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An annotated checklist on marine bony fishes of the Pulicat Lake, India

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Original Article

Abstract

The Pulicat Lake is the second largest brackish water lagoon on India's southeast coast. It has rich biodiversity and supports local economies through fisheries. Sampling was conducted weekly at the Pulicat fish landing centre from January 2023 to April 2024. The study provides an updated checklist of fish species recorded from Pulicat Lake, comprising 202 species categorised under 23 orders, 65 families, and 136 genera, along with information on their abundance and conservation status. Among the recorded bony fish species, 177 were commercial fishes and 25 were classified as non-targeted species. This updated checklist supports the fish diversity database, also the data contributes to promoting the scientific research, conservation, and management efforts and the sustainable utilisation of fishery resources in Pulicat Lake.

Keywords: *Fish diversity, checklist, Pulicat Lake, commercial fish, non-targeted fish*

Introduction

Fish play an important role in the marine ecosystem and human health; however, in recent years, threats from anthropogenic factors, including overfishing, habitat destruction, pollution and climate change, have led to the decline of specific fish communities or migration as invasive species (Singh *et al.,* 2024). Alteration of environmental parameters in the aquatic ecosystems will directly reflect on the variations in the fish abundance and species diversity (Huang *et al.,* 2021) therefore studying the fish species diversity in specific areas helps to assess the ecosystem health. India's rich biodiversity includes 9.7% of the world's fish species (marine and freshwater) which are recorded in Indian waters (NFDB, 2023). A total of 3523 fish species, comprising 1097 genera, 272 families, and 55 orders, have been documented in India, among which Tamil Nadu recorded 1380 species, whereas Andhra Pradesh 1011 species (Kosygin *et al.,* 2024). Pulicat Lake is the second largest brackish water ecosystem in India and is fragile, it is designated a Ramsar site (an internationally recognised wetland under the Ramsar Convention by the IUCN) (Nagarajan *et al.,* 2022). It straddles the borders of Tamil Nadu and Andhra Pradesh states with its eastern boundary marked by Shriharikota Island, separating it from the Bay of Bengal. The Buckingham Canal, a navigational channel, traverses through the lake. Pulicat Lake covers an area of 481 km^2 and is fed by three major rivers (Arani, Kalangi, Swarnamukhi). The lake is rich in biodiversity and serves as a nursery and breeding ground for numerous aquatic species, it is an important route for migratory birds and supports commercial fishing, which is crucial for the livelihoods of the fishers (Saraswathy and Pandian, 2016; Ramesh *et al.,* 2002). The focus of the present study is on Pulicat Lake, which has 354 species belonging to six phyla, including 65 species of microfauna (phytoplankton and zooplankton) and 289 species of macrofauna (Cnidaria, Arthropoda, Mollusca, Echinodermata, Pisces, and Birds) (Prabakaran *et al.,* 2023). The literature on fishes at Pulicat Lake was documented seven decades ago (Chacko *et al.,* 1953). However, limited literature is available, particularly concerning fish diversity in Pulicat Lake. Therefore, this study aims to compile a list of marine bony fish species and provide updated and revised taxonomic nomenclature.

Material and methods

Study area

The Pulicat Lake is approximately 60 km in length with an average depth of 2.0 m and a width ranging from 0.2 to 17.5 m.

Fig. 1. Pulicat Lake bar mouth

Approximately 3000-3500 motorised boats are engaged in fishing via traditional methods such as the *Padu* system and fishing gear including bag nets, stow nets, surrounding nets, drive-in bag nets, barrier nets, bottom set gill nets, encircling stick nets, crab lift nets, and hook & line which are commonly used in the Pulicat region. In the Tamil Nadu region, there are approximately 35 fishing villages with a total population of 15,000 fishermen who rely on fishing for their livelihood in Pulicat Lake and surrounding coastal areas. Construction is underway at Pulicat Lake bar mouth, with structures measuring 160 and 150 m being built on either side. Additionally, two short groynes, each 50 m long, were constructed on the northern side (Fig. 1).

Data collection

Sampling was conducted weekly at the Pulicat fish landing centre, (Fig. 2) in Tamil Nadu from January 2023 to April 2024. Data were collected from marine fish landed at this centre. Fishing activity was suspended from the 4th week of November 2023 to the 2nd week of January 2024 due to the impacts of monsoons, cyclone Michaung and the closure of the bar mouth. The previously published checklists (Prabakaran *et al.,* 2023; Jesintha *et al.*, 2022; Govindan and Ramanibai, 2016; Sanjeevraj, 2006; Remadevi *et al.*, 2004) were the sources considered for updating the checklist of marine bony fishes. The specimen was collected, photographed, and then identified based on taxonomic descriptions from FAO species identification sheets (Psomadakis *et al.,* 2019) and the FishBase database (www.fishbase.org) Froese and Pauly (2024), as well as the literature of Smith and Heemstra, (2012) and Nelson (2016). The identified fish taxa were confirmed by using published references from online resources, including the Catalogue of Fishes of the California Academy of Sciences (https://goo.gl/S792vp) and the World Register of Marine Species (http://www.marine-species.org).

Results

In the present study, 202 bony fishes, comprising 136 genera and 65 families belonging to 23 orders were recorded from

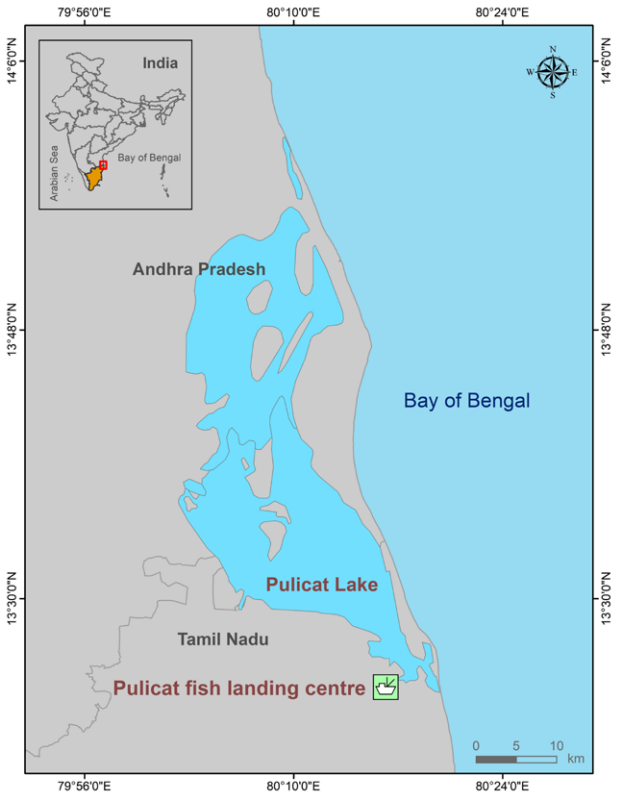

Fig. 2. Map showing the study area

the Pulicat fish landing centre, southeast coast of India. Among these, are 177 commercial fishes, and 25 species were classified as non-targeted. This study reported that 69 species from 55 genera, belonging to 36 families were not previously recorded in the province. A comparison of the number of families, genera and species was reported in previous studies and is shown in Table 1.

Among 23 orders, the order Eupercaria incertae sedis was the most dominant order represented by 34 species, followed by Clupeiformes with 23 species; Carangiformes with 20 species; Perciformes and Acanthuriformes with 18 species each; Tetraodontiformes with 11 species; Beloniformes and Pleuronectiformes with 10 species each; Scombriformes with 9 species; Mugiliformes and Gobiiformes with 7 species each; Siluriformes with 6 species; Mulliformes, Carangaria incertae sedis, and Centrarchiformes with 5 species each; Elopiformes and Aulopiformes with 3 species each; Scorpaeniformes and Ovalentaria incertae sedis with 2 species each; and Gonorynchiformes, Syngnathiformes, Acropomatiformes, and Holocentriformes with 1 species each. Owing to recent taxonomic updates, 33 species reported in the previous checklists were revised to different names in the updated list, as presented in Table 2. The dominant families were Carangidae, Lutjanidae, Engraulidae, Leiognatidae Serranidae, Mugilidae, Scombridae, Gobiidae and Nemipteridae. The remaining families are categorised

Table 1. Species occurrence in the present study compared with earlier reported marine bonyfishes from the Pulicat Lake, Southeast of India

Order	Family	Species	Common names	IUCN status	Abundance classification	Present study	Prabakaran *et al.* (2023)	Jesintha *et al.* (2022)	Govindarajan and Ramanibai (2016)	Sanjeevraj (2006)	Remadevi *et al.* (2004)
Silluriformes	Ariidae	*Netuma thalassina*	Giant sea catfish	NE	Rare	+	-	-	+	-	-
		*Arius subrostratus**	Shovelnose sea catfish	NE	Rare	+	-	-	-	-	-
		Arius jella	Blackfin sea catfish	NE	Common	+	-	+	-	+	-
		Arius arius	Threadfin sea catfish	LC	Common	+	-	-	-	-	+
		Arius maculatus	Spotted catfish	NE	Common	+	-	-	-	-	+
	Plotosidae	*Plotosus canius*	Gray eel-catfish	NE	Common	+	-	+	+	+	+
Mugiliformes	Mugilidae	*Planiliza macrolepis*	Largescale mullet	LC	Dominant	+	-	-	-	+	-
		Planiliza parsia	Goldspot mullet	NE	Occasional	+	-	-	-	-	+
		Planiliza subviridis	Greenback mullet	LC	Dominant	+	-	-	-	+	+
		Ellochelon vaiginensis	Squaretail mullet	LC	Dominant	+	-	-	-	-	+
		Osteomugil cunnesius	Longarm mullet	NE	Common	+	-	+	+	+	+
		Crenimugil seheli	Bluespot mullet	NE	Common	+	-	+	+	-	+
		Mugil cephalus	Flathead mullet	LC	Dominant	+	+	+	+	-	+
Gonorhynchiformes	Chanidae	*Chanos chanos*	Milkfish	LC	Dominant	+	-	+	+	-	-
Acanthuriformes	Leiognathidae	*Karalla dussumieri**	Dussumier's ponyfish	NE	Common	+	-	-	-	-	-
		*Karalla daura**	Goldstripe ponyfish	NE	Occasional	+	-	-	-	-	-
		Deveximentum insidiator	Pugnose ponyfish	NE	Common	+	-	+	+	+	+
		Leiognathus equula	Common ponyfish	LC	Common	+	-	+	-	+	+
		Leiognathus brevirostris	Shortnose pomyfish	NE	Common	+	-		-	-	+
		Leiognathus ruconius	Deep pignose ponyfish	NE	Common	+	-	-	-	-	+
		Gazza minuta	Toothpony	LC	Common	+	-	-	-	-	+
		Auriequula fasciata	Striped ponyfish	LC	Occasional	+	-	+	-	-	-
		Eubleekeria splendens	Splendid ponyfish	LC	Occasional	+	-	+	+	-	+
	Siganidae	*Siganus javus*	Streaked spinefoot	LC	Dominant	+	-	+	+	+	-
		*Siganus lineatus**	Golden-lined spinefoot	LC	Rare	+	-	-	-	-	-
		Siganus vermiculatus	Vermiculated spinefoot	LC	Dominant	+	-	-	+	+	-
		Siganus canaliculatus	White-spotted spinefoot	LC	Common	+	-	+		-	-
	Acanthuridae	*Acanthurus mata*	Elongate surgeonfish	LC	Common	+	-	+	+	+	-
	Drepaneidae	*Drepane punctata*	Spotted sicklefish	NE	Common	+	-	-	-	+	+
	Scatophagidae	*Scatophagus argus*	Spotted scat	LC	Common	+	-	+	+	+	-
	Ephippidae	*Ephippus orbis*	Orbfish	NE	Occasional	+	-	-	+	+	-
	Lobotidae	*Lobotes surinamensis**	Tripletail	LC	Rare	+	-	-	-	-	-
Mulliformes	Mullidae	*Upeneus moluccensis**	Goldband goatfish	LC	Occasional	+	-	-	-	-	-
		Upeneus vittatus	Yellowstriped goatfish	LC	Common	+	-	+	-	-	-
		Upeneus sulphureus	Sulphur goatfish	LC	Common	+	-	-	-	-	+
		*Upeneus japonicus**	Japanese goatfish	NE	Occasional	+	-	-	-	-	-
		Parupeneus indicus	Indian goatfish	LC	Rare	+	-	+	-	+	-
Centrarchiformes	Terapontidae	*Terapon theraps*	Largescaled terapon	LC	Rare	+	-	+	-	-	+
		Terapon jarbua	Jarbua terapon	LC	Dominant	+	+	+	+	+	+
		Terapon puta	Small-scaled terapon	NE	Common	+	-	+	+	+	+
		Pelates quadrilineatus	Fourlined terapon	NE	Dominant	+	-	+	-	+	-
	Kyphosidae	*Kyphosus vaigiensis*	Brassy chub	LC	Occasional	+	-	-	+	-	-

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Beloniformes	Belonidae	*Strongylura leiura*	Banded needlefish	NE	Common	+	-	+	-	-	-
		Strongylura strongylura	Spottail needlefish	NE	Common	+	-	+	-	+	+
		Ablennes hians	Flat needlefish	LC	Occasional	+	-	-	+	-	-
	Hemiramphidae	*Tylosurus crocodilus*	Hound needlefish	LC	Occasional	+	-	+	-	-	-
		*Hemiramphus lutkei**	Lutke's halfbeak	NE	Common	+	-	-	-	-	-
		Hyporhamphus limbatus	Congaturi halfbeak	LC	Occasional	+	-	+	+	-	+
	Exocoetidae	*Hirundichthys coromandelensis**	Coromandel flyingfish	NE	Occasional	+	-	-	-	-	-
		*Exocoetus monocirrhus**	Barbel flyingfish	NE	Common	+	-	-	-	-	-
		Cypselurus poecilopterus	Yellowing flyingfish	NE	Common	+	-	-	+	-	-
		Cheilopogon cyanopterus	Margined flyingfish	LC	Occasional	+	-	-	+	-	-
Carangiformes	Carangidae	*Seriolina nigrofasciata**	Blackbanded trevally	LC	Rare	+	-	-	-	-	-
		Megalaspis cordyla	Torpedo scad	LC	Common	+	-	+	-	-	-
		*Scomberoides tol**	Needle-scaled queenfish	LC	Common	+	-	-	-	-	-
		Scomberides tala	Barred queenfish	LC	Occasional	+	-	-	+	+	-
		*Selar crumenophthalmus**	Bigeye scad	LC	Common	+	-	-	-	-	-
		Parastromateus niger	Black pomfret	LC	Occasional	+	-	-	+	-	-
		Alepes kleinii	Razorbelly scad	LC	Common	+	-	-	+	-	-
		Trachinotus baillonii	Smallspotted dart	LC	Rare	+	-	+	-	-	-
		Decapterus russelli	Indian scad	LC	Common	+	-	-	-	+	-
		Atule mate	Yellowtail scad	LC	Common	+	-	-	-	+	-
		Caranx heberi	Blacktip trevally	LC	Occasional	+	-	-	+	-	-
		Alectis ciliaris	African pompano	LC	Common	+	-	-	+	-	-
		Alectis indica	Indian threadfish	LC	Common	+	-	-	+	+	-
		*Alepes djedaba**	Shrimp scad	LC	Common	+	-	-	-	-	-
		*Atropus atropos**	Cleftbelly trevally	LC	Occasional	+	-	-	-	-	-
		*Selaroides leptolepis**	Yellowstripe scad	LC	Common	+	-	-	-	-	-
		*Gnathanodon speciosus**	Golden trevally	LC	Occasional	+	-	-	-	-	-
		*Elagatis bipinnulata**	Rainbow runner	LC	Occasional	+	-	-	-	-	-
	Coryphaenidae	*Coryphaena hippurus**	Common dolphinfish	LC	Occasional	+	-	-	-	-	-
	Rachycentridae	*Rachycentron canadum*	Cobia	LC	Occasional	+	-	+	+	-	-
Scombriformes	Scombridae	*Rastrelliger kanagurta*	Indian mackerel	LC	Common	+	-	-	-	-	-
		*Rastrelliger faughni**	Island mackeral	VU	Occasional	+	-	-	-	-	-
		*Auxis thazard**	Frigate tuna	LC	Occasional	+	-	-	-	-	-
		*Euthynnus affinis**	Kawakawa	LC	Occasional	+	-	-	+	-	-
		Scomberomorus guttatus	Indo-Pacific king mackerel	DD	Occasional	+	-	-	+	-	-
		*Scomberomorus commerson**	Narrow-barred Spanish mackerel	NT	Occasional	+	-	-	-	-	-
		*Acanthocybium solandri**	Wahoo	LC	Rare	+	-	-	-	-	-
	Trichiuridae	*Lepturacanthus savala*	Savalani hairtail	NE	Occasional	+	-	-	+	-	-
	Stromateidae	*Pampus argenteus**	Silver pomfret	NE	Occasional	+	-	-	-	-	-

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		Stolephorus commersonnii	Commerson's anchovy	LC	Occasional	+	-	+	+	+	-
		Stolephorus indicus	Indian anchovy	LC	Occasional	+	-	+	-	+	-
		*Stolephorus insularis**	Hardenberg's anchovy	DD	Rare	+	-	-	-	-	-
		*Pellona ditchela**	Indian pellona	LC	Common	+	-	-	-	-	-
	Engraulidae	*Thryssa hamiltonii*	Hamilton's thryssa	LC	Common	+	-	-	-	-	+
		Thryssa purava	Oblique-jaw thryssa	DD	Common	+	-	+	-	+	+
		Thryssa malabarica	Malabar thryssa	DD	Common	+	-	-	-	-	+
		Thryssa mystax	Moustached thryssa	LC	Common	+	-	-	-	-	+
		Thryssa dussumieri	Dussumier's thryssa	LC	Common	+	-	+	-	+	-
		Thryssa kammalensis	Kammal thryssa	DD	Common	+	-	-	-	-	+
		*Dussumieria acuta**	Rainbow sardine	LC	Common	+	-	-	-	-	-
Clupeiformes	Clupeidae	*Nematalosa nasus*	Bloch's gizzard shad	LC	Common	+	+	+	+	+	+
		*Amblygaster sirm**	Spotted sardinella	LC	Occasional	+	-	-	-	-	-
		Anodontostoma chacunda	Chacunda gizzard shad	LC	Common	+	-	+	-	+	+
		Hilsa kelee	Kelee shad	LC	Common	+	-	-	-	+	+
	Dorosomatidae	*Herklotsichthys quadrimaculatus*	Bluestripe herring	LC	Occasional	+	-	-	-	-	+
		Sardinella fimbriata	Fringescale sardinella	LC	Occasional	+	-	+	-	+	-
		Sardinella albella	White sardinella	LC	Occasional	+	+	-	-	-	-
		*Ilisha melastoma**	Indian ilisha	LC	Common	+	-	-	-	-	-
	Pristigasteridae	*Ilisha elongata*	Elongate Ilisha	LC	Common	+	-	+		+	-
		Opisthopterus tardoore	Tardoore	LC	Common	+	-	+	-	-	-
	Chirocentridae	*Chirocentrus dorab**	Dorab wolf-herring	LC	Common	+	-	-	-	-	-
		Chirocentrus nudus	Whitefin wolf herring	LC	Common	+	-	-	+	-	-
		Elops machnata	Tenpounder	LC	Occasional	+	-	+	-	-	-
Elopiformes	Elopidae	*Megalops cyprinoides*	Indo-Pacific tarpon	DD	Common	+	-	+	-	+	-
		Elops saurus	Ladyfish	LC	Occasional	+	-	-		+	-
		*Saurida undosquamis**	Brushtooth lizardfish	LC	Common	+	-	-	-	-	-
Aulopiformes	Synodontidae	*Saurida tumbil*	Greater lizardfish	LC	Common	+	-	+	-	+	+
		*Trachinocephalus myops**	Snakefish	LC	Common	+	-	-	-	-	-
		Nemipterus randalli	Randall's threadfin bream	LC	Occasional	+	-	-	+	-	-
		Nemipterus japonicus	Japanese threadfin bream	LC	Common	+	-	+	-	-	-
	Nemipteridae	*Nemipterus bipunctatus*	Delagoa threadfin bream	LC	Occasional	+	-	+	+	-	-
		*Nemipterus mesoprion**	Mauvelip threadfin bream	LC	Occasional	+	-	-	-	-	-
		*Scolopsis vosmeri**	Whitecheck monocle bream	LC	Occasional	+	-	-	-	-	-
		*Parascolopsis akatamae**	Rosy dwarf monocle bream	NE	Rare	+	-	-	-	-	-
		*Epinephelus latifasciatus**	Striped grouper	LC	Occasional	+	-	-	-	-	-
Perciformes		*Epinephelus malabaricus*	Malabar grouper	LC	Common	+	-	-	-	-	+
		*Epinephelus merra**	Honeycomb grouper	LC	Rare	+	-	-	-	-	-
	Serranidae	*Epinephelus chlorostigma**	Brown-spotted grouper	LC	Rare	+	-	-	-	-	-
		*Epinephelus radiatus**	Oblique-banded grouper	LC	Occasional	+	-	-	-	-	-
		Epinephelus morrhua	Comet grouper	LC	Occasional	+	-	-	-	-	+
		Epinephelus sexfasciatus	Sixbar grouper	LC	Occasional	+	-	-	-	+	-
		*Cephalopholis sonnerati**	Tomoto hind	LC	Rare	+	-	-	-	-	-
	Latidae	*Lates calcarifer*	Barramundi/Sea bass	LC	Common	+	-	+	-	+	-

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Eupercaria incertae sedis	Lutjanidae	*Lutjanus argentimaculatus*	Mangrove red snapper	LC	Common	+	-	+	-	+	+
		*Lutjanus fulviflamma**	Dory snapper	LC	Common	+	-	-	-	-	-
		*Lutjanus fulvus**	Blacktail snapper	LC	Common	+	-	-	-	-	-
		Lutjanus johnii	John's snapper	LC	Common	+	-	-	-	+	-
		*Lutjanus lutjanus**	Bigeye snapper	LC	Common	+	-	-	-	-	-
		Lutjanus quinquelineatus	Five-lined snapper	LC	Occasional	+	-	-	-	+	-
		Lutjanus vitta	Brownstripe red snapper	LC	Common	+	-	-	-	+	-
		Lutjanus russellii	Russell's snapper	LC	Common	+	-	+	-	-	-
		Lutjanus ehrenbergii	Blackspot snapper	LC	Occasional	+	-	+	+	-	-
		Aphareus rutilans	Rusty jobfish	LC	Occasional	+	-	-	+	-	-
		Pinjalo pinjalo	Pinjalo	LC	Occasional	+	-	-	+	-	-
	Sciaenidae	*Johnius amblycephalus*	Bearded croaker	LC	Common	+	-	-	-	+	-
		Johnius dussumieri	Sin croaker	LC	Common	+	-	+	-	-	-
		*Otolithes ruber**	Tigertooth croaker	LC	Common	+	-	-	-	-	-
		Nibea maculata	Blotched croaker	LC	Common	+	-	+	+	-	+
		*Dendrophysa russelii**	Goatee croaker	LC	Occasional	+	-	-	-	-	-
	Gerreidae	*Gerres limbatus*	Saddleback silver-biddy	LC	Common	+	-	+	+	-	+
		Gerres filamentosus	Whipfin silver-biddy	LC	Common	+	-	+	-	+	+
		Gerres erythrourus	Deep-bodied mojarra	LC	Common	+	-	+	-	-	-
	Haemulidae	*Plectorhinchus vittatus**	Indian Ocean oriental sweetlips	LC	Occasional	+	-	-	-	-	-
		Diagramma pictum	Painted sweetlips	NE	Occasional	+	-	+	+	-	-
		Pomadasys argenteus	Silver grunt	LC	Occasional	+	-	+	-	-	+
		Pomadasys maculatus	Saddle grunt	LC	Common	+	-	+	+	+	-
		Pomadasys kaakan	Javelin grunter	LC	Rare	+	-	-	-	-	+
	Lethrinidae	*Lethrinus lentjan**	Pinkear emperor	LC	Occasional	+	-	-	-	-	-
		Lethrinus nebulosus	Spangled emperor	LC	Rare	+	-	+	-	+	+
	Scaridae	*Scarus ghobban*	Blue-barred parrotfish	LC	Occasional	+	-	-	-	+	-
	Sparidae	*Rhabdosargus sarba*	Goldlined seabream	LC	Common	+	-	+	-	-	+
	Sillagnidae	*Sillago vincenti*	Vincent's sillago	NE	Occasional	+	-	-	-	-	+
		Sillago sihama	Silver sillago	NE	Common	+	-	+	-	+	+
	Labridae	*Iniistius bimaculatus**	Two-spot razorfish	LC	Common	+	-	-	-	-	-
		*Cymolutes praetextatus**	Knife razorfish	LC	Rare	+	-	-	-	-	-
	Priacanthidae	*Priacanthus hamrur**	Moontail bullseye	LC	Rare	+	-	-	-	-	-
	Cynoglossidae	*Cynoglossus arel**	Largescaled tongusole	DD	Common	+	-	-	-	-	-
		Cynoglossus kopsii	Shortheaded tonguesole	LC	Common	+	-	-	-	+	-
		Cynoglossus puncticeps	Speckled tonguesole	LC	Common	+	-	+	+	+	-
		*Cynoglossus bilineatus**	Fourlined tonguesole	LC	Common	+	-	-	-	-	-
Pleuronectiformes	Paralichthyidae	*Pseudorhombus arsius*	Largetooth flounder	LC	Occasional	+	-	-	+	+	-
	Soleidae	*Brachirus orientalis*	Oriental sole	LC	Common	+	-	+	-	+	+
		Synaptura commersonnii	Commerson's sole	LC	Occasional	+	-	-	-	+	-
		*Zebrias synapturoides**	Indian zebra sole	LC	Occasional	+	-	-	-	-	-
		Zebrias quagga	Fringefin zebra sole	LC	Common	+	-	-	+	-	-
	Psettodidae	*Psettodes erumei*	Indian spiny turbot	DD	Common	+	-	+	+	-	-

Order	Family	Species	Common names	IUCN status	Abundance classification	Present study	Prabakaran *et al.* (2023)	Jesintha *et al.* (2022)	Govindarajan and Ramanibai (2016)	Sanjeevraj (2006)	Remadevi *et al.* (2004)
Ovalentaria incertae sedis	Ambassidae	*Ambassis gymnocephalus*	Bald glassy	LC	Common	+	-	+	-	+	+
		*Ambassis nalua**	Scalloped perchlet	LC	Occasional	+	-	-	-	-	-
	Menidae	*Mene maculata**	Moonfish	NE	Common	+	-	-	-	-	-
	Lactariidae	*Lactarius lactarius*	False trevally	NE	Rare	+	-	-	-	-	+
Carangaria incertae sedis	Polynemidae	*Eleutheronema tetradactylum*	Fourfinger threadfin	NE	Occasional	+	-	+	-	+	-
	Sphyraenidae	*Sphyraena jello*	Pickhandle barracuda	NE	Common	+	-	+	-	+	-
		Sphyraena obtusata	Obtuse barracuda	NE	Common	+	-	-	-	+	-
Scorpaeniformes	Platycephalidae	*Platycephalus indicus*	Bartail flathead	DD	Occasional	+	-	+	+	+	+
Tetraodontiformes	Monacanthidae	*Aluterus monoceros**	Unicorn leatherjacket	LC	Common	+	-	-	-	-	-
			Non-targeted species								
Eupercaria incertae sedis	Monodactylidae	*Monodactylus argenteus*	Silver moony	LC	Common	+	-	+	+	+	-
		*Istigobius diadema**	Spectacled sandgoby	NE	Rare	+	-	-	-	-	-
		Glossogobius giuris	Tank goby	LC	Common	+	-	+	-	+	+
		Oxyurichthys microlepis	Maned goby	LC	Occasional	+	-	-	-	+	+
Gobiiformes	*Gobiidae*	*Favonigobius reichei**	Indo-Pacific tropical sand goby	LC	Occasional	+	-	-	-	-	-
		*Yongeichthys criniger**	-	NE	Occasional	+	-	-	-	-	-
		*Acentrogobius cyanomos**	-	LC	Occasional	+	-	-	-	-	-
		*Arcygobius baliurus**	Isthmus goby	DD	Occasional	+	-	-	-	-	-
		*Ichthyscopus lebeck**	Longnosed stargazer	NE	Occasional	+	-	-	-	-	-
Perciformes	Uranoscopidae	*Uranoscopus cognatus**	Two-spined yellow-tail stargazer	NE	Occasional	+	-	-	-	-	-
		Uranoscopus guttatus	Dollfus' stargrazer	NE	Occasional	+	-	-	-	-	+
Syngnathiformes	Fistulariidae	*Fistularia petimba*	Red cornetfish	LC	Rare	+	-	-	+	-	-
Tetraodontiformes	Triacanthidae	*Triacanthus biaculeatus*	Shortnose tripod	NE	Occasional	+	-	+	+	+	+
		*Pseudotriacanthus strigilifer**	Long-spined tripodfish	NE	Occasional	+	-	-	-	-	-
	Diodontidae	*Diodon holocanthus**	Longspined porcupinefish	LC	Occasional	+	-	-	-	-	-
		Diodon hystrix	Spot-fin porcupinefish	LC	Occasional	+	-	-	+	-	-
	Tetraodontidae	*Arothron reticularis*	Reticulated pufferfish	LC	Occasional	+	-	-	+	+	-
		Takifugu oblongus	Lattice blaasop	LC	Occasional	+	-	-	+	+	+
		Lagocephalus inermis	Smooth blaasop	LC	Occasional	+	-	+	+	+	-
		Lagocephalus lunaris	Lunartail puffer	LC	Occasional	+	-	-	-	+	+
		Chelonodontops patoca	Milkspotted puffer	LC	Occasional	+	-	+	+	+	-
	Balistidae	*Melichthys niger*	Black triggerfish	LC	Occasional	+	-	-	+	-	-
Scorpaeniformes	Apistidae	*Apistus carinatus**	Ocellated waspfish	LC	Rare	+	-	-	-	-	-
Acropomatiformes	Pempheridae	*Pempheris molucca**	Moluccan sweeper	NE	Occasional	+	-	-	-	-	-
Holocentriformes	Holocentridae	*Sargocentron rubrum**	Redcoat squirrelfish	LC	Occasional	+	-	-	-	-	-

LC – Least Concern; NE-Not Evaluated; VU-Vulnerable; DD-Data Deficient; *- Recorded in this study have not been documented previously from Pulicat Lake.

as "others", including Ariidae, Dorosmatidae, Sciaenidae, Haemulidae and Tetraodontidae 5 species of each; Siganidae, Terapontidae, Belonidae, and Exocoetidae, 4 species of each; Elopidae, Clupeidae, Pristigasteridae, Gerreidae, Synodontidae, and Uranoscopidae, 3 species of each, Hemiramphidae, Chirocentridae, Lethrinidae, Sillaginidae, Labridae, Ambassidae and Sphyreaenidae each with 2 species. The remaining families each represent a single species (Fig. 3).

Table 2. List of marine bony fishes from previous studies in Pulicat with nomenclature updates

S. No.	Revised species names	Previously documented species names	Reference
1	*Tylosurus crocodilus*	*Strongylura crocodiles*	Jesintha *et al.* (2022)
2	*Netuma thalassina*	*Arius thalassinus*	Govindan and Ramanibai (2016)
3	*Osteomugil cunnesius*	*Valamugil cunnesius*	Govindan and Ramanibai (2016)
4	*Crenimugil seheli*	*Valamugil seheli*	Govindan and Ramanibai (2016)
5	*Siganus vermiculatus*	*Teuthis vermiculata*	Govindan and Ramanibai (2016)
6	*Strongylura strongylura*	*Belone strongylurus*	Govindan and Ramanibai (2016)
7	*Deveximentum insidiator*	*Secutor insidiator*	Govindan and Ramanibai (2016) Jesintha *et al.* (2022), Remadevi *et al.* (2004)
8	*Cheilopogon cyanopterus*	*Exocoetus bahiensis*	Govindan and Ramanibai (2016)
9	*Monodactylus argenteus*	*Psettus argenteus*	Govindan and Ramanibai (2016)
10	*Fistularia petimba*	*Fistularia serrata*	Govindan and Ramanibai (2016)
11	*Arothron reticularis*	*Tetrodon reticularis*	Govindan and Ramanibai (2016)
12	*Takifugu oblongus*	*Tetrodon oblongus*	Govindan and Ramanibai (2016)
13	*Lagocephalus inermis*	*Tetrodon inermis*	Govindan and Ramanibai (2016)
14	*Melichthys niger*	*Balistes niger*	Govindan and Ramanibai (2016)
15	*Parastromateus niger*	*Formio niger*	Govindan and Ramanibai (2016)
16	*Gerres limbatus*	*Gerres lucidus*	Govindan and Ramanibai (2016)
17	*Eubleekeria splendens*	*Leiognathus splendens*	Govindan and Ramanibai (2016)
18	*Triacanthus biaculeatus*	*Triacanthus brevirostris*	Govindan and Ramanibai (2016)
19	*Thryssa dussumieri*	*Thrissocles dussumieri*	Sanjeevraj (2006)
20	*Planiliza subviridis*	*Mugil dussumieri*	Sanjeevraj (2006)
21	*Epinephelus sexfasciatus*	*Serranus sexfasciatus*	Sanjeevraj (2006)
22	*Scarus ghobban*	*Pseudoscarus ghobban*	Sanjeevraj (2006)
23	*Hilsa kelee*	*Hilsa kanagurta*	Sanjeevraj (2006)
24	*Osteomugil cunnesius*	*Valamugil cunnesius*	Remadevi *et al.* (2004)
25	*Crenimugil seheli*	*Valamugil seheli*	Remadevi *et al.* (2004)
26	*Eubleekeria splendens*	*Leiognathus splendens*	Remadevi *et al.* (2004)
27	*Brachirus orientalis*	*Euryglossa orientalis*	Remadevi *et al.* (2004)
28	*Gerres limbatus*	*Gerres lucidus*	Remadevi *et al.* (2004)
29	*Epinephelus malabaricus*	*Epinephelus salmoides*	Remadevi *et al.* (2004)
30	*Planiliza parsia*	*Liza parsia*	Remadevi *et al.* (2004)
31	*Planiliza subviridis*	*Liza subviridis*	Remadevi *et al.* (2004)
32	*Ellochelon vaiginensis*	*Liza vaigiensis*	Remadevi *et al.* (2004)
33	*Leiognathus ruconius*	*Secutor ruconius*	Remadevi *et al.* (2004)

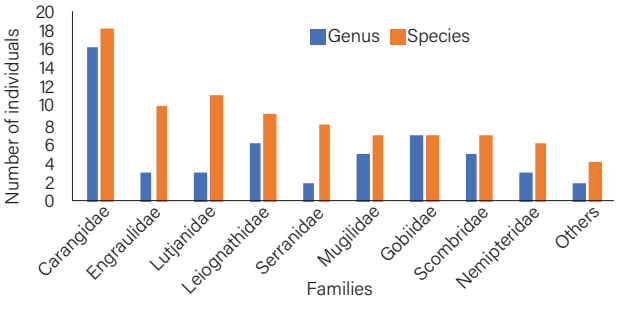

Fig. 3. Dominant family and the number of individuals of each genus and species documented during the study period

Conservation status

The present study revealed that, according to the IUCN red list category, *Rastrelliger faughni* is classified as vulnerable, whereas *Scomberomorus commerson* is categorised as Near Threatened. The ten species were classified as Data Deficient, *viz*., *Scomberomorus guttatus*, *Stolephorus insularis*, *Thryssa purava*, *Thryssa malabarica*, *Thryssa kammalensis*, *Megalops cyprinoids*, *Cynoglossus arel*, *Psettodes erumei*, *Platycephalus indicus* and *Arcygobius baliurus*. The status of the remaining species shows that 147 out of 202 (73%)

are categorised as Least Concern, whereas 43 species (21%) have not yet been evaluated.

Abundance classification

Based on the frequency of occurrence, the fish species were categorised into four groups dominant, common, occasional, and rare. The abundance results are as follows: out of a total 202 individual species, 90 species were found in common, 81 species occur as in occasion, and 22 species found rare. All remaining species were categorised as dominant, *viz., Planiliza macrolepis*, *P. subviridis*, *Ellochelon vaigiensis*, *Mugil cephalus*, *Siganus javus*, *S. vermiculatus*, *Terapon jarbua*, *Pelates quadrilineatus* and *Chanos chanos* as recorded from the Pulicat Lake.

Discussion

The present study revealed 202 bony fishes belonging to 136 genera and 65 families across 23 orders. Compared with earlier findings, Perciformes were the dominant with 83 species from 50 families and 14 orders reported (Govindan and Ramanibai, 2016). The current study revealed that Eupercaria incertae sedis was the most dominant order, with 34 species. Carangidae is the most diverse, with 18 species recorded among all the families. Jesintha *et al.* (2022) reported 95 finfish species with 46 families, the Clupeiformes presented a greater number of species and *Mugil cephalus* was the dominant fish and IUCN status, 75% of these species are classified as being of Least concern, whereas in the present study 73% of the reported were found similar. Previous studies on finfish documented are as follows: 23 species by Chacko *et al.* (1953), 81 species (Selvanathan and Kaliyamurthy, 1972), 161 species (Sanjeevaraj, 2006), 87 species (Remadevi *et al.*, 2004) and 13 species (Prabakaran *et al.*, 2023; Table. 3). This study reported 202 marine bony fishes, with 69 species being documented for the first time from Pulicat Province. These findings indicate that Pulicat Lake has high fish diversity, which supports valuable fisheries resources and plays a crucial role in both the local economy and biodiversity (Prabakaran *et al.,* 2023). This lake also serves as a nursing and breeding ground for aquatic fauna, thereby supporting commercial fishing activity (Kumar and Sunder, 2015).

Table 3. Number of families and species was compared between previous studies and the present study

Previous studies	Families	Genera	Species
Remadevi *et al.* (2004)	32	59	87
Sanjeevraj (2006)	43	55	161
Govindan and Ramanibai (2016)	51	66	83
Jesintha *et al.* (2022)	42	72	95
Prabakaran *et al.* (2023)	10	13	13
Present study	65	136	202

The lake mouth has a highly dynamic feature that influences water circulation and mixing, which affects the physiochemical parameters, primary production, plankton, biodiversity, and fisheries within the lake. The main ecological challenges are the accelerated rate of siltation and the impact of floodwaters from surrounding catchment areas, which erode topsoil and carry into the lake silt during the northeast monsoon (October to December) (Sanjeevaraj, 2006). This study provides evidence that the construction of the bar month, facilitates the exchange of water between the sea and the lake will stabilise the salinity levels and thereby increase the diversity and abundance of plankton and fish. This improvement benefits fishermen by making it easier to access the fishing grounds.

In the Pulicat Lake, pollution arises from various sources, including anthropogenic activities, sewage, agricultural runoff, and coastal industrial waste discharges from the North Chennai Thermal Power Plant, Ennore port activities, the Manali petrochemical industry, metal contamination, environment destruction, overfishing, aquaculture ponds, fish processing and tourism. These factors can significantly degrade water quality and harm aquatic ecosystems (Jeba Kumar and Natesan, 2015; Jayaraj and Pandey, 2021; Akila, 2022). Although these issues lead to detrimental effects on aquatic organisms, conserving fish diversity holds significant ecological importance.

Conclusion

This study provides a taxonomically updated checklist of marine bony fishes occurring in Pulicat Lake and this checklist has been organised according to the Catalogue of Fishes California Academy of Sciences. Furthermore, the study supports the use of a fish diversity database to promote scientific research, conservation, and management efforts as well as the sustainable utilisation of fisheries resources in Pulicat Lake. The study also emphasises the urgent need for conducting more comprehensive surveys to assess the population status of existing fish species in Pulicat Lake, which is imperative for their conservation.

Author contributions

Conceptualization: YM; Methodology: YM, JD; Data Collection: YM; Data Analysis: YM, JD; Writing Original Draft: YM, JD; Writing Review and Editing: YM, JD, TA, SA; Supervision: TA, SA.

Data availability

The data are available and can be requested from the corresponding author.

Conflict of interests

The authors declare that they have no conflict of financial or non-financial interests that could have influenced the outcome or interpretation of the results.

Ethical statement

No ethical approval is required as the study does not include activities that require ethical approval or involve protected organisms/ human subjects/ collection of sensitive samples/ protected environments.

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