Journal of Environmental Research and Engineering

JERE, 2025, 1 (1): 23-35

The Checklist of Species in the Ray Field Region off the Coast of Samandağ-Hatay offshore in the northeastern Mediterranean

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ABSTRACT

In the present study, the checklist of species in the Ray Field region off the coast of Samandağ-Hatay, located between 36°10'47.4‘N 35°52'22.0’E and 36°08' 31.6‘N 35°54'12.2’E, extending approximately 5 km in length and 1 mile offshore in the northeastern Mediterranean, was listed based on the previous projects during the project research period of 2008-2025 years. The present analysis revealed that 98 species belong to 33 family and 16 class were observed in the study area. Among the species, the class status of observed species as a percentage was 46.94 % teleost, 26.53 % Elasmobranchii, 8.16 % Phaeophyceae, 3.06 % Florideophyceae, 2.04 % Reptilia, 2.04 % Scyphozoa and 11.22 % other classes. Moreover, the IUCN conservation status of species in the Mediterranean was as follows: 38 non-status, 5 DD, 29 LC, 3 NT, 3 VU, 9 EN and 11 CR. Based on the findings, this area should also be designated as a Marine Protected Area.

ARTICLE INFO

Received 12.10.2025,
Accepted 10.11.2025,
Available online 20.11.2025
Publication Date 20.11.2025

Keywords:
Marine Protected Area, Breeding area, Biodiversity, IUCN

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INTRODUCTION

Coastal ecosystems of the eastern Mediterranean host a rich and dynamic assemblage of marine species, yet many of these areas remain insufficiently documented despite increasing anthropogenic pressures and rapid environmental change (Dimarchopoulou et al. 2017; Tsikliras and Dimarchopoulou, 2021). The Ray Field region off the coast of Samandağ-Hatay in Türkiye represents one such biologically important area. This region encompasses a range of habitats that support diverse fish communities and other marine taxa (Turan et al., 2025; Gürlek et al., 2013; Ergüden et al., 2017; Doğdu et al. 2025; Uysal et al., 2025). However, comprehensive assessments of species composition, conservation status, and ecological significance have been lacking.

In addition to its ecological significance, the Ray Field region is increasingly subjected to a range of environmental and anthropogenic pressures that threaten local and Mediterranean biodiversity (Coll et al., 2010; UNEP/MAP–SPA/RAC, 2021). Intensive fishing activities, including both artisanal and commercial practices, have contributed to the depletion of several demersal, elasmobrach and pelagic species, altering community structure and reducing ecosystem resilience (Colloca et al., 2017; Fiorentino and Vitale, 2021, Turan et al., 2024a). Climate change further exacerbates these challenges by driving rises in sea temperature, shifts in species distribution, and increased frequency of extreme weather events, all of which disrupt habitat stability (Turan et al., 2024b). Coastal erosion, accelerated by unsustainable coastal development and weakened sediment dynamics, continues to degrade nearshore habitats that serve as essential feeding and nursery grounds for numerous marine organisms (Anthony, 2014; Christofi et a., 2024). Collectively, these stressors underscore the urgency of implementing effective conservation measures and highlight the vulnerability of the region’s marine ecosystems (Ramírez Benítez et al., 2018).

In the present study, long-term monitoring efforts conducted between 2008 and 2025 provide a unique opportunity to evaluate spatiotemporal trends in the local ichthyofauna. Such datasets are essential not only for understanding the ecological characteristics of the region but also for informing conservation strategies aimed at mitigating biodiversity loss. Recent studies have highlighted the Mediterranean Sea as a hotspot for both endemic species and taxa of conservation concern, with many species increasingly threatened by overfishing, habitat degradation, invasive species, and climate-driven shifts in distribution.

MATERIALS AND METHODS

The study area is called as Ray Field region off the coast of Samandağ-Hatay in the northeastern Mediterranean Sea (Figure 1). This area is located in the Hırlavuk region of Samandağ. This area

is also particularly important as it serves as a breeding ground for numerous shark, ray and guitarfish species listed as endangered by the IUCN.

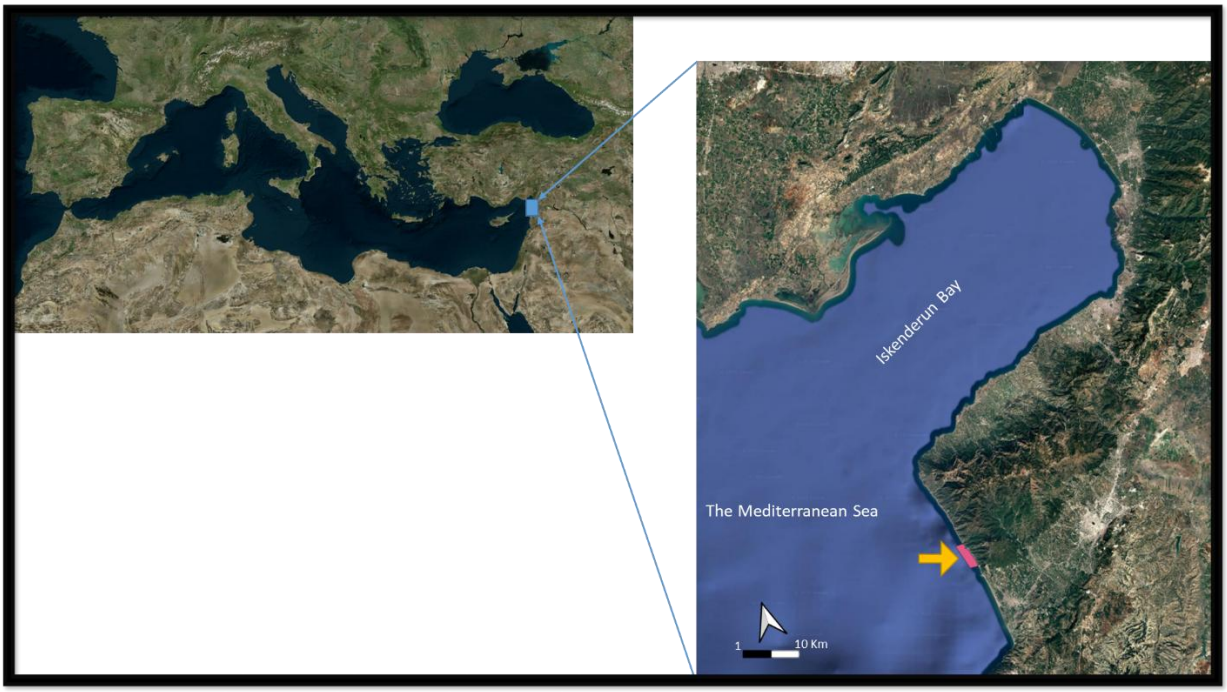

Figure 1. Location of the study area, known as the Ray Field region, off the Samandağ–Hatay coast in the northeastern Mediterranean Sea. The yellow arrow indicate Ray Field region (purple color)

The Ray Field region off the coast of Samandağ-Hatay was located between 36°10'47.4‘N 35°52'22.0’E and 36°08' 31.6‘N 35°54'12.2’E, extending approximately 5 km in length and 1 mile offshore. This area should also be designated as a Marine Protected Area (Figure 2).

The data used in this study were collected during the project research period of 2008-2025 years within the framework of projects supported by the MarIAS, Turquoise Coast Environment Fund–Turkey (ElasmoKAP-TCEF-2024), Nature and Science Society Project, TAGEM projects, İskenderun Technical University BAP Project, conducted in the Ray field region of Hatay-Samandağ coast of Türkiye. The data were collected depending on the project content by underwater visual census (UVC) method, trawling, small-scale purse seine and gill nets.

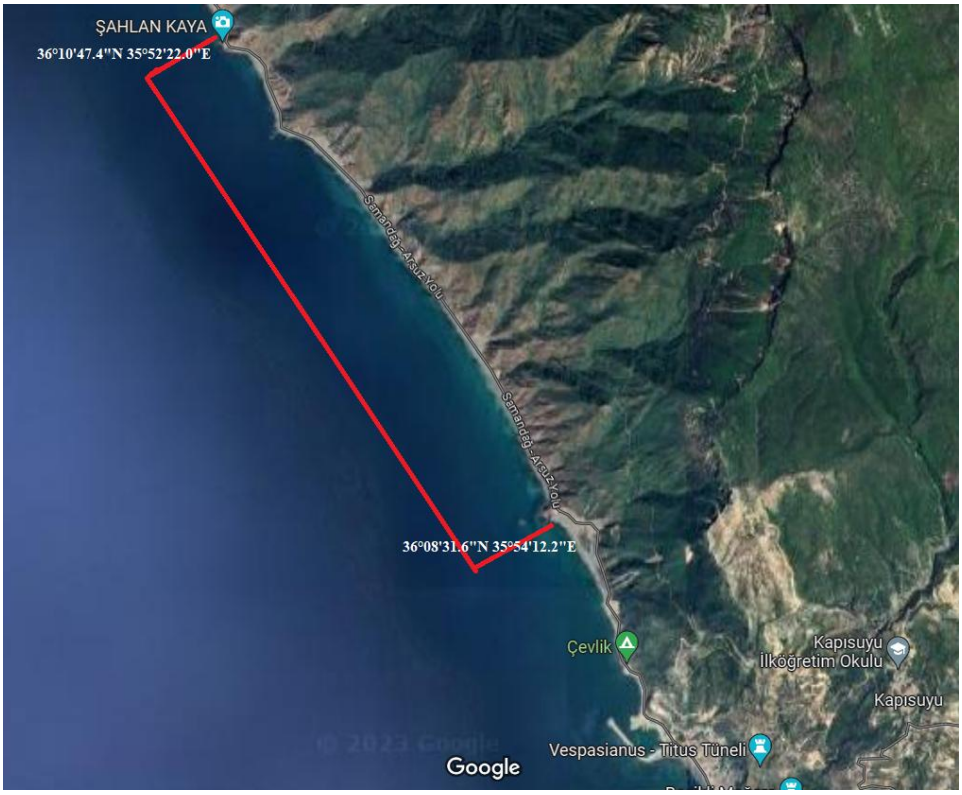

Figure 2. Detailed view of the Ray Field region showing the exact boundaries of the study transect off the Samandağ–Hatay coast.

RESULTS AND DISCUSSION

In the present study, 17 class, 54 family and 98 species were observed in the study area and near the study area (Figure 3). Twenty of these species are protected or prohibited from hunting. We included some shark species thrawler from outside of the study area near the ray field (Turan et al., 2024c) since these species were also occasionally fished by fishermen in this region (personal communication with fishermen).

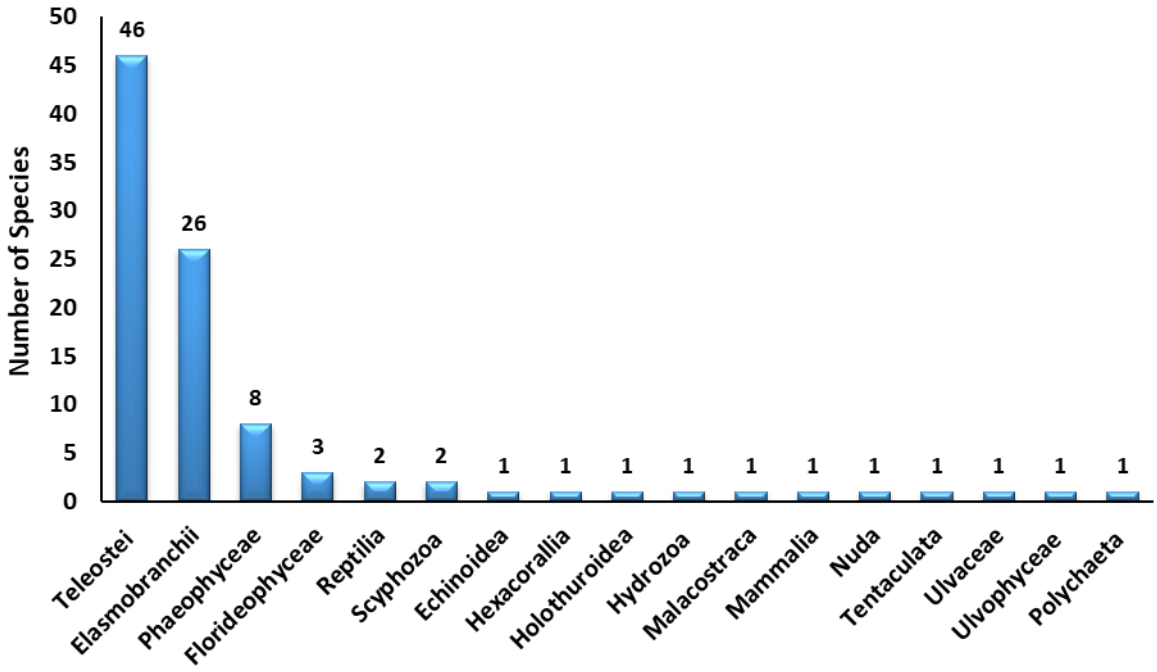

Figure 3. Distribution of species identified in the study area according to taxonomic groups.

As shown in Figure 3, Teleostei (46 species) and Elasmobranchii (26 species) constitute the majority of the total species richness in the study area. The macroalgae groups Phaeophyceae (8 species) and Florideophyceae (3 species) follow these groups. Other taxonomic groups (Reptilia, Scyphozoa, Echinoidea, Hexacorallia, Holothuroidea, Hydrozoa, Malacostraca, Mammalia, Nuda, Tentaculata, Ulvaceae, Ulvophyceae, and Polychaeta) were represented by 1–2 species each. This distribution indicates that the biological diversity in the study area is largely dominated by fish (Teleostei and Elasmobranchii) and macroalgae.

IUCN Global Category results show that a significant proportion of species in the study area fall into the Least Concern (LC; 39%) category (Figure 4). This indicates that many species are at a relatively low threat level globally. However, the high Non-status (26%) rate indicates that some species have not been assessed or have not yet been globally classified. The percentages of species in the Vulnerable (VU; 11%) and Critically Endangered (CR; 11%) categories are noteworthy and indicate the presence of species at significant risk globally. Species in the Near Threatened (NT; 5%), Endangered (EN; 5%), and Data Deficient (DD; 3%) categories indicate a need for further research and close monitoring of population trends.

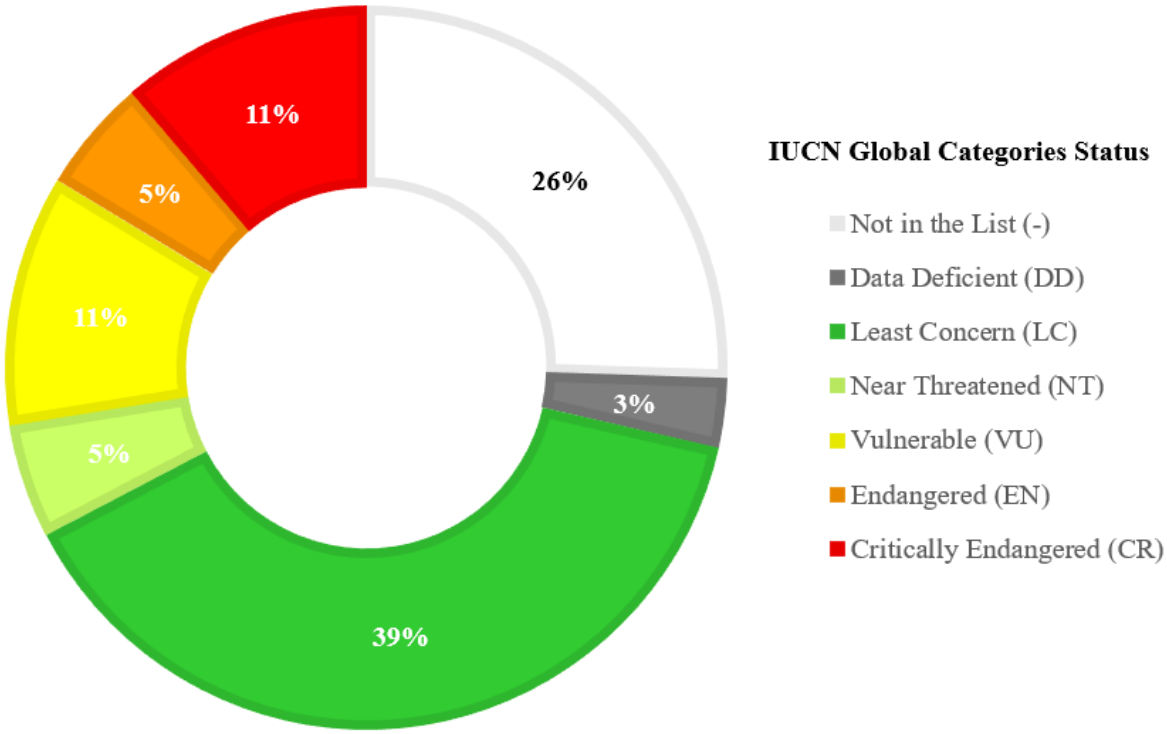

Figure 4. Distribution of species identified in the study area according to IUCN Global Conservation Categories.

The IUCN assessment conducted at the Mediterranean scale reveals a different distribution of conservation status compared to global categories (Figure 5). The fact that the Non-status category (39%) constitutes the largest share indicates that sufficient assessments are lacking for many species specific to the Mediterranean or that regional status has not yet been defined. Least Concern (LC; 30%) has a lower rate than global values, suggesting that some species face more fragile ecological conditions in the Mediterranean. Furthermore, there is a notable concentration in the Critically Endangered (CR; 11%) and Endangered (EN; 9%) categories, suggesting that ecosystem pressures in the region may be more pronounced than at the global scale. The Near Threatened (NT; 3%), Vulnerable (VU; 3%), and Data Deficient (DD; 5%) categories highlight regional research needs and data gaps.

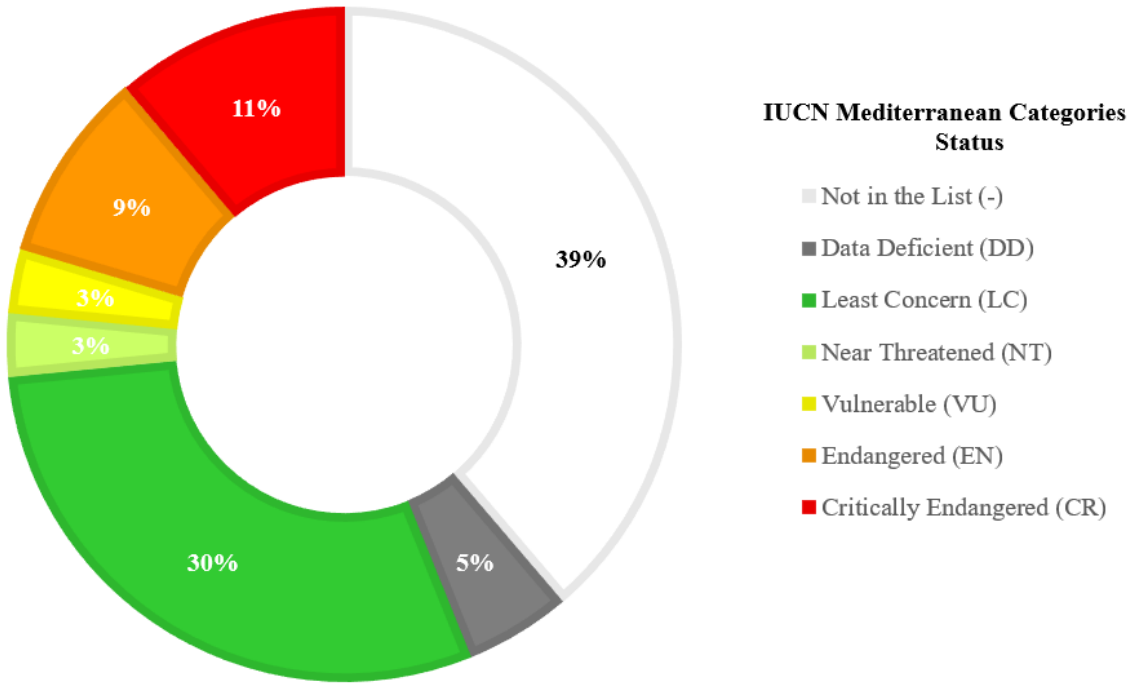

Figure 5. Distribution of species according to the IUCN Mediterranean Regional Conservation Categories.

In figure 4 and figure 5 reveal significant differences in the conservation statuses of species at the global and Mediterranean scales. Species with a wider global distribution are generally concentrated in the LC and Non-status categories, while at the Mediterranean scale, threat levels increase and the proportion of species in the EN and CR categories is regionally higher. This difference clearly highlights the ecological fragility of the Mediterranean, the regional intensity of environmental pressures, and the vulnerable status of species with limited distribution. Therefore, the study's results indicate that species should be assessed not only globally but also regionally, and that Mediterranean-specific conservation plans should be prioritised, especially for threatened species (Coll et al., 2010; IUCN, 2025)

A holistic overview of the taxonomic classifications of the 98 species identified in the study area, their IUCN global and Mediterranean regional conservation statuses, their legal protection status in Turkey, and whether they are alien to the Mediterranean is presented in Table 1. A significant portion of the species belongs to the classes Teleostei and Elasmobranchii, and the concentration of VU, EN, and CR categories, particularly in top-trophic predators such as sharks and rays, is noteworthy (Dulvy et al., 2014; Coll et al., 2010). Twenty percent of the species in the study area

are alien species that have recently entered the Mediterranean, and the presence of these species is considered a strong indicator of biogeographic transformation in the region (Zenetos et al., 2022; Turan et al., 2024b). However, 20 species identified in the region are protected under national legislation in Türkiye, and the fact that many of these species fall into high-threat categories indicates that regional conservation pressures persist (Turan et al., 2014; UNEP/MAP–SPA/RAC, 2021). Overall, the dataset presented in the table reveals that the region is in a critical ecological balance in terms of both high-priority threatened species and alien species rapidly expanding their range, further emphasizing the need for targeted conservation efforts tailored to the Mediterranean context (IUCN, 2023).

Table 1. Checklist of species in the ray field region with their IUCN status (CR, Critically Endangered; EN, Endangered; VU, Vulnerable; NT, Near Threatened; LC, Least Concern; DD, Data Deficient; "-", Not in the List; and "+", in the list.

No	Class	Family	Species	IUCN Global Categories	IUCN Mediterranean Categories	Protected species in Türkiye	Alien
1	Teleostei	Apogonidae	Cheilodipterus novemstriatus	LC	-		+
2		Callionymidae	Synchiropus phaeton	LC	LC		
3		Carangidae	Seriola dumerili	LC	LC		
4			Trachurus mediterraneus	LC	LC		
5			Trachurus trachurus	VU	LC		
6		Congridae	Trachinotus ovatus	LC	LC		
7		Alosidae	Ariosoma balearicum	LC	LC		
8		Epinephelidae	Alosa fallax	LC	LC		
9			Epinephelus aeneus	NT	NT		
10			Epinephelus costae	DD	DD		
11			Epinephelus marginatus	VU	EN	+	
12		Fistulariidae	Mycteroperca rubra	LC	LC		
13			Fistularia petimba	LC	LC		+
14			Fistularia commersonii	LC	-		+
15		Haemulidae	Pomadasys stridens	LC	-		+
16		Holocentridae	Sargocentron rubrum	LC	-		+
17		Labridae	Symphodus tinca	LC	LC		
18			Thalassoma pavo	LC	LC		

19			Xyrichthys novacula	LC	LC		
20		Moronidae	Dicentrarchus labrax	NT	NT		
21			Mullus barbatus	LC	LC		
22		Mullidae	Mullus surmelatus	-	-		
23			Parupeneus forsskali	LC	-		+
24		Muraenidae	Enchelycore anatina	LC	LC		+
25			Muraena helena	LC	LC		
26		Pempheridae	Pempheris vanicolensis	-	-		+
27		Plotosidae	Plotosus lineatus	LC	-		+
28		Pomacentridae	Chromis chromis	LC	LC		
29		Scaridae	Scarus ghobban	LC	-		+
30		Sciaenidae	Umbrina cirrosa	VU	VU		
31		Scorpaenidae	Pterois miles	-	-		+
32		Serranidae	Serranus scriba	LC	LC		
33		Siganidae	Siganus luridus	LC	-		+
34			Siganus rivulatus	LC	-		+
35			Lithognathus mormyrus	LC	LC		
36			Oblada melanura	LC	LC		
37			Pagrus auriga	LC	DD		
38			Pagrus pagrus	LC	LC		
39			Sarpa salpa	LC	LC		
40		Sparidae	Sparus aurata	LC	LC		
41			Spicara smaris	LC	LC		
42			Diplodus annularis	LC	LC		
43			Diplodus cervinus	LC	LC		
44			Diplodus sargus	LC	LC		
45			Diplodus vulgaris	LC	LC		
46		Tetraodontidae	Torquigener flavimaculosus	LC	-		+
47	**Elasmobranchii**	Alopiidae	Alopias superciliosus	VU	EN	+	
48			Alopias vulpinus	VU	EN	+	
49			Prionace glauca	NT	CR		
50		Carcharhinidae	Carcharhinus falciformis	VU	DD	+	
51			Carcharhinus longimanus	CR	EN	+	
52			Carcharhinus plumbeus	EN	EN	+	
53		Dasyatidae	Dasyatis marmorata	NT	DD		
54			Dasyatis pastinaca	VU	VU		
55		Glaucostegidae	Glaucostegus cemiculus	CR	-		
56		Gymnuridae	Gymnura altavela	EN	CR		
57		Lamnidae	Carcharodon carcharias	VU	CR		
58			Isurus oxyrinchus	EN	CR	+	

59			Lamna nasus	VU	CR	+	
60		Mobulidae	Mobula japanica	CR	EN	+	
61			Mobula mobular	CR	EN	+	
62		Myliobatidae	Aetomylaeus bovinus	CR	CR		
63		Oxynotidae	Oxynotus centrina	EN	CR		
64			Dipturus batis	CR	-		
65		Rajidae	Raja clavata	NT	NT	+	
66			Rostroraja alba	EN	EN		
67		Rhinobatidae	Rhinobatos rhinobatos	CR	EN	+	
68			Squalus blainville	DD	DD	+	
69		Squalidae	Squatina aculeata	CR	CR	+	
70			Squatina oculata	CR	CR	+	
71			Squatina squatina	CR	CR	+	
72		Triakidae	Galeorhinus galeus	CR	VU	+	
73	**Echinoidea**	Diadematidae	Diadema setosum	-	-		+
74	**Florideophyceae**	Corallinaceae	Jania rubens	-	-		
75		Rhodomelaceae	Laurencia obtusa	-	-		
76			Laurencia papillosa	-	-		
77	**Hexacorallia**	Actiniidae	Anemonia sulcata	-	LC		
78	**Holothuroidea**	Synaptidae	Synaptula reciprocans	-	-		
79	**Hydrozoa**	Aglaopheniidae	Macrorhynchia philippina	-	-		+
80	**Malacostraca**	Scyllaridae	Scyllarides latus	DD	-		
81	**Mammalia**	Phocidae	Monachus monachus	VU	CR	+	
82	**Nuda**	Beroidae	Beroe ovata	-	-		+
83	**Phaeophyceae**	Dictyotaceae	Padina pavonia	-	-		
84			Dictyota dichotoma	-	-		
85		Sargassaceae	Cystoseira compressa	-	-		
86			Cystoseira barbata	-	-		
87			Cystoseira corniculata	-	-		
88			Sargassum vulgare	-	-		
89		Stypocaulaceae	Stypocaulon scoparium	-	-		
90			Stypopodium schimperi	-	-		
91	**Reptilia**	Cheloniidae	Caretta caretta	VU	LC	+	
92			Chelonia mydas	LC	-	+	
93	**Scyphozoa**	Ulmaridae	Aurelia aurita	-	-		
94		Rhizostomatidae	Rhopilema nomadica	-	-		+
95	**Tentaculata**	Bolinopsidae	Mnemiopsis leidyi	-	-		+
96	**Ulvaceae**	Ulvaceae	Ulva lactuca	-	-		

97	**Ulvophyceae**	Codiaceae	Codium fragile	-	-	+
98	**Polychaeta**	Amphinomidae	Hermodice carunculata	-	-	

In this context, the present study compiles and analyses a comprehensive checklist of species recorded in the Ray Field region. These findings underscore the ecological value of the area and highlight its importance as a potential refuge for species of conservation priority.

Given the high biodiversity and presence of numerous threatened taxa, the results strongly support the recommendation that the Ray Field region be considered for designation as a Marine Protected Area (MPA). Establishing a protected zone would contribute significantly to safeguarding local species richness, enhancing fisheries sustainability, and preserving the ecological integrity of this critical Mediterranean habitat.

The findings of this long-term assessment highlight the ecological importance of the Ray Field region and reveal a diverse assemblage of marine species, including several taxa of high conservation concern. The presence of numerous Vulnerable, Endangered, and Critically Endangered species according to the IUCN Mediterranean assessments underscores the region's role as a potential refuge for threatened fauna. The cumulative evidence from this study strongly supports the need for enhanced management measures, including the potential designation of the area as a Marine Protected Area. Such protection could mitigate ongoing pressures, promote population recovery, and preserve the ecological integrity of this biologically valuable region.

Acknowledge

Thanks to the MarIAS, Turquoise Coast Environment Fund–Turkey (ElasmoKAP-TCEF-2024), Nature and Science Society, TAGEM, İskenderun Technical University for support.

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