloch, 1793)	Marine	LC	LC	Co	CIUFPB, Li
Scombriformes	Scombridae	*Thunnus albacares* (Bonnaterre, 1788)	Marine	LC	LC	Co	Li
Scombriformes	Scombridae	*Thunnus atlanticus* (Lesson, 1831)	Marine	LC	LC	Co	Li
Scombriformes	Scombridae	*Thunnus obesus* (Lowe, 1839)	Marine	VU	LC	Co	CIUFPB, Li
Scombriformes	Trichiuridae	*Trichiurus lepturus* Linnaeus, 1758	Marine	LC	LC	Co	CIUFPB, Li
Synbranchiformes	Synbranchidae	*Synbranchus* aff. *marmoratus* Bloch, 1795	Freshwater	LC	LC		CIUFPB, UFRN, Li
Carangiformes	Centropomidae	*Centropomus ensiferus* Poey, 1860	Marine-Estuary	LC	DD	Co	CIUFPB, Li
Carangiformes	Centropomidae	*Centropomus parallelus* Poey, 1860	Marine-Estuary	LC	DD	Co	CIUFPB, Li
Carangiformes	Centropomidae	*Centropomus pectinatus* Poey, 1860	Marine-Estuary	LC	DD	Co	CIUFPB, Li
Carangiformes	Centropomidae	*Centropomus undecimalis* (Bloch, 1792)	Marine-Estuary	LC	DD	Co	CIUFPB, Li
Carangiformes	Sphyraenidae	*Sphyraena barracuda* (Edwards, 1771)	Marine-Estuary	LC	DD	Co	CIUFPB, Li
Carangiformes	Sphyraenidae	*Sphyraena borealis* DeKay, 1842	Marine	LC	Ne	Co	CIUFPB, Li
Carangiformes	Sphyraenidae	*Sphyraena guachancho* Cuvier, 1829	Marine-Estuary	LC	DD	Co	CIUFPB, Li
Carangiformes	Polynemidae	*Polydactylus oligodon* (Günther, 1860)	Marine	LC	LC	Co	CIUFPB
Carangiformes	Polynemidae	*Polydactylus virginicus* (Linnaeus, 1758)	Marine-Estuary	LC	LC	Lc	CIUFPB, Li
Carangiformes	Cyclopsettidae	*Citharichthys arenaceus* Evermann & Marsh, 1900	Marine-Estuary	LC	LC		CIUFPB, Li
Carangiformes	Cyclopsettidae	*Citharichthys cornutus* (Günther, 1880)	Marine	LC	LC		Li
Carangiformes	Cyclopsettidae	*Citharichthys macrops* Dresel, 1885	Marine	LC	LC		CIUFPB, Li
Carangiformes	Cyclopsettidae	*Citharichthys spilopterus* Günther, 1862	Marine-Estuary-Freshwater	LC	LC		CIUFPB, Li
Carangiformes	Cyclopsettidae	*Cyclopsetta fimbriata* (Goode & Bean, 1885)	Marine	LC	LC		Li
Carangiformes	Cyclopsettidae	*Etropus crossotus* Jordan & Gilbert, 1882	Marine-Estuary	LC	LC		CIUFPB, Li
Carangiformes	Cyclopsettidae	*Syacium micrurum* Ranzani, 1842	Marine-Estuary	LC	LC		CIUFPB, Li
Carangiformes	Cyclopsettidae	*Syacium papillosum* (Linnaeus, 1758)	Marine	LC	LC		Li
Carangiformes	Bothidae	*Bothus lunatus* (Linnaeus, 1758)	Marine	LC	LC		Li

TABLE 2 | (Continued)

Class/Order	Family	Species	Habit	IUCN	BR	Use	Source
Carangiformes	Bothidae	*Bothus ocellatus* (Agassiz, 1831)	Marine	LC	LC		CIUFPB, Li
Carangiformes	Bothidae	*Bothus robinsi* Topp & Hoff, 1972	Marine	LC	LC		Li
Carangiformes	Paralichthyidae	*Paralichthys brasiliensis* (Ranzani, 1842)	Marine-Estuary	LC	LC	Co	CIUFPB, Li
Carangiformes	Achiridae	*Achirus achirus* (Linnaeus, 1758)	Marine-Estuary	LC	LC		CIUFPB, Li
Carangiformes	Achiridae	*Achirus declivis* Chabanaud, 1940	Marine-Estuary-Freshwater	LC	LC		CIUFPB, Li
Carangiformes	Achiridae	*Achirus lineatus* (Linnaeus, 1758)	Marine-Estuary-Freshwater	LC	LC		CIUFPB, Li
Carangiformes	Achiridae	*Gymnachirus nudus* Kaup, 1858	Marine-Estuary	LC	LC		Li
Carangiformes	Achiridae	*Trinectes inscriptus* (Gosse, 1851)	Marine-Estuary	LC	Ne		CIUFPB
Carangiformes	Achiridae	*Trinectes microphthalmus* (Chabanaud, 1928)	Marine-Estuary-Freshwater	LC	LC		CIUFPB, Li
Carangiformes	Achiridae	*Trinectes paulistanus* (Miranda Ribeiro, 1915)	Marine-Estuary-Freshwater	LC	LC		CIUFPB, Li
Carangiformes	Cynoglossidae	*Symphurus plagusia* (Bloch & Schneider, 1801)	Marine-Estuary	LC	LC		CIUFPB, Li
Carangiformes	Cynoglossidae	*Symphurus rhytisma*? Böhlke, 1961	Marine	LC	LC		CIUFPB
Carangiformes	Cynoglossidae	*Symphurus tessellatus* (Quoy & Gaimard, 1824)	Marine-Estuary	LC	LC		CIUFPB, Li
Carangiformes	Carangidae	*Alectis ciliaris* (Bloch, 1787)	Marine	LC	LC	Co	Li
Carangiformes	Carangidae	*Caranx bartholomaei* (Cuvier, 1833)	Marine	LC	LC	Co	CIUFPB, Li
Carangiformes	Carangidae	*Caranx crysos* (Mitchill, 1815)	Marine	LC	LC	Co	CIUFPB, Li
Carangiformes	Carangidae	*Caranx hippos* (Linnaeus, 1766)	Marine-Estuary-Freshwater	LC	LC	Co	CIUFPB, Li
Carangiformes	Carangidae	*Caranx latus* Agassiz, 1831	Marine-Estuary-Freshwater	LC	LC	Co	CIUFPB, Li
Carangiformes	Carangidae	*Caranx lugubris* Poey, 1860	Marine	LC	LC	Co	MNRJ, Li
Carangiformes	Carangidae	*Caranx ruber* (Bloch, 1793)	Marine	LC	LC	Co	Li
Carangiformes	Carangidae	*Chloroscombrus chrysurus* (Linnaeus, 1766)	Marine	LC	LC	Co	CIUFPB, Li
Carangiformes	Carangidae	*Decapterus macarellus* (Cuvier, 1833)	Marine	LC	LC	Co	Li
Carangiformes	Carangidae	*Decapterus tabl* Berry, 1968	Marine	LC	LC	Co	Li
Carangiformes	Carangidae	*Elagatis bipinnulata* (Quoy & Gaimard, 1825)	Marine	LC	LC	Co	Li
Carangiformes	Carangidae	*Hemicaranx amblyrhynchus* (Cuvier, 1833)	Marine	LC	LC		CIUFPB
Carangiformes	Carangidae	*Naucrates ductor* (Linnaeus, 1758)	Marine	LC	LC		Li
Carangiformes	Carangidae	*Oligoplites palometa* (Cuvier, 1832)	Marine-Estuary-Freshwater	LC	LC	Co	CIUFPB, Li
Carangiformes	Carangidae	*Oligoplites saliens* (Bloch, 1793)	Marine-Estuary	LC	LC	Co	CIUFPB, Li
Carangiformes	Carangidae	*Oligoplites saurus* (Bloch & Schneider, 1801)	Marine-Estuary	LC	LC	Co	CIUFPB, Li
Carangiformes	Carangidae	*Selar crumenophthalmus* (Bloch, 1793)	Marine	LC	LC	Co	CIUFPB, Li
Carangiformes	Carangidae	*Selene brownii* (Cuvier, 1816)	Marine	LC	LC	Co	CIUFPB, Li
Carangiformes	Carangidae	*Selene setapinnis* (Mitchill, 1815)	Marine	LC	LC	Co	CIUFPB, Li
Carangiformes	Carangidae	*Selene vomer* (Linnaeus, 1758)	Marine-Estuary	LC	LC	Co, Lc	CIUFPB, Li
Carangiformes	Carangidae	*Seriola dumerili* (Risso, 1810)	Marine	LC	LC	Co	Li
Carangiformes	Carangidae	*Seriola rivoliana* Valenciennes, 1833	Marine	LC	LC	Co	Li
Carangiformes	Carangidae	*Trachinotus carolinus* (Linnaeus, 1766)	Marine-Estuary	LC	LC	Co	CIUFPB, Li
Carangiformes	Carangidae	*Trachinotus cayennensis* Cuvier, 1832	Marine	LC	LC		Li
Carangiformes	Carangidae	*Trachinotus falcatus* (Linnaeus, 1758)	Marine	LC	LC	Co	CIUFPB, Li
Carangiformes	Carangidae	*Trachinotus goodei* Jordan & Evermann, 1896	Marine	LC	LC	Co	CIUFPB, Li
Carangiformes	Carangidae	*Trachurus lathami*? Nichols, 1920	Marine	LC	LC		CIUFPB

TABLE 2 | (Continued)

Class/Order	Family	Species	Habit	IUCN	BR	Use	Source
Carangiformes	Carangidae	*Uraspis secunda* (Poey, 1860)	Marine	LC	LC		Li
Carangiformes	Echeneidae	*Echeneis naucrates* Linnaeus, 1758	Marine	LC	LC		CIUFPB, Li
Carangiformes	Echeneidae	*Remora remora* (Linnaeus, 1758)	Marine	LC	LC		CIUFPB, Li
Carangiformes	Rachycentridae	*Rachycentron canadum* (Linnaeus, 1766)	Marine	LC	LC	Co	CIUFPB, Li
Carangiformes	Coryphaenidae	*Coryphaena hippurus* Linnaeus, 1758	Marine	LC	LC	Co	Li
Atheriniformes	Atherinopsidae	*Atherinella blackburni* (Schultz, 1949)	Marine-Estuary	LC	LC	Co	CIUFPB, Li
Atheriniformes	Atherinopsidae	*Atherinella brasiliensis* (Quoy & Gaimard, 1825)	Marine-Estuary	LC	LC	Co	CIUFPB, Li
Atheriniformes	Atherinopsidae	*Membras dissimilis*? (Carvalho, 1956)	Marine	Ne	NT		CIUFPB
Beloniformes	Belonidae	*Ablennes hians* (Valenciennes, 1846)	Marine-Estuary-Freshwater	LC	LC		Li
Beloniformes	Belonidae	*Strongylura marina* (Walbaum, 1792)	Marine-Estuary-Freshwater	LC	LC	Co	CIUFPB, Li
Beloniformes	Belonidae	*Strongylura timucu* (Walbaum, 1792)	Marine-Estuary-Freshwater	LC	LC	Co	CIUFPB, Li
Beloniformes	Belonidae	*Tylosurus crocodilus* (Péron & Lesueur, 1821)	Marine	LC	LC	Co	Li
Beloniformes	Hemiramphidae	*Hemiramphus brasiliensis* (Linnaeus, 1758)	Marine-Estuary	LC	LC		CIUFPB, Li
Beloniformes	Hemiramphidae	*Hemiramphus balao* Lesueur, 1821	Marine	LC	DD	Co	Li
Beloniformes	Hemiramphidae	*Hyporhamphus roberti* (Valenciennes, 1847)	Marine-Estuary	LC	LC		CIUFPB, Li
Beloniformes	Hemiramphidae	*Hyporhamphus unifasciatus* (Ranzani, 1841)	Marine-Estuary	LC	DD	Co	CIUFPB, Li
Beloniformes	Exocoetidae	*Cheilopogon cyanopterus* (Valenciennes, 1847)	Marine	LC	LC		Li
Beloniformes	Exocoetidae	*Cheilopogon melanurus* (Valenciennes, 1847)	Marine	LC	LC		Li
Beloniformes	Exocoetidae	*Exocoetus volitans* Linnaeus, 1758	Marine	LC	LC		Li
Beloniformes	Exocoetidae	*Hirundichthys affinis* (Günther, 1866)	Marine	LC	LC		Li
Cyprinodontiformes	Rivulidae	***Hypsolebias* sp.**	Freshwater	Na	Na		*To be cataloged*
Cyprinodontiformes	Poeciliidae	*Poecilia reticulata* Peters, 1859*	Freshwater	LC	Ne		CIUFPB, PUCRS, UFRN, Li
Cyprinodontiformes	Poeciliidae	*Poecilia vivipara* Bloch & Schneider, 1801	Freshwater-Estuary	LC	LC	Co, Lc	CIUFPB, MNRJ, PUCRS, UFRN, Li
Cyprinodontiformes	Poeciliidae	*Xiphophorus maculatus* (Günther, 1866)*	Freshwater	DD	Ne		CIUFPB, Li
Cichliformes	Cichlidae	*Astronotus ocellatus* (Agassiz, 1831)*	Freshwater	LC	LC	Co, Lc	CIUFPB, Li
Cichliformes	Cichlidae	*Cichla ocellaris* Bloch & Schneider, 1801*	Freshwater	LC	LC	Co, Lc	CIUFPB, Li
Cichliformes	Cichlidae	*Cichla monoculus* Spix & Agassiz, 1831*	Freshwater	LC	LC	Co, Lc	CIUFPB, UFRN, Li
Cichliformes	Cichlidae	*Cichlasoma orientale* Kullander, 1983	Freshwater	LC	LC		CIUFPB, PUCRS, UFRN, Li
Cichliformes	Cichlidae	*Cichlasoma sanctifranciscense* Kullander, 1983	Freshwater	LC	LC		CIUFPB
Cichliformes	Cichlidae	*Coptodon rendalli* (Boulenger, 1897)*	Freshwater	LC	Ne	Co(Aq), Lc	CIUFPB, PUCRS, Li
Cichliformes	Cichlidae	*Geophagus brasiliensis* (Quoy & Gaimard, 1824)	Freshwater-Estuary	LC	LC		CIUFPB, PUCRS, UFRN, Li
Cichliformes	Cichlidae	*Oreochromis niloticus* (Linnaeus, 1758)*	Freshwater	LC	Ne	Co(Aq), Me, Lc	CIUFPB, UFRN, Li
Cichliformes	Cichlidae	*Parachromis managuensis* (Günther, 1867)*	Freshwater	LC	Ne		CIUFPB, UFRN, Li
Cichliformes	Cichlidae	*Saxatilia brasiliensis* (Bloch, 1792)	Freshwater	LC	LC		CIUFPB, UFRN, PUCRS, Li

TABLE 2 | (Continued)

Class/Order	Family	Species	Habit	IUCN	BR	Use	Source
Mugiliformes	Mugilidae	*Mugil brevirostris* Miranda Ribeiro, 1915	Marine-Estuary	Ne	DD	Co	Li
Mugiliformes	Mugilidae	*Mugil curema* Valenciennes, 1836	Marine-Estuary	LC	DD	Co, Lc	CIUFPB, Li
Mugiliformes	Mugilidae	*Mugil curvidens* Valenciennes, 1836	Marine-Estuary	Ne	DD	Co	CIUFPB, Li
Mugiliformes	Mugilidae	*Mugil incilis* Hancock, 1830	Marine-Estuary	LC	DD	Co	CIUFPB, Li
Mugiliformes	Mugilidae	*Mugil liza* Valenciennes, 1836	Marine-Estuary	DD	NT	Co, Lc	CIUFPB, Li
Mugiliformes	Mugilidae	*Mugil rubrioculus* Harrison, Nirchio, Oliveira, Ron & Gaviria, 2007	Marine-Estuary	LC	DD	Co	Li
Blenniiformes	Pomacentridae	*Abudefduf saxatilis* (Linnaeus, 1758)	Marine	LC	LC	LC	CIUFPB, Li
Blenniiformes	Pomacentridae	*Azurina multilineata* (Guichenot, 1853)	Marine	LC	LC	Co(Or)	CIUFPB, Li
Blenniiformes	Pomacentridae	*Chromis flavicauda* (Günther, 1880)	Marine	DD	LC	Co(Or)	CIUFPB, Li
Blenniiformes	Pomacentridae	*Chromis jubauna* Moura, 1995	Marine	LC	LC	Co(Or)	CIUFPB
Blenniiformes	Pomacentridae	*Microspathodon chrysurus* (Cuvier, 1830)	Marine	LC	VU	Co(Or)	Li
Blenniiformes	Pomacentridae	*Stegastes fuscus* (Cuvier, 1830)	Marine	LC	LC	Co(Or)	CIUFPB, MZUSP, Li
Blenniiformes	Pomacentridae	*Stegastes pictus* (Castelnau, 1855)	Marine	LC	LC	Co(Or)	CIUFPB, MZUSP, Li
Blenniiformes	Pomacentridae	*Stegastes variabilis* (Castelnau, 1855)	Marine	LC	LC	Co(Or)	CIUFPB, MZUSP, Li
Blenniiformes	Grammatidae	*Gramma brasiliensis* Sazima, Gasparini & Moura, 1998	Marine	LC	DD	Co(Or)	CIUFPB, Li
Blenniiformes	Opistognathidae	*Opistognathus aurifrons* (Jordan & Thompson, 1905)	Marine	LC	LC		CIUFPB, Li
Blenniiformes	Opistognathidae	*Opistognathus cuvierii*? Valenciennes, 1836	Marine	LC	LC		CIUFPB
Blenniiformes	Gobiesocidae	*Gobiesox barbatulus* Starks, 1913	Marine	LC	LC		Li
Blenniiformes	Gobiesocidae	*Gobiesox strumosus*? Cope, 1870	Marine	LC	Ne		CIUFPB
Blenniiformes	Gobiesocidae	*Tomicodon fasciatus* (Peters, 1859)	Marine	LC	Ne		CIUFPB, Li
Blenniiformes	Tripterygiidae	*Enneanectes altivelis* Rosenblatt, 1960	Marine	LC	LC		CIUFPB, Li
Blenniiformes	Blenniidae	*Entomacrodus vomerinus* (Valenciennes, 1836)	Marine	LC	LC		CIUFPB, MZUSP, Li
Blenniiformes	Blenniidae	*Hypleurochilus fissicornis* (Quoy & Gaimard, 1824)	Marine	LC	LC		Li
Blenniiformes	Blenniidae	*Hypleurochilus pseudoaequipinnis* Bath, 1994	Marine	LC	LC		CIUFPB, Li
Blenniiformes	Blenniidae	*Ophioblennius atlanticus*? (Valenciennes, 1836)	Marine	LC	Ne		CIUFPB
Blenniiformes	Blenniidae	*Ophioblennius trinitatis* Miranda Ribeiro, 1919	Marine	LC	LC		Li
Blenniiformes	Blenniidae	*Parablennius marmoreus* (Poey, 1876)	Marine	LC	LC	LC	Li
Blenniiformes	Blenniidae	*Parablennius pilicornis* (Cuvier, 1829)	Marine	LC	LC		CIUFPB, Li
Blenniiformes	Blenniidae	*Scartella cristata* (Linnaeus, 1758)	Marine	LC	LC		CIUFPB, MZUSP, Li
Blenniiformes	Labrisomidae	*Gobioclinus kalisherae* (Jordan, 1904)	Marine	LC	LC		CIUFPB, Li
Blenniiformes	Labrisomidae	*Labrisomus cricota* Sazima, Gasparini & Moura, 2002	Marine	LC	LC		Li
Blenniiformes	Labrisomidae	*Labrisomus nuchipinnis* (Quoy & Gaimard, 1824)	Marine	LC	LC		CIUFPB, MNRJ, MZUSP, Li
Blenniiformes	Labrisomidae	*Malacoctenus delalandii* (Valenciennes, 1836)	Marine	LC	LC		CIUFPB, Li
Blenniiformes	Labrisomidae	*Malacoctenus triangulatus*? Springer, 1959	Marine	LC	LC		CIUFPB
Blenniiformes	Labrisomidae	*Malacoctenus zaluari* Carvalho-Filho, Gasparini & Sazima, 2020	Marine	LC	Ne		Li
Blenniiformes	Labrisomidae	*Paraclinus arcanus* Guimarães & Bacellar, 2002	Marine	LC	LC		CIUFPB, Li
Blenniiformes	Labrisomidae	*Paraclinus rubicundus* (Starks, 1913)	Marine	LC	LC		CIUFPB, Li

TABLE 2 | (Continued)

Class/Order	Family	Species	Habit	IUCN	BR	Use	Source
Blenniiformes	Labrisomidae	*Starksia brasiliensis* (Gilbert, 1900)	Marine	LC	LC		CIUFPB, Li
Blenniiformes	Chaenopsidae	*Emblemaria australis* Ramos, Rocha & Rocha, 2003[c]	Marine	LC	DD		CIUFPB, Li
Blenniiformes	Chaenopsidae	*Emblemariopsis signifer* (Ginsburg, 1942)	Marine	LC	LC		CIUFPB, Li
Blenniiformes	Dactyloscopidae	*Dactyloscopus crossotus* Kanazawa, 1952	Marine	LC	LC		CIUFPB, Li
Blenniiformes	Dactyloscopidae	*Dactyloscopus tridigitatus* Böhlke, 1968	Marine	LC	LC		CIUFPB, Li
Perciformes	Serranidae	*Diplectrum formosum* (Linnaeus, 1766)	Marine	LC	LC	Co	CIUFPB, Li
Perciformes	Serranidae	*Diplectrum radiale* (Quoy & Gaimard, 1824)	Marine	LC	LC	Co	Li
Perciformes	Serranidae	*Serranus annularis* (Günther, 1880)	Marine	LC	LC		CIUFPB, Li
Perciformes	Serranidae	*Serranus baldwini* (Evermann & Marsh, 1899)	Marine	LC	LC		CIUFPB, Li
Perciformes	Serranidae	*Serranus flaviventris* (Cuvier, 1829)	Marine	LC	LC		CIUFPB, Li
Perciformes	Serranidae	*Serranus phoebe* Poey, 1851	Marine	LC	LC		CIUFPB, Li
Perciformes	Epinephelidae	*Alphestes afer* (Bloch, 1793)	Marine	LC	DD	Co	CIUFPB, Li
Perciformes	Epinephelidae	*Cephalopholis fulva* (Linnaeus, 1758)	Marine	LC	NT	Co	CIUFPB, MZUSP, Li
Perciformes	Epinephelidae	*Dermatolepis inermis* (Valenciennes, 1833)	Marine	DD	DD	Co	Li
Perciformes	Epinephelidae	*Epinephelus adscensionis* (Osbeck, 1765)	Marine	LC	DD	Co	CIUFPB, Li
Perciformes	Epinephelidae	*Epinephelus guttatus* (Linnaeus, 1758)	Marine	LC	Ne		Li
Perciformes	Epinephelidae	*Epinephelus itajara* (Lichtenstein, 1822)	marine	VU	CR	Co	CIUFPB, Li
Perciformes	Epinephelidae	*Epinephelus morio* (Valenciennes, 1828)	Marine	VU	EN	Co	Li
Perciformes	Epinephelidae	*Hyporthodus niveatus* (Valenciennes, 1828)	Marine	VU	VU	Co	Li
Perciformes	Epinephelidae	*Mycteroperca bonaci* (Poey, 1860)	Marine	NT	EN	Co	CIUFPB, Li
Perciformes	Epinephelidae	*Mycteroperca interstitialis* (Poey, 1860)	Marine	VU	VU	Co	Li
Perciformes	Epinephelidae	*Paranthias furcifer* (Valenciennes, 1828)	Marine	LC	Ne	Co	CIUFPB, Li
Perciformes	Grammistidae	*Rypticus bistrispinus* (Mitchill, 1818)	Marine	LC	LC		CIUFPB, Li
Perciformes	Grammistidae	*Rypticus randalli* Courtenay, 1967	Marine	LC	LC		CIUFPB, Li
Perciformes	Grammistidae	*Rypticus saponaceus* (Bloch & Schneider, 1801)	Marine	LC	LC		CIUFPB, Li
Perciformes	Grammistidae	*Rypticus subbifrenatus* Gill, 1861	Marine	LC	LC		CIUFPB
Perciformes	Triglidae	*Prionotus* cf. *nudigula* Ginsburg, 1950	Marine	LC	LC		CIUFPB, Li
Perciformes	Triglidae	*Prionotus punctatus* (Bloch, 1793)	Marine	LC	LC		CIUFPB, Li
Perciformes	Liopropomatidae	*Liopropoma carmabi* (Randall, 1963)	Marine	LC	LC		Li
Perciformes	Scorpaenidae	*Pterois volitans* (Linnaeus, 1758)*	Marine	LC	Ne		CIUFPB, Li
Perciformes	Scorpaenidae	*Scorpaena bergii* Evermann & Marsh, 1900	Marine	LC	LC		CIUFPB, Li
Perciformes	Scorpaenidae	*Scorpaena brasiliensis* Cuvier, 1829	Marine	LC	LC		CIUFPB, Li
Perciformes	Scorpaenidae	*Scorpaena inermis* Cuvier, 1829	Marine	LC	LC		Li
Perciformes	Scorpaenidae	*Scorpaena isthmensis* Meek & Hildebrand, 1928	Marine	LC	LC		CIUFPB, Li
Perciformes	Scorpaenidae	*Scorpaena melasma* Eschmeyer, 1965	Marine	DD	LC		CIUFPB
Perciformes	Scorpaenidae	*Scorpaena plumieri* Bloch, 1789	Marine-Estuary	LC	LC		CIUFPB, Li
Perciformes	Scorpaenidae	*Scorpaenodes caribbaeus* Meek & Hildebrand, 1928	Marine	LC	LC		Li
Perciformes	Scorpaenidae	*Scorpaenodes tredecimspinosus* (Metzelaar, 1919)	Marine	LC	LC		CIUFPB, Li
Labriformes	Labridae	*Bodianus brasiliensis* (Heiser, Moura & Robertson, 2000)	Marine	LC	Ne		Li
Labriformes	Labridae	*Bodianus pulchellus* (Poey, 1860)	Marine	LC	LC	Co(Or)	Li
Labriformes	Labridae	*Bodianus rufus* (Linnaeus, 1758)	Marine	LC	LC	Co(Or)	CIUFPB, Li

TABLE 2 | (Continued)

Class/Order	Family	Species	Habit	IUCN	BR	Use	Source
Labriformes	Labridae	*Clepticus brasiliensis* Heiser, Moura & Robertson, 2000	Marine	LC	LC		Li
Labriformes	Labridae	*Cryptotomus roseus* Cope, 1871	Marine	LC	LC		CIUFPB, Li
Labriformes	Labridae	*Doratonotus megalepis* Günther, 1862	Marine	LC	LC		CIUFPB, Li
Labriformes	Labridae	*Halichoeres bivittatus* (Bloch, 1791)	Marine	LC	LC		CIUFPB, Li
Labriformes	Labridae	*Halichoeres brasiliensis* (Bloch, 1791)	Marine	DD	DD		CIUFPB, Li
Labriformes	Labridae	*Halichoeres dimidiatus* (Agassiz, 1831)	Marine	LC	LC	Co(Or)	CIUFPB, Li
Labriformes	Labridae	*Halichoeres penrosei* Starks, 1913	Marine	LC	LC		CIUFPB, Li
Labriformes	Labridae	*Halichoeres poeyi* (Steindachner, 1867)	Marine	LC	LC		CIUFPB, Li
Labriformes	Labridae	*Halichoeres radiatus* (Linnaeus, 1758)	Marine	LC	LC		CIUFPB, Li
Labriformes	Labridae	*Nicholsina usta* (Valenciennes, 1840)	Marine	LC	LC		CIUFPB, Li
Labriformes	Labridae	*Scarus trispinosus* Valenciennes, 1840	Marine	EN	CR		CIUFPB, Li
Labriformes	Labridae	*Scarus zelindae* Moura, Figueiredo & Sazima, 2001	Marine	DD	EN		CIUFPB, Li
Labriformes	Labridae	*Sparisoma amplum* (Ranzani, 1841)	Marine	LC	VU		Li
Labriformes	Labridae	*Sparisoma axillare* (Steindachner, 1878)	Marine	DD	VU		CIUFPB, Li
Labriformes	Labridae	*Sparisoma frondosum* (Agassiz, 1831)	Marine	DD	VU		Li
Labriformes	Labridae	*Sparisoma radians* (Valenciennes, 1840)	Marine	LC	LC		CIUFPB, Li
Labriformes	Labridae	*Thalassoma noronhanum* (Boulenger, 1890)	Marine	LC	LC		CIUFPB, Li
Labriformes	Labridae	*Xyrichtys martinicensis* Valenciennes, 1840	Marine	LC	Ne		Li
Labriformes	Labridae	*Xyrichtys novacula* (Linnaeus, 1758)	Marine	LC	LC		CIUFPB, Li
Labriformes	Labridae	*Xyrichtys splendens* Castelnau, 1855	Marine	LC	LC		CIUFPB, Li
Labriformes	Uranoscopidae	*Astroscopus y-graecum* (Cuvier, 1829)	Marine	LC	Ne		HVASF
Centrarchiformes	Kyphosidae	*Kyphosus sectatrix* (Linnaeus, 1758)	Marine	LC	LC	Co	CIUFPB, Li
Centrarchiformes	Cirrhitidae	*Amblycirrhitus pinos* (Mowbray, 1927)	Marine	LC	DD		Li
Acropomatiformes	Pempheridae	*Pempheris schomburgki* Müller & Troschel, 1848	Marine	LC	LC		CIUFPB, Li
Acanthuriformes	Gerreidae	*Diapterus auratus* Ranzani, 1842	Marine-Estuary	LC	LC	Co	CIUFPB, Li
Acanthuriformes	Gerreidae	*Diapterus rhombeus* (Cuvier, 1829)	Marine-Estuary	LC	LC	Co	CIUFPB, Li
Acanthuriformes	Gerreidae	*Eucinostomus argenteus* Baird & Girard, 1855	Marine-Estuary	LC	LC	Co	CIUFPB, Li
Acanthuriformes	Gerreidae	*Eucinostomus gula* (Quoy & Gaimard, 1824)	Marine-Estuary	LC	LC	Co	CIUFPB, Li
Acanthuriformes	Gerreidae	*Eucinostomus havana* (Nichols, 1912)	Marine-Estuary	LC	LC	Co	CIUFPB, Li
Acanthuriformes	Gerreidae	*Eucinostomus lefroyi* (Goode, 1874)	Marine	LC	LC		CIUFPB, Li
Acanthuriformes	Gerreidae	*Eucinostomus melanopterus* (Bleeker, 1863)	Marine-Estuary-Freshwater	LC	LC	Co	CIUFPB, MNRJ, Li
Acanthuriformes	Gerreidae	*Eugerres brasilianus* (Cuvier, 1830)	Marine-Estuary	LC	LC	Co	CIUFPB, Li
Acanthuriformes	Gerreidae	*Genyatremus luteus* (Bloch, 1790)	Marine-Estuary	DD	LC	Co	CIUFPB, Li
Acanthuriformes	Gerreidae	*Gerres cinereus* (Walbaum, 1792)	Marine-Estuary	LC	LC	Co	CIUFPB, Li
Acanthuriformes	Gerreidae	*Eucinostomus jonesii* (Günther, 1879)	Marine	LC	LC		Li
Acanthuriformes	Ephippidae	*Chaetodipterus faber* (Broussonet, 1782)	Marine-Estuary	LC	LC	Co, Lc	CIUFPB, Li
Acanthuriformes	Sciaenidae	*Bairdiella goeldi* Marceniuk, Molina, Caires, Rotundo, Wosiacki & Oliveira, 2019	Marine-Estuary	LC	LC	Co	CIUFPB, Li
Acanthuriformes	Sciaenidae	*Ctenosciaena gracilicirrhus* (Metzelaar, 1919)	Marine	LC	LC		CIUFPB
Acanthuriformes	Sciaenidae	*Cynoscion acoupa* (Lacepède, 1801)	Marine-Estuary	VU	DD	Co	CIUFPB, Li
Acanthuriformes	Sciaenidae	*Cynoscion jamaicensis* (Vaillant & Bocourt, 1883)	Marine-Estuary	LC	LC	Co	CIUFPB, Li
Acanthuriformes	Sciaenidae	*Cynoscion leiarchus* (Cuvier, 1830)	Marine-Estuary	LC	LC	Co	CIUFPB, Li
Acanthuriformes	Sciaenidae	*Cynoscion microlepidotus* (Cuvier, 1830)	Marine-Estuary	LC	LC	Co	CIUFPB, Li

TABLE 2 | (Continued)

Class/Order	Family	Species	Habit	IUCN	BR	Use	Source
Acanthuriformes	Sciaenidae	*Cynoscion virescens* (Cuvier, 1830)	Marine-Estuary	LC	DD	Co	CIUFPB, Li
Acanthuriformes	Sciaenidae	*Eques lanceolatus* (Linnaeus, 1758)	Marine	Ne	LC	Co	Li
Acanthuriformes	Sciaenidae	*Isopisthus parvipinnis* (Cuvier, 1830)	Marine-Estuary	LC	LC	Co	CIUFPB, Li
Acanthuriformes	Sciaenidae	*Larimus breviceps* Cuvier, 1830	Marine	LC	LC	Co	CIUFPB, MNRJ, Li
Acanthuriformes	Sciaenidae	*Macrodon ancylodon* (Bloch & Schneider, 1801)	Marine-Estuary	LC	LC	Co	CIUFPB, Li
Acanthuriformes	Sciaenidae	*Menticirrhus cuiaranensis* Marceniuk, Caires, Rotundo, Cerqueira, Siccha-Ramirez, Wosiacki & Oliveira, 2020	Marine-Estuary	LC	LC	Co	CIUFPB, Li
Acanthuriformes	Sciaenidae	*Menticirrhus martinicensis* (Cuvier, 1830)	Marine-Estuary	LC	LC	Co	CIUFPB
Acanthuriformes	Sciaenidae	*Micropogonias furnieri* (Desmarest, 1823)	Marine-Estuary	LC	VU	Co	CIUFPB, Li
Acanthuriformes	Sciaenidae	*Nebris microps* Cuvier, 1830	Marine-Estuary	LC	LC	Co	CIUFPB, Li
Acanthuriformes	Sciaenidae	*Odontoscion* aff. *dentex* (Cuvier, 1830)	Marine	LC	LC	Co	CIUFPB, Li
Acanthuriformes	Sciaenidae	*Paralonchurus brasiliensis* (Steindachner, 1875)	Marine-Estuary	LC	LC	Co	CIUFPB, Li
Acanthuriformes	Sciaenidae	*Pareques lineatus* (Cuvier, 1830)	Marine	LC	Ne	Co	CIUFPB, Li
Acanthuriformes	Sciaenidae	*Plagioscion squamosissimus* (Heckel, 1840)*	Freshwater	LC	LC	Co, Lc	CIUFPB, Li
Acanthuriformes	Sciaenidae	*Stellifer brasiliensis* (Schultz, 1945)	Marine-Estuary	LC	LC		CIUFPB, Li
Acanthuriformes	Sciaenidae	*Stellifer collettei* Chao, Carvalho-Filho & Andrade Santos, 2021	Marine-Estuary	LC	LC		CIUFPB, Li
Acanthuriformes	Sciaenidae	*Stellifer gomezi* (Cervigón, 2011)	Marine	Ne	LC		CIUFPB
Acanthuriformes	Sciaenidae	*Stellifer menezesi* Chao, Carvalho-Filho & Andrade Santos, 2021	Marine-Estuary	LC	LC		CIUFPB
Acanthuriformes	Sciaenidae	*Stellifer musicki* Chao, Carvalho-Filho & Andrade Santos, 2021	Marine	LC	LC		CIUFPB, Li
Acanthuriformes	Sciaenidae	*Stellifer microps* (Steindachner, 1864)	Marine-Estuary	LC	LC		CIUFPB, Li
Acanthuriformes	Sciaenidae	*Stellifer naso* (Jordan, 1889)	Marine-Estuary	LC	LC		CIUFPB, Li
Acanthuriformes	Sciaenidae	*Stellifer punctatissimus* (Meek & Hildebrand, 1925)	Marine-Estuary	LC	LC		CIUFPB, Li
Acanthuriformes	Sciaenidae	*Stellifer rastrifer* (Jordan, 1889)	Marine-Estuary	LC	LC		CIUFPB, Li
Acanthuriformes	Sciaenidae	*Stellifer stellifer* (Bloch, 1790)	Marine-Estuary	DD	LC		CIUFPB, MNRJ, Li
Acanthuriformes	Sciaenidae	*Umbrina coroides* Cuvier, 1830	Marine-Estuary	LC	LC	Co	CIUFPB, Li
Acanthuriformes	Haemulidae	*Anisotremus surinamensis* (Bloch, 1791)	Marine	DD	DD	Co	CIUFPB, Li
Acanthuriformes	Haemulidae	*Anisotremus virginicus* (Linnaeus, 1758)	Marine	LC	LC	Co	CIUFPB, Li
Acanthuriformes	Haemulidae	*Conodon nobilis* (Linnaeus, 1758)	Marine-Estuary	LC	LC	Co	CIUFPB, Li
Acanthuriformes	Haemulidae	*Haemulon atlanticus* Carvalho, Marceniuk, Oliveira & Wosiacki, 2021	Marine	LC	LC	Co	CIUFPB, MNRJ, Li
Acanthuriformes	Haemulidae	*Haemulon aurolineatum* Cuvier, 1830	Marine	LC	LC	Co	CIUFPB, Li
Acanthuriformes	Haemulidae	*Haemulon bonariense* Cuvier, 1830	Marine	LC	Ne		Li
Acanthuriformes	Haemulidae	*Haemulon melanurum* (Linnaeus, 1758)	Marine	LC	LC	Co	Li
Acanthuriformes	Haemulidae	*Haemulon parra* (Desmarest, 1823)	Marine	LC	LC	Co	CIUFPB, Li
Acanthuriformes	Haemulidae	*Haemulon plumierii* (Lacepède, 1801)	Marine	LC	DD	Co	CIUFPB, Li
Acanthuriformes	Haemulidae	*Haemulon squamipinna* Rocha & Rosa, 1999	Marine	LC	LC	Co	CIUFPB, MZUSP, Li
Acanthuriformes	Haemulidae	*Haemulon striatum* (Linnaeus, 1758)	Marine	LC	LC		Li
Acanthuriformes	Haemulidae	*Haemulopsis corvinaeformis* (Steindachner, 1868)	Marine-Estuary	LC	LC	Co	CIUFPB, Li
Acanthuriformes	Haemulidae	*Orthopristis rubra*? (Cuvier, 1830)	Marine-Estuary	LC	LC	Co	CIUFPB, MNRJ
Acanthuriformes	Haemulidae	*Orthopristis scapularis* Fowler, 1915	Marine	LC	LC	Co	CIUFPB, Li

TABLE 2 | (Continued)

Class/Order	Family	Species	Habit	IUCN	BR	Use	Source
Acanthuriformes	Haemulidae	*Paranisotremus moricandi* (Ranzani, 1842)	Marine	LC	LC		CIUFPB, Li
Acanthuriformes	Haemulidae	*Pomadasys ramosus* (Poey, 1860)	Marine-Estuary	Ne	LC		CIUFPB
Acanthuriformes	Haemulidae	*Rhonciscus approximans* (Bean & Dresel, 1884)	Marine-Estuary-Freshwater	Ne	Ne		Li
Acanthuriformes	Haemulidae	*Rhonciscus crocro* (Cuvier, 1830)	Marine-Estuary	DD	LC	Co	CIUFPB
Acanthuriformes	Lobotidae	*Lobotes surinamensis* (Bloch, 1790)	Marine-Estuary	LC	LC	Co(Rf)	CIUFPB, Li
Acanthuriformes	Lutjanidae	*Lutjanus alexandrei* Moura & Lindeman, 2007	Marine	Ne	DD	Co	CIUFPB, Li
Acanthuriformes	Lutjanidae	*Lutjanus analis* (Cuvier, 1828)	Marine-Estuary	NT	NT	Co	CIUFPB, MNRJ, Li
Acanthuriformes	Lutjanidae	*Lutjanus buccanella* (Cuvier, 1828)	Marine	DD	DD	Co	CIUFPB, Li
Acanthuriformes	Lutjanidae	*Lutjanus cyanopterus* (Cuvier, 1828)	Marine-Estuary	VU	VU	Co	CIUFPB, MNRJ, Li
Acanthuriformes	Lutjanidae	*Lutjanus jocu* (Bloch & Schneider, 1801)	Marine-Estuary	DD	NT	Co	OBIS_BR
Acanthuriformes	Lutjanidae	*Lutjanus campechanus* (Poey, 1860)	Marine	VU	EN	Co	Li
Acanthuriformes	Lutjanidae	*Lutjanus synagris* (Linnaeus, 1758)	Marine-Estuary	NT	DD	Co	CIUFPB, Li
Acanthuriformes	Lutjanidae	*Lutjanus vivanus* (Cuvier, 1828)	Marine	LC	DD	Co	CIUFPB, Li
Acanthuriformes	Lutjanidae	*Ocyurus chrysurus* (Bloch, 1791)	Marine	DD	DD	Co	CIUFPB, Li
Acanthuriformes	Lutjanidae	*Rhomboplites aurorubens* (Cuvier, 1829)	Marine	VU	DD	Co	CIUFPB, Li
Acanthuriformes	Malacanthidae	*Malacanthus plumieri* (Bloch, 1786)	Marine	LC	LC	Co	CIUFPB, Li
Acanthuriformes	Pomacanthidae	*Centropyge aurantonotus* Burgess, 1974	Marine	LC	DD	Co(Or)	CIUFPB, Li
Acanthuriformes	Pomacanthidae	*Holacanthus ciliaris* (Linnaeus, 1758)	Marine	LC	DD	Co(Or)	CIUFPB, Li
Acanthuriformes	Pomacanthidae	*Holacanthus tricolor* (Bloch, 1795)	Marine	LC	DD	Co(Or)	CIUFPB, Li
Acanthuriformes	Pomacanthidae	*Pomacanthus arcuatus* (Linnaeus, 1758)	Marine	LC	DD	Co(Or)	Li
Acanthuriformes	Pomacanthidae	*Pomacanthus paru* (Bloch, 1787)	Marine	LC	DD	Co(Or)	CIUFPB, Li
Acanthuriformes	Chaetodontidae	*Chaetodon ocellatus* Bloch, 1787	Marine	LC	DD	Co(Or)	CIUFPB, Li
Acanthuriformes	Chaetodontidae	*Chaetodon sedentarius* Poey, 1860	Marine	LC	LC	Co(Or)	Li
Acanthuriformes	Chaetodontidae	*Chaetodon striatus* Linnaeus, 1758	Marine	LC	LC	Co(Or)	CIUFPB, Li
Acanthuriformes	Acanthuridae	*Acanthurus bahianus* Castelnau, 1855	Marine	LC	LC		CIUFPB, Li
Acanthuriformes	Acanthuridae	*Acanthurus chirurgus* (Bloch, 1787)	Marine	LC	LC		CIUFPB, Li
Acanthuriformes	Acanthuridae	*Acanthurus coeruleus* Bloch & Schneider, 1801	Marine	LC	LC	Co(Or)	CIUFPB, Li
Acanthuriformes	Sparidae	*Archosargus probatocephalus* (Walbaum, 1792)	Marine-Estuary	LC	LC	Co	OBIS_BR, Li
Acanthuriformes	Sparidae	*Archosargus rhomboidalis* (Linnaeus, 1758)	Marine-Estuary	LC	LC	Co	CIUFPB, Li
Acanthuriformes	Sparidae	*Calamus calamus* (Valenciennes, 1830)	Marine	LC	DD	Co	Li
Acanthuriformes	Sparidae	*Calamus penna* (Valenciennes, 1830)	Marine	LC	LC		CIUFPB, Li
Acanthuriformes	Sparidae	*Calamus pennatula* Guichenot, 1868	Marine	LC	LC	Co	CIUFPB, Li
Acanthuriformes	Priacanthidae	*Heteropriacanthus cruentatus* (Lacepède, 1801)	Marine	LC	LC	Co	Li
Acanthuriformes	Priacanthidae	*Priacanthus arenatus* Cuvier, 1829	Marine	LC	LC	Co	CIUFPB, Li
Acanthuriformes	Antigoniidae	*Antigonia capros*? Lowe, 1843	Marine	LC	LC		CIUFPB
Lophiiformes	Ogcocephalidae	*Ogcocephalus parvus* Longley & Hildebrand, 1940	Marine	LC	DD		Li
Lophiiformes	Ogcocephalidae	*Ogcocephalus vespertilio* (Linnaeus, 1758)	Marine-Estuary	LC	LC		CIUFPB, MZUSP, Li
Lophiiformes	Antennariidae	*Antennarius multiocellatus* (Valenciennes, 1837)	Marine	LC	LC		CIUFPB, Li
Lophiiformes	Antennariidae	*Antennarius scaber* (Cuvier, 1817)	Marine	LC	Ne		Li
Lophiiformes	Antennariidae	*Antennarius striatus* (Shaw, 1794)	Marine	LC	LC		CIUFPB, Li

TABLE 2 | (Continued)

Class/Order	Family	Species	Habit	IUCN	BR	Use	Source
Lophiiformes	Antennariidae	*Histrio histrio* (Linnaeus, 1758)	Marine	LC	LC		Li
Tetraodontiformes	Molidae	*Mola mola* (Linnaeus, 1758)	Marine	VU	LC		CIUFPB, Li
Tetraodontiformes	Diodontidae	*Chilomycterus antennatus* (Cuvier, 1816)	Marine	LC	Ne		Li
Tetraodontiformes	Diodontidae	*Chilomycterus antillarum* (Jordan & Rutter, 1897)	Marine	LC	LC		CIUFPB, Li
Tetraodontiformes	Diodontidae	*Chilomycterus spinosus* (Linnaeus, 1758)	Marine-Estuary	LC	LC		CIUFPB, Li
Tetraodontiformes	Diodontidae	*Diodon holocanthus* (Linnaeus, 1758)	Marine-Estuary	LC	LC		CIUFPB, Li
Tetraodontiformes	Diodontidae	*Diodon hystrix* (Linnaeus, 1758)	Marine-Estuary	LC	LC		CIUFPB, Li
Tetraodontiformes	Tetraodontidae	*Canthigaster figueiredoi* (Moura & Castro, 2002)	Marine	LC	LC		Li
Tetraodontiformes	Tetraodontidae	*Sphoeroides psittacus* (Bloch & Schneider, 1801)	Marine-Estuary	LC	LC	Co, Lc	Li
Tetraodontiformes	Tetraodontidae	*Lagocephalus laevigatus* (Linnaeus, 1766)	Marine-Estuary	LC	LC	Co, Lc	CIUFPB, Li
Tetraodontiformes	Tetraodontidae	*Sphoeroides camila* Carvalho-Filho, Rotundo, Pitassy & Sazima, 2023	Marine	Ne	Ne		Li
Tetraodontiformes	Tetraodontidae	*Sphoeroides greeleyi* Gilbert, 1900	Marine-Estuary	LC	LC		CIUFPB, Li
Tetraodontiformes	Tetraodontidae	*Sphoeroides pachygaster* (Muller & Troschel, 1848)	Marine	LC	LC		CIUFPB, Li
Tetraodontiformes	Tetraodontidae	*Sphoeroides spengleri* (Bloch, 1785)	Marine-Estuary	LC	LC		CIUFPB, Li
Tetraodontiformes	Tetraodontidae	*Sphoeroides testudineus* (Linnaeus, 1758)	Marine-Estuary	LC	LC	Lc	CIUFPB, Li
Tetraodontiformes	Tetraodontidae	*Sphoeroides tyleri* (Shipp, 1972)	Marine	LC	LC		Li
Tetraodontiformes	Ostraciidae	*Acanthostracion polygonius* (Poey, 1876)	Marine	LC	LC		Li
Tetraodontiformes	Ostraciidae	*Acanthostracion quadricornis* (Linnaeus, 1758)	Marine	LC	LC		CIUFPB, Li
Tetraodontiformes	Ostraciidae	*Lactophrys trigonus* (Linnaeus, 1758)	Marine	LC	LC		Li
Tetraodontiformes	Monacanthidae	*Aluterus heudelotii* (Hollard, 1855)	Marine	LC	LC		CIUFPB, Li
Tetraodontiformes	Monacanthidae	*Aluterus monoceros* (Linnaeus, 1758)	Marine	LC	DD		CIUFPB, Li
Tetraodontiformes	Monacanthidae	*Aluterus schoepfi* (Walbaum, 1792)	Marine	LC	LC		CIUFPB, Li
Tetraodontiformes	Monacanthidae	*Aluterus scriptus* (Osbeck, 1765)	Marine	LC	LC		Li
Tetraodontiformes	Monacanthidae	*Cantherhines macrocerus* (Hollard, 1853)	Marine	LC	LC		CIUFPB, Li
Tetraodontiformes	Monacanthidae	*Cantherhines pullus* (Ranzani, 1842)	Marine	LC	LC		CIUFPB, Li
Tetraodontiformes	Monacanthidae	*Monacanthus ciliatus* (Mitchill, 1818)	Marine	LC	LC		CIUFPB, Li
Tetraodontiformes	Monacanthidae	*Stephanolepis hispida* (Linnaeus, 1766)	Marine	LC	LC		CIUFPB, Li
Tetraodontiformes	Monacanthidae	*Stephanolepis setifer* (Bennett, 1831)	Marine	LC	LC		Li
Tetraodontiformes	Balistidae	*Balistes capriscus* (Gmelin, 1789)	Marine	VU	EN	Co, Me	CIUFPB, Li
Tetraodontiformes	Balistidae	*Balistes vetula* (Linnaeus, 1758)	Marine	NT	DD	Co	CIUFPB, MZUSP, Li
Tetraodontiformes	Balistidae	*Canthidermis sufflamen* (Mitchill, 1815)	Marine	LC	DD		Li
Tetraodontiformes	Balistidae	*Melichthys niger* (Bloch, 1786)	Marine	LC	LC		CIUFPB, Li
Tetraodontiformes	Balistidae	*Xanthichthys ringens* (Linnaeus, 1758)	Marine	LC	LC		CIUFPB, Li

We identified 467 marine and estuarine teleosts, distributed across 26 orders and 96 families. The most representative orders are Acanthuriformes (87 spp., 18.67%), Carangiformes (61, 13.09%), and Gobiiformes (42, 9.01%). The most speciose families are Sciaenidae (29, 6.12%), Carangidae (27, 5.70%), and Labridae (23, 4.85%) (Tab. 2; Fig. 5A). Only one species is non-native, the lionfish *Pterois volitans*, an invasive species from the family Scorpaenidae (Tab. 2; Fig. 6F).

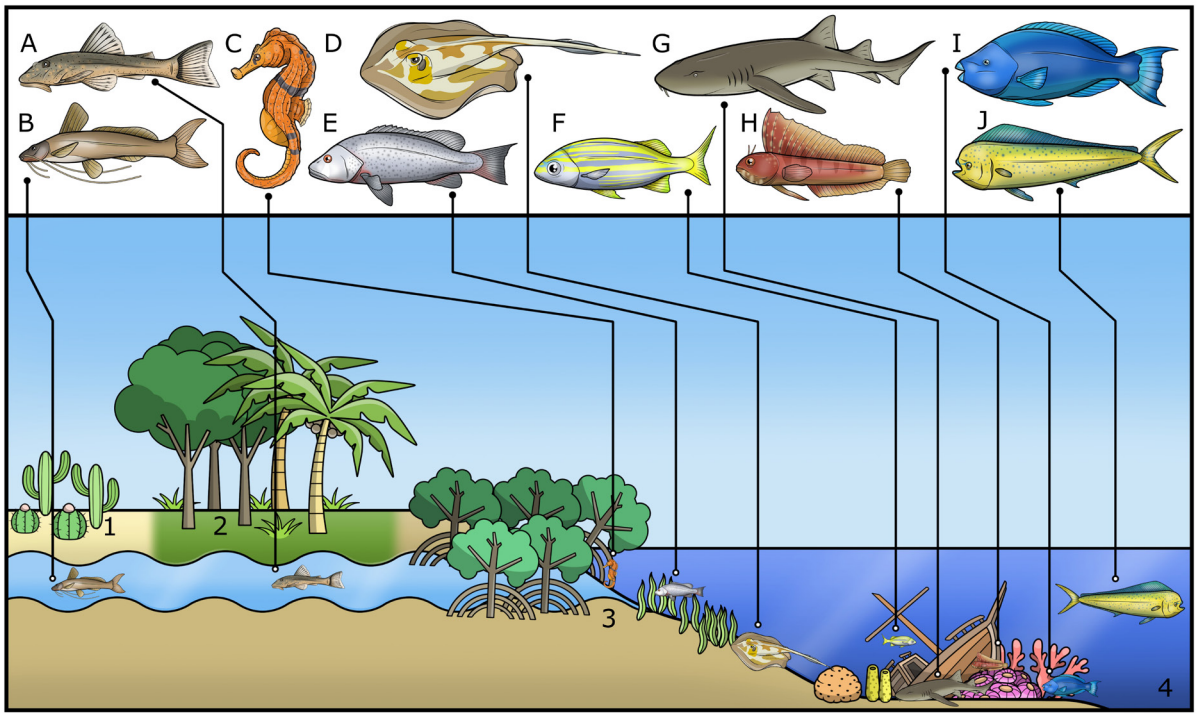

FIGURE 4 | Schematic overview of the ichthyofauna of Paraíba State and their associated habitats: Freshwater (1–2), estuarine (3) and marine (4). **A.** *Parotocinclus jacksoni*; **B.** *Pimelodella enochi*; **C.** *Hippocampus reidi*; **D.** *Hypanus marianae*; **E.** *Lutjanus cyanopterus*; **F.** *Haemulon squamipinna*; **G.** *Ginglymostoma cirratum*; **H.** *Emblemaria australis*; **I.** *Scarus trispinosus*; **J.** *Coryphaena hippurus*. The number indicate the biome and realms: 1. Caatinga, 2. Atlantic Forest, 3. Mangrove Forest, and 4. Marine region. Illustration by Lukas M. Silva.

For elasmobranch fishes, we identified 35 species across 7 orders and 17 families, all inhabiting marine environments, with some occasionally visiting estuaries. The most representative elasmobranchs fish orders are Carcharhiniformes (19 species, 54.30%) and Myliobatiformes (9 species, 25.71%), together accounting for 80% of all species. The families with the highest diversity are Carcharhinidae (11 species, 31.43%) and both Sphyrnidae and Dasyatidae (4 species each, 11.43%, see Tab. 2; Fig. 5C).

In freshwater environments, we identified a total of 63 teleost fish species, including exclusively freshwater species and some that may occasionally enter marine waters. These species belong to nine orders and 22 families (Tab. 2). Additionally, one species, the rivulid fish *Hypsolebias* sp., is currently being described (in prep.). The most speciose orders are Characiformes (30 spp., 47.69%), Siluriformes (15 spp., 23.08%), and Cichliformes (10 spp., 15.38%), collectively accounting for 80% of all freshwater species. The most speciose families are Cichlidae (10, 15.40%), Acestrorhamphidae (9, 13.84%), and Loricariidae (7, 12.31%) (Tab. 2; Fig. 5B). Of the 63 species, 13 are non-native, belonging to six families: Cichlidae (6 species), Serrasalmidae (1), Poeciliidae (2), and Acestrorhamphidae, Engraulidae, Cyprinidae, and Sciaenidae (1 each). Regarding species richness per basin, the Paraíba River is the most diverse, holding 47 species, followed by the Piranhas River (45 species), Mamanguape River (31), Abiaí River (29), Gramame River (29), Curimataú River (21), Camaratuba River (18), and Miriri River (12) (see Tab. 2; Fig. 3A).

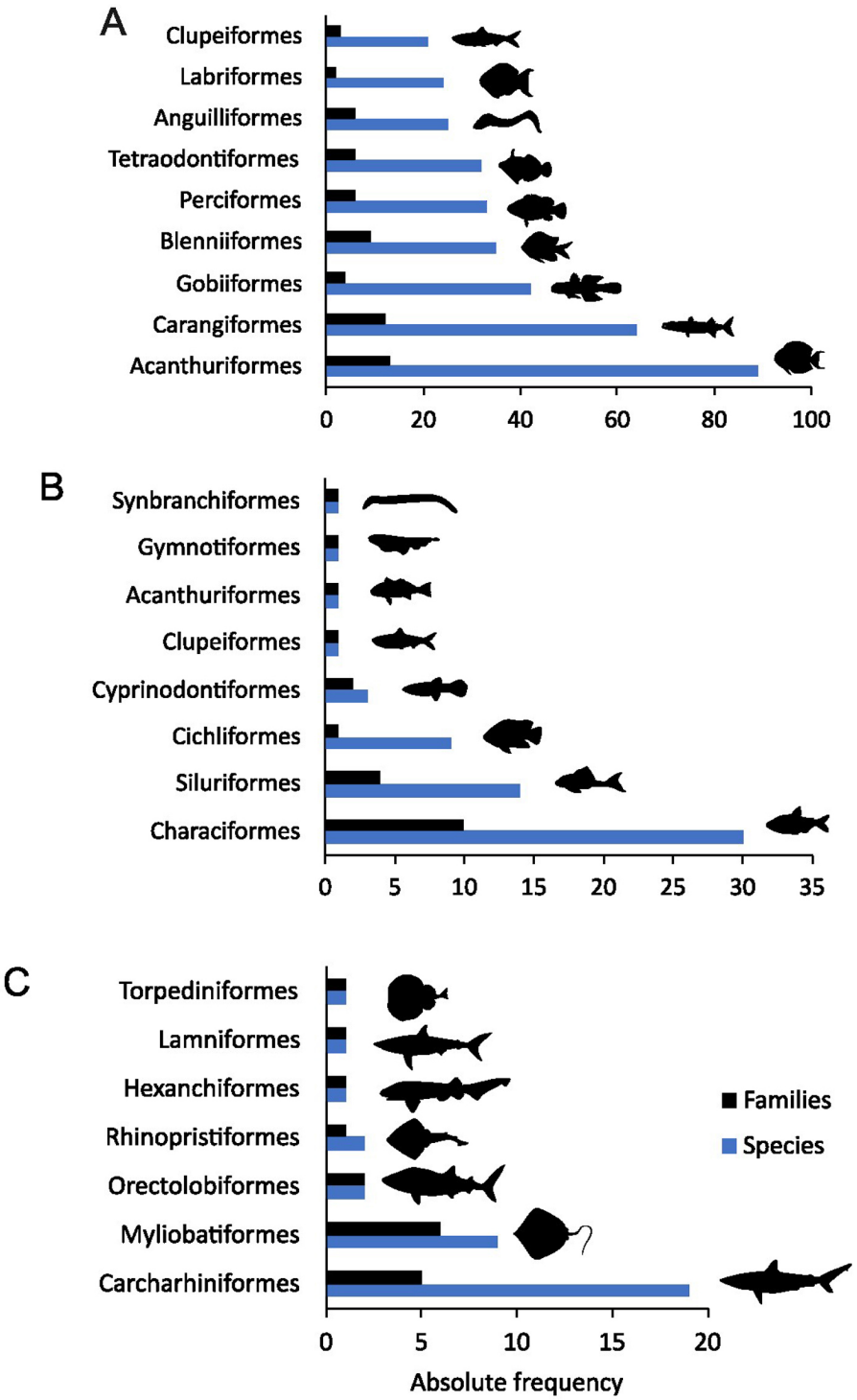

FIGURE 5 | Absolute frequency of **A.** Marine-estuarine teleost species; **B.** Freshwater teleost species; and **C.** Elasmobranch species in the Paraíba State, Brazil. Marine teleost fishes are further categorized by their most representative orders, families and species.

Endemism and threat status. A total of nine freshwater fish species is endemic to the NCCD ecoregion, encompassing two orders and three families (Tab. 2). To date, no species have been reported exclusively as endemic to the Atlantic Forest biome in Paraíba. The family Loricariidae exhibits the highest richness of endemic species. *Parotocinclus cearensis*, *P. seridoensis*, and *P. jacksoni*; are endemic to the NCCD. Additionally, *P. jacksoni* is endemic to Mamanguape River basin and *P. spilosoma* is endemic to the Paraíba River basin. In marine environments, one marine species is endemic to the Northeastern Brazil Marine ecoregion (NBM): the teleost fish *Emblemaria australis*. The species *Thalassophryne punctata*; *Haemulon squamipinna*, and the stingray *Hypanus marianae* are endemic to the Tropical Southwestern Atlantic province and are restricted to the coastal zone (Tab. 2; Fig. 6).

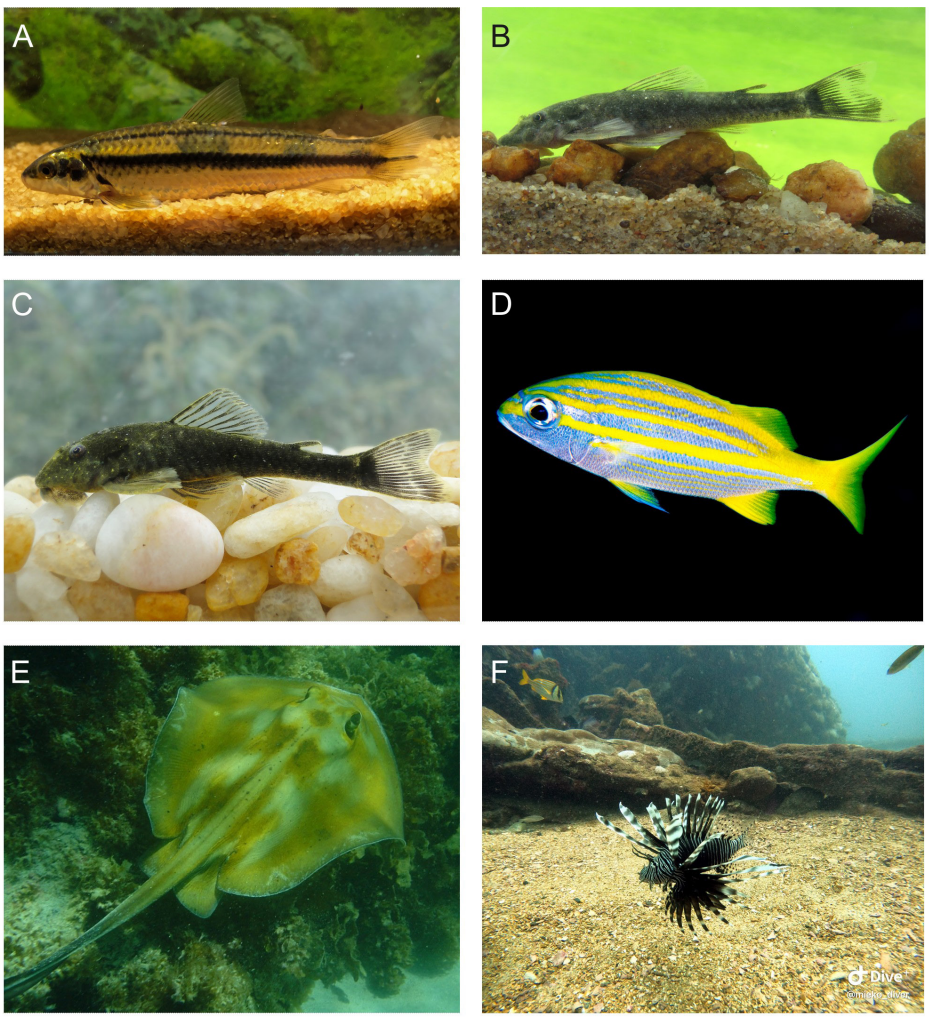

FIGURE 6 | Fish species of Paraíba State. **A.** *Apareiodon davisi*; **B.** *Parotocinclus jacksoni*, endemic to the Mamanguape River; **C.** *Parotocinclus spilosoma*, endemic to the Paraíba River (Photos by Telton Ramos); **D.** *Haemulon squamipinna*, endemic to the Tropical Southwestern Atlantic province (Photo by Luis A. Rocha), and **E.** *Hypanus marianae*, endemic to Tropical Southwestern Atlantic province (Photo by Tiego Costa). **F.** The invasive marine species *Pterois volitans* (Photo by Vannesa Mieko).

In this study, we report that 44 species are threatened according to the IUCN, comprising 5 Critically Endangered (CR) species, 13 Endangered (EN) species, and 26 Vulnerable (VU) species, all of which inhabit marine and estuarine environments. According to the Sistema de Avaliação do Risco de Extinção da Biodiversidade (SALVE), Paraíba State is home to 43 threatened species, including 11 CR species, such as the Atlantic goliath grouper, *Epinephelus itajara*. Nine EN species occur in the state, including the red grouper, *Epinephelus morio*, and only two species from freshwater environments, the loricariids *Parotocinclus seridoensis* and *P. spilosoma*. Additionally, Paraíba has 23 VU species, including the large-eye marine stingray, *Hypanus marianae*, endemic to the Tropical Southwestern Atlantic province (Tab. 2; Fig. 7). Of the total number of threatened fish species in Paraíba, 51.20% are elasmobranch species, including 14 sharks (*e.g.*, the great hammerhead *Sphyrna mokarran*) and eight rays (*e.g.*, the Brazilian guitarfish *Pseudobatos horkelii*), both classified as CR species (Tab. 2). Among the data-deficient species (DD), 38 (61%) are marine and 24 (39%) are estuarine. Additionally, 28 (82%) marine and 3 (9%) estuarine and freshwater species remain non-evaluated (NE) (Tab. 2; Fig. 7).

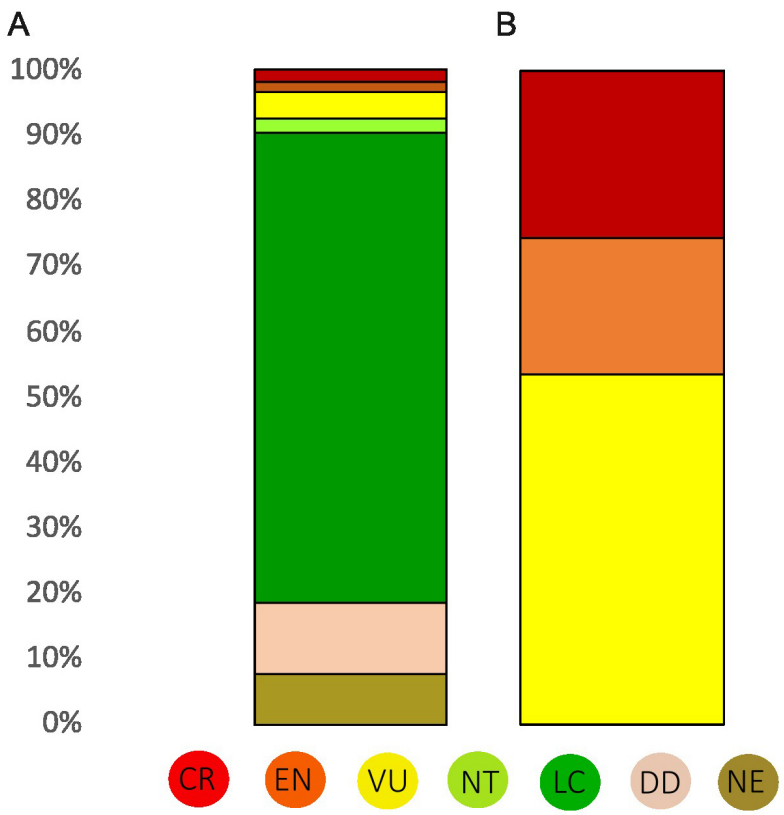

FIGURE 7 | **A.** Extinction risk categories of fish species of the Paraíba State, according to national assessment lists; and **B.** The threatened species. CR: Critically Endangered; EN: Endangered; VU: Vulnerable; NT: Near Threatened; LC: Least Concern; DD: Data Deficient; NE: Not Evaluated.

Human use. Around 200 species are used by humans for trade (including ornamental purpose), local consumption, and traditional medicine (Tab. 2). In marine environments, commercially valuable species include the "camurin" *Centropomus undecimalis*, the "pescada" *Cynoscion acoupa*, the "vermelhos" *Lutjanus* spp., the "serras" *Scomberomorus cavalla* and *S. brasiliensis*, and the "dourado" *Coryphaena hippurus*. Some elasmobranch species are also caught and consumed locally, such as "cação rabo seco" *Rhizoprionodon porosus* and other species of "cação" (*e.g.*, *Carcharhinus* spp.). Among the species captured, some are classified as threatened, including *Lutjanus cyanopterus* and *L. campechanus*, as well as some shark and ray species such as *Carcharhinus porosus* and *Urotrygon microphthalmum*, which are incidentally captured and consumed by local communities. In freshwater environments, around 14 species are used by local communities, including the native "curimatã" *Prochilodus brevis* and the "piau" *Leporinus piau*, which are important food and income sources (Tab. 2). Additionally, several exotic cichlid species, such as "tilápia do Nilo" *Oreochromis niloticus*, "tucunaré" *Cichla monoculus* and *C. ocellaris* are also relevant food sources.

DISCUSSION

Multiple anthropogenic pressures threaten tropical fish biodiversity, ecosystem resilience, and the sustainability of resource use (Floeter *et al*., 2006; Costa, Barletta, 2016; Torremorell *et al*., 2021). Despite significant progress in studying Paraíba's ichthyofauna, research efforts remain spatially biased, thematically concentrated, and insufficient to face conservation and management demands. Addressing these gaps is crucial for protecting fish diversity and supporting food security and local economies (Floeter *et al*., 2006; Ribeiro *et al*., 2009, 2015; Leão *et al*., 2016; Dala-Corte *et al*., 2020; Pelicice *et al*., 2021).

Although research on Paraíba's fish dates back to the 17th century, contemporary efforts have notably expanded since the 1990s, reflecting broader national trends in ichthyology (*e.g*., Ramos *et al*., 2019; Vendel *et al*., 2022; Villarins *et al*., 2022; Marceniuk *et al*., 2023) including reef fishes in the Southwestern Atlantic (Rocha, Sampaio, 2022), stream-dwelling fishes (Lima *et al*., 2021) and elasmobranchs (Coelho *et al*., 2021; Viana *et al*., 2024). This growth results from the expansion of graduate programs, the consolidation of research groups, and the establishment of biological collections such as CIUFPB, now the largest ichthyological collection in Brazil's Northeast (Azevedo *et al*., 2010; Viana *et al*., 2019; Rosa *et al*., 2023; Márquez Velásquez *et al*., 2025). However, institutional consolidation contrasts with knowledge asymmetries, such as certain basins and taxonomic groups that remain poorly studied due to inconsistent funding and the lack of a long-term research policy (Crouzeilles *et al*., 2017; Oliveira *et al*., 2020).

The increasing number of publications has not led to proportional advances in understanding the life histories and ecological roles of the studied species, some of which are commercially exploited. Although the application of molecular tools and integrative taxonomy (*e.g*., Berbel-Filho *et al*., 2016, 2018; Lustosa-Costa *et al*., 2024) is starting to uncover cryptic diversity and enhancing taxonomical work (*e.g*., Medeiros, Maltchik, 2001); and comparative anatomical studies have recently begun to be applied to phylogenetic analyses (Medeiros *et al*., 2025), such studies are still emerging and

should be stimulated by funding agencies. Ethnobiological studies increasingly focus on the importance of traditional ecological knowledge in understanding fish ecology (*e.g*., Rosa *et al*., 2005; Mourão, Nordi, 2006; Almeida *et al*., 2014) and supporting participatory governance and management practices at the local level (Müller, Guimbo, 2011; Brasil, 2025). In the future, collaborative governance models that integrate academic, governmental, and community actors will be essential. Long-term funding for underrepresented regions and species groups, and integrating local knowledge into research agendas can help align biodiversity science with conservation and social equity.

Geographical distribution of research

Continental environments. Ichthyological surveys in Paraíba over recent decades produced valuable data for major basins, including the Paraíba (*e.g*., Rosa, Groth, 2004; Ramos *et al*., 2018a,b), Piranhas-Açu (Silva *et al*., 2014), Mamanguape (*e.g*., Rosa, Groth, 2004; Xavier *et al*., 2012, Oliveira-Silva *et al*., 2018), Gramame (Gomes-Filho, Rosa, 2001; Suruagy, Crispim, 2023), Curimataú rivers (Ramos *et al*., 2005) and smaller coastal basins, such as Jaguaribe river (Ramos *et al*., 2017). The small coastal rivers within the Tambaba Environmentally Protected Area, including Graú, Mucatú, Bucatú, and Gurugi rivers (Ramos *et al*., 2019), have also been well sampled. However, research efforts are spatially biased, with more than half of all studies focused on the Paraíba and Mamanguape River basins.

This asymmetry results from biogeographical, logistical, and institutional factors. The Borborema Plateau shapes Paraíba's hydrography, which encompasses both the Caatinga (northwest-flowing) and Atlantic Forest (eastward-draining) domains (Rosa *et al*., 2003b). However, the proximity of the Paraíba and Mamanguape River basins to the capital João Pessoa, where research infrastructure, graduate programs, and funding are concentrated, has led to their overrepresentation in the literature. Furthermore, the Mamanguape River flows through the municipality of Rio Tinto, where one of the campuses of the Universidade Federal da Paraíba (UFPB) is located, and its estuary lies within the federal Environmental Protected Area Barra de Mamanguape, thereby enhancing the visibility and research appeal in the river basin (CERHPB, 2004; Azevedo *et al*., 2010; Junqueira *et al*., 2020). Systematic inventories covering all of the state's eleven drainage systems are still lacking.

Smaller basins, such as Gramame and Abiaí Rivers, are relatively well-represented in collections and publications, while others remain poorly known. The Curimataú basin, covering 5% of the state's area, and the Miriri basin, both under strong degradation pressure, received insufficient attention (CERHPB, 2004; AESA, 2022). Similarly, the interstate river basins of Jacu, Guaju, and Trairi, despite covering only small portions of Paraíba, face intense anthropogenic pressures, including sugarcane expansion, sewage input, and overgrazing (Hunka *et al*., 2007; Araújo *et al*., 2019; Marinho *et al*., 2023). The lack of surveys in these basins, even when they overlap adjacent inventoried areas (*e.g*., Trairi River in RN; Medeiros *et al*., 2019), reveals not only logistical and institutional asymmetries but also a misalignment between conservation priorities and research programs.

In addition, ichthyofaunal surveys within Conservation Units (CUs) in Paraíba State have been published. However, these data remain scattered and often scarce for several CUs, hindering a comprehensive assessment of the species distribution and

management effectiveness. Of the 34 CUs established, 12 classified as strictly protected and 22 as sustainable use, 14 is entirely covered by Atlantic Forest, 12 by Caatinga, and only the Guaribas Biological Reserve encompasses both biomes (da Costa & da Silva, 2025). Five UCs included terrestrial and coastal marine environments. The freshwater ichthyofaunal data are restricted to some units, including the Environmental Protected Area (APA) of Tambaba (Ramos *et al*., 2019); the Biological Reserves (REBIO) Guaribas in Camaratuba River (Gouveia *et al*., 2017); the Private Natural Heritage Reserve (RPPN) Fazenda Pacatuba (Furtado *et al*., 2018); the State Park Mata do Xem-Xém (Ramos *et al*., 2018a,b), both in Paraíba River; and the Mata do Buraquinho Wildlife Refuge, crossed by the smaller coastal basin of the Jaguaribe River (Ramos *et al*., 2017). Overall, these fragmented records highlight the need for broader and more systematic surveys within these units to better inform management and conservation planning.

Marine environments. Marine ichthyological research in Paraíba State has predominantly centered on shallow coastal zones, particularly natural reefs (*e.g*., Souza *et al*., 2007; Honório *et al*., 2010) and artificial structures, such as shipwrecks (*e.g*., Cardoso *et al*., 2020; Medeiros *et al*., 2022), largely due to the logistical ease of sampling nearshore habitats. Initial efforts began in the 1970s with estuarine surveys (Oliveira, 1972), followed by studies on shark fisheries (Lima, Ferreira, 1975) and broader inventories in the 1980s (Rosa 1980a, b). From the late 1990s, taxonomic efforts (*e.g*., Rosa *et al*., 1997; Rocha *et al*., 1998, 2000) expanded knowledge of the coastal ichthyofauna and compilations validated new records of species (Marceniuk *et al*., 2023; Silva Nascimento, Ramos, 2024).

Despite their ecological and socioeconomic significance, providing food, income, and tourism services (Costa *et al*., 2007; Ilarri *et al*., 2008), coastal reef systems are increasingly threatened by pollution, mass tourism, and unregulated coastal development (Ilarri *et al*., 2008; Queiroz Pereira, 2020). In contrast, deeper marine zones remain markedly understudied as a consequence of cost and access constraints. Once considered buffered from anthropogenic impacts (Pulido Mantas *et al*., 2024), these environments are subject to overfishing, sedimentation, debris, and invasive species (Rocha *et al*., 2018; Soares *et al*., 2019). Existing data for deeper areas result from oceanographic surveys (Ramos, 1994; Rincon *et al*., 2017; Mincarone *et al*., 2022; Villarins *et al*., 2022) and technical SCUBA dives (Rocha *et al*., 2000; Feitoza *et al*., 2005). Only recently, advanced methods, such as trimix diving, remotely operated vehicles (ROVs), baited remote underwater video systems (BRUVS), and sidescan sonar, begun to reveal mesophotic reef biodiversity (*e.g*., Medeiros *et al*., 2021; Silva *et al*., 2021). Scaling up the use of these tools is essential to minimize depth-related sampling gaps and inform conservation strategies across the full marine gradient.

Some of these marine environments in Paraíba State are currently under the protection of CUs, and some ichthyofaunal surveys have been carried out within and around these protected areas. Most of the five federal protected areas designated for sustainable use have ichthyofaunal studies documented in the literature: the Restinga de Cabedelo National Forest (FLONA), the only federally protected area in the Paraíba River estuary (*e.g*., Vendel *et al*., 2022); the Acaú-Goiana Extractive Reserve (RESEX), located along the coastal boundary between Paraíba and Pernambuco States (*e.g*., Barleta, Costa 2009); the Area of Relevant Ecological Interest (AREI) of the Mamanguape River Mangroves, the Environmental Protection Area (APA) of the Mamanguape River (*e.g*., Xavier *et al*.,

2012; Oliveira-Silva *et al.*, 2018), and the most recently established Queimado Shipwreck Marine Protected Area (Medeiros *et al.*, 2022). Additionally, the state hosts the strictly protected Areia Vermelha Marine State Park, a CU for which an ichthyofaunal survey exists but remains unpublished (Querino, 2011). Given that these CUs play a key role in conserving marine biodiversity and mitigating anthropogenic pressures, systematic surveys are crucial to support effective monitoring and adaptive management.

Species richness and taxonomy trends

Freshwater ecosystems. Paraíba's freshwater fish fauna comprises about 8% of the species recorded in Northeastern Brazil, 52% of which occur in the Northeastern Caatinga and Coastal Drainages ecoregion (Carvalho-Rocha 2023), 73% in the Mid-Northeastern Caatinga Ecoregion (MNCE) (Lima *et al.*, 2017; Silva *et al.*, 2020), and only 5% of species endemic to the Pernambuco Endemism Centre in the Northern Atlantic Forest, which hosts approximately 58 species (Marinho *et al.*, 2023). These patterns suggest that Paraíba's ichthyofauna has a strong biogeographic alignment with the Caatinga, despite comprising only a small portion of the MNCE (56,467.24 km²; IBGE, 2022). The MNCE remains one of Brazil's least studied regions for freshwater fishes, primarily due to its intermittent flows (Lévêque *et al.*, 2008; Lima *et al.*, 2017; Berbel-Filho *et al.*, 2018), and Northeast Brazil remains underrepresented in global ichthyofaunal databases (Tedesco *et al.*, 2017).

Fish diversity in Paraíba is influenced by historical marine transgressions, aridification, and drainage reorganization (Ab'Sáber, 1957; Lundberg *et al.*, 1998), as well as by human-induced introductions and extinctions (Rosa *et al.*, 2003b; Ribeiro 2006). As is typical in most Neotropical basins (Buckup *et al.*, 2007; Lima *et al.*, 2017; Menezes *et al.*, 2007), Paraíba's fish fauna is dominated by Characiformes and Siluriformes with Acestrorhamphidae, Cichlidae, and Loricariidae being the most speciose families. Among the 62 recorded species, 13 are non-native (21%), mostly cichlids. Such cichlid dominance represents 73% of all exotic species reported for the Caatinga (Lima *et al.*, 2017), raising concerns about biotic homogenization, competitive displacement, and long-term impacts on the structure of ecological communities.

The absence of Rivulidae records in Paraíba State is notable, given their endemism in the MNCE and commonness in Caatinga habitats (Myers, 1952; Lima *et al.*, 2017; Berbel-Filho *et al.*, 2018; Abrantes *et al.*, 2020). As annual fish species adapted to ephemeral ponds, rivulids survive through diapause and are typically active only during the rainy season (Berois *et al.*, 2016). Their detectability is sensitive to sampling season, a factor that likely explains their omission from most dry-season surveys (Rosa *et al.*, 2023). More than 50 annual fish species have been described from the Caatinga (Lima *et al.*, 2017), but Paraíba has only one known record of a Rivulid (TPAR, 2025, pers. obs.). This points to the importance of seasonal sampling in temporary aquatic habitats, which may contain endemic lineages relevant for systematics, biogeography, and conservation planning. Eight of the 49 Caatinga endemics occur in Paraíba, including the "cascudinho" *Parotocinclus jacksoni*, whose distribution is restricted to the Caatinga (upper) section of the Mamanguape River basin (Oliveira-Silva *et al.*, 2018; Ramos *et al.*, 2021a). Another "cascudinho", *Parotocinclus spilosoma,* is endemic to the Paraíba River basin. These narrow-range endemics contribute to the state's ecological and evolutionary distinctiveness in freshwater fish assemblages and suggest the presence of microendemism shaped by isolation.

The full extent of freshwater fish diversity in Paraíba State remains unknown. Underestimation of species richness is the most likely scenario for most taxonomic groups, as supported by: (i) undescribed species in collections (*e.g.*, *Hypsolebias* sp.; (ii) unresolved taxonomy of widespread complexes (*e.g.*, *Astyanax bimaculatus*, *Hoplias malabaricus, Synbranchus marmoratus*); iii) limited digitization and few recent revisions (Lima *et al.*, 2017; Marinho *et al.*, 2023), and iv) under-sampled sub-basins.

Marine ecosystems. Despite its relative small coastline (138 km, Ab'Saber, 2001), Paraíba's fish diversity comprises ~83% of species known from tropical northeastern Brazil (Rosa *et al.*, 2023), and 14% of South American marine fishes (Reis *et al.*, 2016). Forty of them are Brazilian endemics and three are restricted to the northeastern coast. Recent estimates suggest the existence of 418–427 coastal teleost species (Marceniuk *et al.*, 2023; Rosa *et al.*, 2023), and surveys in mesophotic zones and other under-sampled habitats continue to reveal additional diversity (*e.g.*, Silva *et al.*, 2021).

Elasmobranch fishes recorded in Paraíba account for about 19% of Brazil's elasmobranch diversity (Kotas *et al.*, 2023) with the stingray *Hypanus marianae* representing a coastal Tropical Southwestern Atlantic endemic. In Paraíba, sharks are the most common group in elasmobranch records, particularly Carcharhiniformes, as in other Brazilian regions (*e.g.*, Rosa, Gadig, 2014; Bezerra *et al.*, 2021) and worldwide (Compagno, 2003; Ebert *et al.*, 2021). Myliobatiformes is the most species-rich order among batoids (Fricke *et al.*, 2025). Within Myliobatiformes, records of Mobula birostris reported in the literature for Paraíba likely refer to Mobula yarae Bucair & Marshall, 2025. The regional pattern of more shark than ray species, which diverges from global patterns (Fricke *et al.*, 2025), may result from research focus, greater catchability, and higher intrinsic diversity of sharks within Brazil's elasmobranch fauna (*e.g.*, Meneses *et al.*, 2005; Rosa, Gadig, 2014; Bezerra *et al.*, 2021). It may also be partly explained by the exclusion of grey literature in this study, which includes theses and undergraduate monographs that hold unpublished information on the elasmobranch fish fauna of Paraíba and the Brazilian Northeast.

Paraíba's marine fish assemblages reflect a complex interplay of biogeographic processes that shape patterns of endemism and species turnover. Situated within the north-northeastern subprovince of the Brazilian Province (Briggs, 1974; Pinheiro *et al.*, 2018), the state lies at a transitional biogeographic zone. The intersection of ecological processes and historical events that have shaped Paraíba's marine biota includes dispersal capacity (Floeter *et al.*, 2008; Cowman, Bellwood, 2013), environmental conditions and local adaptation (Robertson and Cramer 2014), oceanographic currents (Spalding *et al.*, 2007), habitat discontinuities (Riginos, Nachman, 2001), isolation-by-distance and gene flow (Rocha *et al.*, 2008), and vicariance events (Joyeux *et al.*, 2001).

Conservation concerns

Aquatic ecosystems in Paraíba State hold numerous endangered species whose ecological functions are tightly linked with ecosystem resilience. In marine habitats, threatened taxa include teleosts of the families Epinephelidae, Labridae, Lutjanidae, Carangidae, and Ariidae, and elasmobranchs of the families Sphyrnidae, Carcharhinidae, and Rhinobatidae. These species play diverse ecological roles. For example, parrotfishes (Labridae) promote reef diversity through grazing and bioerosion (Bonaldo *et al.*, 2014) and sharks control prey dynamics (Heithaus *et al.*, 2008). The critically endangered

endemic parrotfish *Scarus trispinosus* (ICMBio, 2026) experienced population declines over the past three decades due to overexploitation by small-scale fisheries (Roos *et al.*, 2016). Additionally, the demographic decline of the critically threatened mesopredator *Epinephelus itajara* (Epinephelidae) affects epibenthic and demersal food webs of marine rocky shores (Artero *et al.*, 2015; Freitas *et al.*, 2015). This is a widespread effect as the species ranks among the most endangered taxa in the whole Atlantic Ocean (IUCN, 2025).

Chondrichthyans, which play key ecological roles (Heithaus *et al.*, 2012; Dedman *et al.*, 2024), rank among the most threatened vertebrate groups worldwide (Dulvy *et al.*, 2021; Pacoureau *et al.*, 2021). Paraíba State is no exception, as more than 40% of local chondrichthyan species face severe extinction risks (ICMBio, 2026). Widespread ecological impact derived from disruption of size-structured predation and nutrient flow chains arise from population declines of top predators, such as the great hammerhead shark *Sphyrna mokarran*, the smalltail shark *Carcharhinus porosus* and the Brazilian guitarfish *Pseudobatos horkelii*.

Major anthropogenic processes that may be driving marine population declines in Paraíba include habitat degradation, pollution, coastal development, climate change (Hillebrand *et al.*, 2018; Prates *et al.*, 2010), overfishing (Pinheiro *et al.*, 2010; Bender *et al.*, 2014), and biological invasions, particularly by the lionfish *Pterois volitans* (Luiz *et al.*, 2021; Soares *et al.*, 2022, Maggioni *et al.*, 2023). The spread of lionfish in a variety of habitats, from mangroves to deep reefs and in marine protected areas, raises concerns as this invasive species imposes strong predation on juvenile reef fishes, which is likely to erode the biotic architecture of local food webs (Albins, Hixon, 2008; Soares *et al.*, 2022, 2023). It is important to note that many of the introduced species documented in the Southwestern Atlantic and along the Brazilian coast since the mid-2000s (Schwindt *et al.*, 2020) exhibit cryptobenthic behavior (Ferreira *et al.*, 2009), which may hinder earlier detection and facilitate unnoticed establishment, highlighting the potential occurrence of cryptic invasive species in Paraíba State.

Despite their ecological and economic importance, estuaries are among the most threatened ecosystems (Whitfield *et al.*, 2022). Estuaries are critical habitats for many fish species, playing a key role as nurseries by providing juveniles with favorable conditions, such as high temperatures, prey availability, and refuge from predators, enhancing growth and survival (Potter *et al.*, 2015; Xavier *et al.*, 2022). Anthropogenic pressures, including human occupation and economic activities, resulting in sewage discharges (Cortez *et al.*, 2023), sugarcane plantations, and intensive shrimp aquaculture in the surrounding area (Marcelino *et al.*, 2005; Barletta *et al.*, 2010) are among the main threats, further compounded by impacts related to climate change. More than 160 species have been recorded in the estuaries of Paraíba State (mainly in Mamanguape and Paraiba Rivers) including threatened species such as *Lutjanus cyanopterus* and the Atlantic tarpon *Megalops atlanticus* Valenciennes, 1847, which occurs in both estuarine and reef areas (Xavier *et al.*, 2012; Vendel *et al.*, 2022), highlighting ecosystem connectivity. The Critically Endangered *Carcharhinus porosus* was reported in the Paraiba estuary and at Tambaú and Bessa beaches, but it has not been captured there or elsewhere in Paraíba State since the 1980s, emphasizing the need for continuous monitoring of fish populations. The diversity and structural complexity of these habitats highlight the importance of the Mangrove-Reef System as a priority area for conservation and research.

Regarding freshwater environments, the conservation status of many species remains unclear as substantial knowledge gaps persist. To date, only two species, the loricariids *Parotocinclus seridoensis* and *P. spilosoma*, are listed as endangered, with population declines linked to habitat loss and fragmentation (ICMBio, 2026). Three native species have not been evaluated, including *Hemigrammus rodwayi*, *Pseudancistrus papariae* and the endemic *Parotocinclus jacksoni* (Ramos *et al*., 2021a). Missing data constraints extinction risk assessments and conservation planning, reinforcing the need for substantial investments supporting systematic surveys in freshwater systems.

Freshwater ecosystems and their fishes are also among the most threatened habitats and species worldwide (Dudgeon *et al*., 2006; Sayer *et al*., 2025). Paraíba mirrors these global trends, which are driven by the interplay of diverse regional processes, such as: i) hydrologic changes caused by dams, weirs and channels (Brito *et al*., 2020; Carvalho *et al*., 2023); ii) habitat destruction from intensive agriculture, especially sugarcane plantations, along with removal of riparian vegetation, livestock and shrimp farming (Sousa *et al*., 2020; Marinho *et al*., 2023); iii) pollution and eutrophication of water bodies (Correia *et al*., 2015); and iv) introductions of invasive species (Leão *et al*., 2011).

To date, 13 non-native freshwater fish species have been reported in Paraíba (21%) (Latini *et al*., 2016), indicating a strong trend of biotic homogenization. This results from accidental or deliberate introductions via aquaculture, aquarium trade (Leão *et al*., 2011), biological control (Leão *et al*., 2011; Latini *et al*., 2016), and interbasin water transfer (Ramos *et al*., 2021b). The "tucunaré" (*Cichla ocellaris*) and tilapias (*Oreochromis niloticus* and *Coptodon rendalli*) were introduced for food safety by government programs or for sport fishing (Rosa, Groth, 2004; Leão *et al*., 2011). Aquarium species were accidentally released in the wild, such as *Xiphophorus maculatus*, *Astronotus ocellatus*, and *Parachromis managuensis* (Ramos *et al*., 2020; Marinho *et al*., 2023). Species used for mosquito control, such as the "barrigudinho" *Poecilia reticulata*, used against the dengue vector, *Aedes aegypti* (Levis *et al*., 2013; Azevedo-Santos *et al*., 2016). Biotic homogenization is expected to increase due to large-scale interbasin water transfer, such as illustrated by "tetra-fortuna" *Moenkhausia costae*, the first record of an allochthonous species in the Paraíba river arising from its novel connections with the São Francisco River since 2018 (Ramos *et al*., 2021b).

Introductions correlate with habitat degradation, which amplifies the impacts of invasive species (Poff *et al*., 2007), leading to the regional extinction of native species (Rosa, Groth, 2004; Charvet *et al*., 2021); biotic homogenization (Latini, Petrere, 2004; Rosa, Groth, 2004; Orlandi Neto *et al*., 2024); food web changes arising from novel predation and competition pressures (Zaret, Paine, 1973; Pyke, 2008); hybridization (Oliveira *et al*., 2006), and the spillover of parasites and diseases (Dobson, May, 1987; Williams *et al*., 2013). Emerging host-parasite dynamics under strong anthropogenic changes deserve particular attention (Chalkowski *et al.,* 2018; De Lima *et al*., 2025; Moraes *et al*., 2025). For example, it is still unclear whether nematodes parasitizing *M. costae* in the Paraíba river are also exotic species (Sousa *et al*., 2025), with potential to reaching the native fauna and leading to community changes (Lacerda *et al*., 2013).

Despite the importance of protected areas for biodiversity conservation, they also face threats and challenges. Exotic species have already been recorded within their area. For example, in APAs of Tambaba (Ramos *et al*., 2019) the "tucunaré *C. monoculus* and the "barrigudinho" *P. reticulata* were recorded, the latter also documented in REBIO

Guaribas (Gouveia *et al*., 2017); the RPPN Fazenda Pacatuba (Furtado *et al*., 2018) and State Park Mata do Xem-Xém (Ramos *et al*., 2018a,b). Additionally, the "tilápia do Nilo" *O. niloticus* has been recorded in the REBIO Guaribas and the State Park Mata do Xem-Xém, within the Paraíba River basin (Gouveia *et al*., 2017; Ramos *et al*., 2018a). As previously mentioned, these species pose a threat to the native ichthyofauna, and their populations should be monitored. On the other hand, the need to effectively implement management plans persists. These plans have been established in only eight of the 34 protected areas in the state, although in some cases their preparation is underway, including the holding of public hearings (da Costa, da Silva, 2025). This panorama is consistent with that observed in other regions of Brazil, where the implementation of management plans remains limited: 84% of protected areas established more than five years ago still lack this critical management tool (Riva *et al*., 2014). Moreover, the establishment of management councils, currently present in 14 of these areas, is critical to ensure effective governance and promote participatory decision-making. Therefore, ichthyological surveys, proper design and management plans, and the establishment of management councils in UCs in Paraiba State are essential to guide the biodiversity conservation actions and an effective management.

Economic perspectives. The freshwater and marine ichthyofauna of Paraíba support local communities through commercial and sport fishing (*e.g*., Nascimento *et al*., 2016; Santos *et al*., 2023) and ecotourism (Costa *et al*., 2007; Souza, 2007). Particularly, small-scale fisheries and aquaculture are vital for local economies in terms of livelihoods and food security (Paulo Júnior *et al*., 2012). Key resources include "tilapia", "traíra", "tucunaré", "curimatã", and "pescada do Piauí" (IBAMA, 2008). Artisanal marine fishing targets mostly Scombridae (*e.g*., *Euthynnus alletteratus*, *Scomberomorus brasiliensis*, *S. cavalla*) and Carangidae (*e.g*., *Caranx bartholomaei*), Lutjanidade and Centropomidae (*Centropomus undecimalis*) (IBAMA, 2008), with eventual captures of elasmobranchs in the family Carcharhinidae (*Rhizoprionodon porosus*, *Carcharhinus* spp.), Sphyrnidae (*Sphyrna* spp.) (Mariano, Rosa, 2010; Morais, 2016), and rays, including *Urotrygon microphthalmum*, *Rhinoptera bonasus*, *Aetobatus narinari* and *Hypanus guttatus* (RSR, 2025, pers. comm.; JPCB, 2023, pers. comm.). In general, these elasmobranchs are caught incidentally in artisanal beach seines and gillnets. Catches have strongly declined, for example, with artisanal fishing dropping to half between 2002–2004 (IBAMA, 2007). As a consequence, regulation is urgently needed for both marine and freshwater environments as fish stocks approach collapse (MPA, 2013).

Other income-generating activities involve ornamental species, such as seahorses (*Hippocampus* spp.), a rare fish species threatened in Brazil, not only by the trade and habitat degradation (Borges *et al*., 2025a) but also by its biological characteristics as high site fidelity and low reproduction rate (Foster, Vincent, 2004). In this context, over the past decades, researchers at UFPB developed conservation projects investigating biological, ecological, and bioeconomic aspects of the seahorse *Hippocampus reidi* (*e.g*., Rosa *et al*., 2005). Currently, researchers at the Universidade Estadual da Paraíba (UEPB) are conducting studies to fill knowledge gaps regarding seahorse species and determine their conservation priorities in Brazil, using a multidisciplinary approach that integrates biogeographical, ecological, and ethnobiological knowledge (Borges *et al*., 2025b).

The conservation and management of species and fishery resources are essential not only to preserve biodiversity but also to ensure the continuity of economic activities, social well-being and food security (Tickner *et al*., 2020; Oguh *et al*., 2021).

Multidisciplinary efforts and participatory management, to improve decision-making and socio-ecological management (Pomeroy, Rivera-Guieb, 2006), as well as in the identification of potential resources. Additionally, empowering local communities through human resource development can support management and productive activities by strengthening local capacities in fisheries management, monitoring and enforcement, civic education, and communication. Such initiatives, typically implemented through training courses or workshops, also contribute to the development of sustainable economic alternatives, such as ecotourism, as observed in other regions of Brazil (WCS-Brasil, https://amazoniacienciaciudadana.org/) and other South American countries (https://www.wwf.org.co).

Some examples that advance in this direction may involve training fishermen in the cultivation and processing techniques of native freshwater fish species, as a means to diversify local livelihoods, reduce pressure on wild stocks, and offer products with greater added value and acceptance in different markets, for example, boneless fillets (Kubitza *et al*., 2007). Additionally, strengthening the fisheries value chain via training in fish processing and marketing are complementary strategies. Encouraging responsible fish consumption can improve food security while increasing community income. Finally, transforming discarded fishing nets into handcrafted products can also contribute to the mitigation of marine pollution.

Finally, it is relevant to discuss with local communities how the sustainable management of fish populations contributes to biodiversity conservation and long-term profitability for the fishing and tourism activities. This could include practices such as: i) the identification, establishment and control of key areas for reproduction of freshwater species and of marine protected areas, ii) catch limits, iii) the promotion of conservation of native species, and iii) the control of invasive species. Thus, it is essential to utilize traditional knowledge and empower local people through the development of human capital, science, and technological innovation to create sustainable solutions that meet the needs of communities (Alcalá Moya, 2011; Nishi, Subramanian, 2023).

Integrative overview and perspective. This study presents significant advances in the research on the ichthyofauna of freshwater, estuarine and marine environments in Paraíba State; however, there is still much to be done. Our review found biases related to research topics and the spatial distribution of studies and species. Although much of the river basins have already been inventoried, some areas are under-sampled, such as the small coastal rivers. Thus, future sampling efforts should be directed to these under-sampled localities to address these gaps, in addition to the inventories performed at the regional scale to support public conservation policies (Rosa *et al*., 2003a; Tedesco *et al*., 2017). Reducing these gaps will require an intensive and joint effort of a diverse team of professionals and institutions. Interdisciplinary and inter-institutional efforts are also applied to biodiversity research and social development. Additionally, infrastructure, equipment, new technologies, and investments in human resources are essential to optimize research and promote projects and initiatives that involve local communities, biodiversity conservation, and social welfare.

To address most of the knowledge gaps of the fish fauna of Paraíba State, and promoting its conservation and sustainable use, we recommend the following actions: i) fish surveys to fill local gaps, mainly in: under-sampled drainages such as Miriri, Curimatau and Camaratuba Rivers as well as the small coastal and interstate basins; headwater areas of drainage, which are more difficult to access; deep reefs, estuaries and

in the UCs; ii) to prioritize the monitoring of basins and their estuaries, mainly those harboring the highest number of endemic and threatened species, such as the Paraíba and Mamanguape River basins; iii) to strengthen the control mechanisms of conservation units (CUs); to implement and update management plans in order to improve oversight and enforcement; and to expand existing conservation units to encompass potential key areas for species conservation; iv) to develop projects to recover degraded aquatic habitats, through restoration of riparian forests programs, particularly in estuarine areas such as the Mamanguape and Paraíba River estuaries, as well as the protection and recovery of river headwaters; and coastal reef restoration programs; v) promotion of environmental education projects for the conservation of freshwater and marine ecosystems and their species in schools and communities; vi) restriction and control of introduction of exotic species in natural aquatic environments; and vii) digitalization, curation and availability of biological collection data. It is essential to acknowledge that a substantial amount of unpublished research, stemming from undergraduate and graduate theses from universities in the Northeast, remains unexplored and has yet to be published. This represents valuable sources for research on the ichthyofauna of Paraíba State. The following table (Tab. 3) presents topics and questions that we consider relevant to future research. Advancing these actions will be crucial for strengthening research and conservation of the fish fauna of Paraíba State.

TABLE 3 | Future research on the fish fauna of Paraíba State.

Research area	Future perspectives
Biology and Population Ecology	Studies on the biological aspects and population status of data-deficient and near-threatened species.
	Explore the age and growth, as well as the life history parameters, of fisheries resources, which are key to effective fisheries management.
Ecology	Effects of climate change on demography, physiology, and biological processes, as well as on the distribution patterns of species.
Ecotoxicology	Assessing the effects of pollution in fish populations and the effect of human consumption of the polluted species; screening of contaminants in tissues.
Biogeography-Phylogeography	How species responded to past changes may help to predict how they might cope with the ongoing climatic changes. Evaluation of processes that generated and maintained the diversity of fish fauna of the Caatinga and the Atlantic Forest.
Biological invasions	To assess the degree of invasibility of this species in the basin, the ecological impacts (on the ecosystems and on the native species) are considered. For marine species, to assess the distribution, biology, reproduction, and trophic ecology aspects, and to propose control and management measures.
Genetic-eDNA	DNA collected from environmental samples, such as water, can be used to analyse genetic data and detect the presence of species in the area.
Parasitology	Parasite diversity, parasite-host relationships, effects of parasitism on the host`s condition and how environmental changes and biological invasions may affect these associations.
Fisheries	Monitoring of landing data, description of catches and fishing effort.
Conservation	Delineation of habitat use and critical areas for endangered, endemic species; evaluation of the effectiveness of existing MPAs for the species.
Bioeconomy	Explore ways to sustainably use and manage fish, in a manner that ensures the long-term health of aquatic ecosystems and maximises the benefits for local communities.
Taxonomy and Systematics	Ichthyofaunal surveys at poorly sampled areas; use of integrative taxonomy to better understand widespread species complexes; digitise scientific data from collections and make them available; improve data quality of scientific collections by providing reliable species identification.

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Not applicable.

DATA AVAILABILITY STATEMENT

The data supporting the findings of this study are included in the supplementary material of this article. The datasets generated during the current study are also available in the DATAPB repository (DOI: https://doi.org/10.48472/DATAPB/QL6VGJ) upon request.

AI STATEMENT

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The authors declare no competing interests.

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PEER REVIEW

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