

Original Research Articles

Establishing a fish repository at Ege University Faculty of Fisheries (1965-2023): A Journey on a long and challenging road to becoming a museum

Bahar Bayhan^{1a}, Sencer Akalin¹, Salim C. Akçınar¹, Burcu Taylan¹, Murat Kaya¹, Ertan Taşkavak¹, Okan Özaydın¹, Tuncay M. Sever¹, Alp Salman¹, Şule Gürkan¹, Dilek İlhan¹, Orçin Uygun², Burak Altay¹

¹ Faculty of Fisheries, Ege University, ² Faculty of Fisheries, Sinop University

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This study examined preserved marine fish specimens collected from numerous field surveys conducted along Türkiye's Black Sea, Marmara, Aegean, and Mediterranean coasts since 1965. Our review and categorization of these materials revealed that the specimens belong to 360 species from 131 families. Current data shows that the museum collection includes 20 species of cartilaginous fish and 8 species of bony fish listed as endangered on the IUCN Red List, alongside 54 non-native fish species. Prepared according to museum standards by Ege University Fisheries Faculty's Scientific Material (ESFM), this collection of Turkish marine fish constitutes 66% of all Turkish marine fish fauna. This makes it the largest and oldest marine fish collection in Türkiye. Considering Türkiye's maritime borders with neighboring countries, this collection is significant nationally and globally. Given the diverse marine fish species in Turkish seas over the past half-century, this preserved material is a vital reference for local and foreign ichthyologists. If organized and transformed into a visitable museum, this extensive collection could raise awareness about the diversity of marine fish species in our seas. As a result, we have established the "biological repository of Turkish Marine Fish Department" in the Faculty Museum, now known as the Fisheries Faculty's Scientific Material (ESFM) at Ege University. We present the fish in the collection as a species list.

INTRODUCTION

Marine fish are a vital food source for humans, underscoring their importance. Both commercial and hobbyist fishermen routinely catch them. Moreover, their global significance extends beyond an impressive annual catch of roughly 100 million tons; they also encompass underwater scientific research and tourism. Research on Türkiye's marine fish began in the late 18th century, spearheaded by the German-born Dr. Curt Kosswig, a significant figure in advancing natural science in the country. In 1951, publications on fish and fishing in Türkiye were initiated under the "Istanbul Baltalimanı Hydrobiology Research Institute" under Kosswig's leadership (Figure 1a). He also played a key role in developing academic staff through theoretical lectures (Figure 1b) and nationwide fieldwork (Figure 1c).

Dr. Remzi Geldiay, a student of Kosswig, furthered his research at Ege University in 1961, marking the second generation. Under his guidance, the Marine Biology Research and Application Laboratory was established in 1965. Dr.

Savaş Mater, a Ph.D. graduate under¹, embarked on building a collection of marine fish in Türkiye. The first National Congress of Marine and Freshwater Research, held at the Urla Unit of Ege University Faculty of Fisheries in 1981, was Kosswig's final event (Figure 1d). Inspired by the publication "Memories from the Scientific Expeditions of Dr. Curt Kosswig for the History of Türkiye's Fauna²" Mehmetoğlu (2018)³ coined the phrase "Türkiye's fish never forgot KOSSWIG!" aptly expressing our sentiment. Today, rigorous and conscious biological research on fish species in Turkish seas carries on, and without a doubt, it will continue.

This project has been driven by cataloging all marine fish species in Türkiye, much like a living museum, to benefit future generations. Museums are treasured spaces where we can witness the echoes of the past. In Türkiye, museum practices have evolved to modern standards in the Republican era. Modern museums play a vital role in educating society and fostering socio-cultural development through societal, social, psychological, and technological lenses.⁴

a Corresponding Author, Bayhan Bahar, Email: bahar.bayhan@ege.edu.tr; baharbayhann@gmail.com



Figure 1. (a): Curt Kosswig working in his room at the Baltalimanı Hydrobiology Institute (1955), (b): Curt Kosswig giving a lecture at the Faculty of Sciences, Ege Üniversitesi, İzmir, Türkiye (April, 1967), (c): Curt Kosswig at H.B.A. “ARAR” research vessel (1954), (d): 1st National Congress on Marine and Freshwater Researches. 15-17 October 1981, Urla-İzmir (1- Curt Kosswig, 2- Remzi Geldiay, 3- Savaş Mater).

Various works have introduced fish species found in the Turkish seas,⁵⁻¹⁴ along with inventories listing all species in the collection.¹⁵⁻¹⁸ In this study, however, we’ve compiled a checklist based on the most recent publications, offering the latest species lists and new species records for Turkish marine fishes. The availability of marine fishes in our collection has also been documented.

“Museum” hails from classical origins, specifically the Greek “mouseion” which meant a place for contemplation or a philosophical institution. The term was later Latinized as “museum,” used primarily during Roman times for locations of philosophical discussions. Today, various well-known dictionaries provide slightly differing definitions. The Oxford Dictionary describes a museum as a building for storing and exhibiting objects including antiquities, natural history, and art. Collins Dictionary terms it a building where a vast number of interesting and valuable objects like works of art or historical items are kept, studied, and displayed to the public. Britannica Dictionary identifies a museum as a building where interesting and valuable items such as paintings, sculptures, scientific objects, or historical artifacts are gathered and displayed to the public. Lastly, The American Heritage Dictionary of the English Language defines it as an establishment dedicated to the acquisition, preservation, study, exhibition, and educational interpretation of objects possessing scientific, historical, or artistic significance.

On the other hand, biological repositories are critical to many scientific research projects. These repositories store and preserve various biological samples, such as tissues, cells, DNA, other biomolecules, as well as vertebrate and

invertebrate animals, and plants. They provide a secure environment to ensure the long-term integrity and availability of these samples for future studies. Additionally, biological repositories facilitate data sharing and collaboration among researchers and institutions. They offer access to a broad range of samples from different species and populations, enabling comparative studies and new discoveries. Moreover, these repositories often provide standardized protocols and quality control measures to ensure the reliability and reproducibility of research findings.

The “Scientific Material of the Faculty of Fisheries of Ege University (ESFM)” is a biological repository established on March 19, 2007, by the faculty’s administrative body. Since its inception, specimens identified during various research activities have been assigned registration numbers. ESFM, as the first official unit in Türkiye dedicated to biological diversity conservation, boasts a collection unmatched by any other institution in the country.¹⁹ Since January 2010, ESFM has been registered with the Registry of Biological Repositories, managed by the Smithsonian Institution. The preserved specimens in the collection primarily serve as the basis for various scientific research and as comparative material. ESFM is located on the ground floor of the administrative building of the Ege University Faculty of Fisheries, covering an area of 199 m². Specimens in the collection are preserved using either a 10% formalin or 70% ethanol solution.¹⁹

This research aims to catalog the fish species collected from diverse fieldwork conducted over the past half-century along the coasts of the Black Sea, Marmara Sea, Aegean Sea, and Mediterranean Sea in Türkiye. This includes arranging



Figure 2. Turkish seas and research area.

these species as museum specimens following international standards and presenting them comprehensively. This collection is the oldest and largest of its kind in Türkiye, and considering Türkiye's four unique seas and the neighboring countries with coastlines, it holds significant value both nationally and internationally. Therefore, this project will ensure that fish species found in Turkish seas are meticulously preserved for future generations. In conclusion, we've created the marine fish collection in Türkiye with an eye to the future. We hope this collection will be a valuable resource for ichthyologists and taxonomists in Türkiye and beyond. A further goal is to develop this collection into a museum open to the public in the near future, which will play a pivotal role in preserving and educating about our rich fish diversity for generations to come.

MATERIALS AND METHODS

Our Turkish marine fish collection, ESFM-PIS, houses specimens collected from Türkiye's Black Sea, Marmara, Aegean Sea, and Mediterranean coasts since 1965 (Figure 2). These samples were taken during various MS and PhD studies and national and international academic and commercial projects. After being caught, the fish were promptly preserved in a 10% formalin solution using whatever means were available. When the conditions weren't optimal, we froze the specimens, stored them on ice, and transported them to the lab for fixation as soon as possible. We identified the species based on the works of²⁰Whitehead et al. (1984-1986),⁸Akşiray (1987),⁹Mater et al. (2005), and¹⁴Mater et al. (2011). The names of the species listed in the table were chosen in line with current databases,^{21,22} and the systematic classification of species followed²³ Nelson et al. (2016). For the identification process, we used glass jars of appropriate sizes based on the dimensions of the species. We wrapped the jar lids with parafilm to minimize formaldehyde leakage. Each jar had a tag containing the scientific name, sampling date and location, and catalog number. All materials in the collection were cataloged in the EFSM as 'ESFM-PIS/Sampling year-Catalog number' (Figure 3).

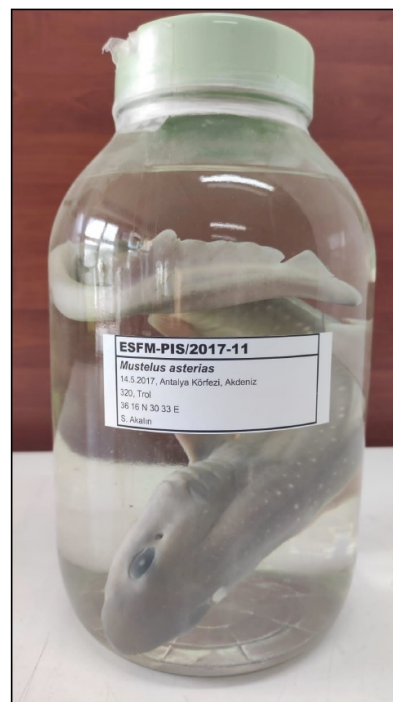


Figure 3. A sample of preserved material.

RESULTS

Established in Paris in 1946, the International Council of Museums²⁴ defines a museum as a non-profit, enduring entity serving society. Its role includes research, collection, conservation, interpretation, and tangible and intangible heritage exhibition. Museums are open and accessible to all, fostering inclusivity, diversity, sustainability, and ethical and professional communication. They encourage community participation and provide varied experiences for education, enjoyment, reflection, and knowledge sharing.

In this study, we classified marine fish collected from the Turkish seas and preserved at Ege University's Faculty of Fisheries for about six decades. This classification process resulted in an up-to-date database. Most of these marine fish specimens, each with a unique registration number, were obtained from projects conducted in Turkish seas and have been cited in various scientific papers. A smaller portion of the specimens are contributions from academics or volunteers from different institutions.

The Mediterranean, one of the most significant inland seas worldwide, includes the Eastern Mediterranean basin encompassing Türkiye. These seas, differing in geology, geomorphology, oceanography, and ecology, each host unique fish fauna. The Black Sea and the Sea of Marmara, inland seas, are home to cold-loving, endemic, cosmopolitan, and Atlanto-Mediterranean species. The Northern Aegean shares some similarities with these two inland seas. However, on the Southern Aegean and Mediterranean coasts, cold-preferring species give way to temperate and warm climate-loving species, including Lessepsian species, migrants from the Red Sea.¹⁴

Fish, the primitive vertebrates, make up roughly half of the vertebrate group in the Mediterranean basin, with

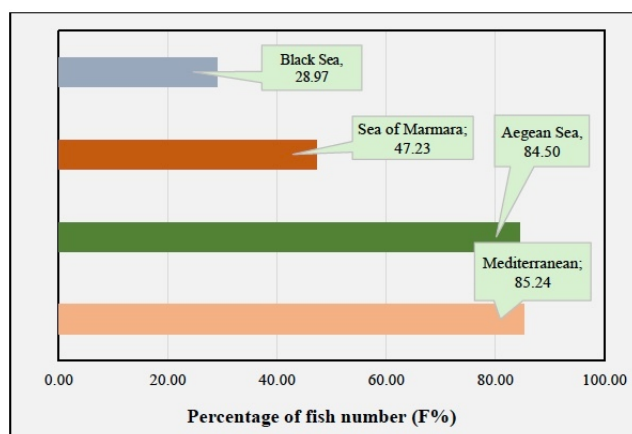


Figure 4. Percentage of fish number (F%) in the Turkish seas.

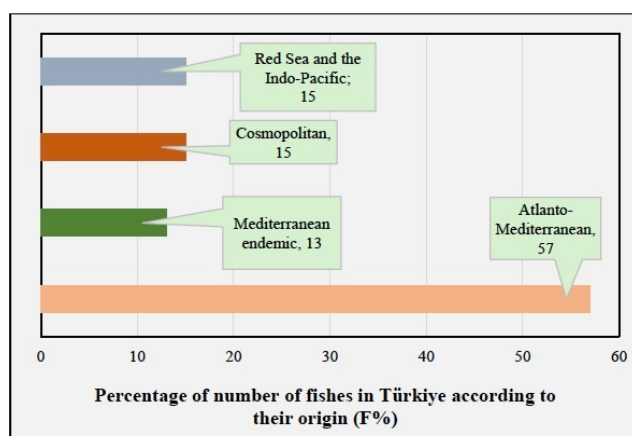


Figure 5. Percentage of number of fishes (F%) in the Turkish seas according to their origin.

894 species. The Turkish seas host 542 fish species. Among these, 462 are found in the Mediterranean, 458 in the Aegean Sea, 256 in the Marmara Sea, and 157 in the Black Sea (Figure 4). Furthermore, around 57% of these species are Atlanto-Mediterranean, 13% are Mediterranean endemic, 15% are cosmopolitan, and 15% hail from the Red Sea and the Indo-Pacific¹⁸ (Figure 5).

Our study has resulted in the scientific collection of specimens from 360 species, representing 131 families, from the seas around Türkiye. This collection includes jawless fish species, 35 from 18 cartilaginous fish families and 311 from 107 bony fish families. Thus, our collection at ESFM-PIS represents 66% of fish species found in Turkish waters (see Table 1; Figure 6). Established in 1965, our marine fish collection has grown significantly recently. It now includes 54 (15.0%) foreign bony fish species. Our collection houses 20 cartilaginous fish and 8 species of bony fish listed as endangered on the IUCN Red List. Among these, 28 endangered species (are critically endangered, endangered, and vulnerable) (see Table 1).

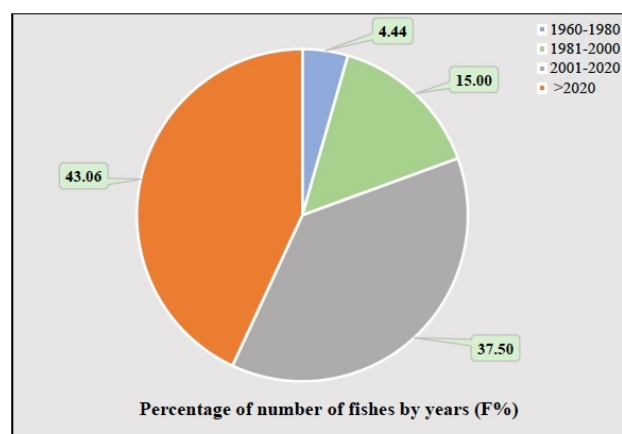


Figure 6. Percentage of number of fishes (F%) by years in the ESFM-PIS.

DISCUSSION

The Ege University Faculty of Fisheries has meticulously cataloged its marine fish specimens in an internationally recognized system. For each specimen, we've recorded specifics like the collection date, the sampling location, quantity, habitat, depth, and project number. We've also noted down the collector and identifier details for each specimen. Preserved in glass jars with a 10% formalin solution, these specimens are carefully labelled with standardized ESFM tags.

Over time, we've compiled a comprehensive list of fish species found in Turkish seas. Starting with a report of 530 species by¹⁸Karataş and colleagues in 2021, the count has now reached 544, thanks to the new records added by Çınar and colleagues,²⁵İrmak and Özden,²⁶Manasırılı and Mavruk, and²⁷Ergüden and colleagues. Of these, our ESFM-PIS has registered 360 species, accounting for roughly 66% of the total. Further, of the 69 cartilaginous fish species found in Turkish seas, 37 (54%) are housed in museums, as are 322 of the 474 bony fish species (68%). The remaining 187 species, largely comprising large, rare, deep-sea, and commercially uncatchable species, are not in collections.

Most of our specimens hail from the Aegean Sea and the Mediterranean, with a smaller number from the Marmara and Black Sea. We're working to broaden our collection to include samples from all fish species in all Turkish seas. Currently, our collection houses 28 endangered species, including 11 that are critically endangered according to the IUCN Red List.

Our collection also features 54 (15.0%) species that have migrated into the Mediterranean and Southern Aegean Seas from the Red Sea after the Suez Canal was opened. We're committed to continually adding these species, which will bolster the overall species count. The ESFM-PIS, with its rich species diversity, is a valuable resource for researchers studying Turkish marine fish. As we add the missing species, the collection will continue to grow. The 60-year span of collected samples, adhering to museum standards, paves the way for a comprehensive research path, aiming to include all Turkish marine fish species in the ESFM-PIS.

Table 1. Checklist of marine fishes distributed in the Turkish seas and their presence/absence in the ESFM-PIS (ESFM-PIS● present, ○ absent; Seas: ○ no record in the relevant sea, ⊙ present in the relevant sea but not in the museum, ⊕ present in the relevant sea and in the ESFM-PIS).

	TAXA	ESFM-PIS	Mediterranean Sea	Aegean Sea	Marmara Sea	Black Sea	Catalog Number
	AGNATHA						
	Petromyzontiformes						
	Petromyzontidae						
1	<i>Lampetra lanceolata</i>	●	○	○	○	⊕	ESFM-PIS/ 2022-29
	CHONDRICHTHYES						
	Carcharhiniformes						
	Carcharhinidae						
2	<i>Carcharhinus altimus</i> (Springer, 1950)	○	⊕	○	○	○	
3	<i>Carcharhinus brevipinna</i> (Müller & Henle, 1839)	○	⊕	⊕	○	○	
4	<i>Carcharhinus limbatus</i> (Müller & Henle, 1839)	○	⊕	○	○	○	
5	<i>Carcharhinus plumbeus</i> (Nardo, 1827)	●	⊕	⊕	○	○	ESFM-PIS/ 2001-03
6	<i>Prionace glauca</i> (Linnaeus, 1758)	○	⊕	⊕	⊕	○	
	Scyliorhinidae						
7	<i>Galeus melastomus</i> Rafinesque, 1810	●	⊕	⊕	⊕	○	ESFM-PIS/ 2015-19
8	<i>Scyliorhinus canicula</i> (Linnaeus, 1758)	●	⊕	⊕	⊕	⊕	ESFM-PIS/ 2023-46
9	<i>Scyliorhinus stellaris</i> (Linnaeus, 1758)	●	⊕	⊕	⊕	○	ESFM-PIS/ 2023-48
	Sphyrnidae						
10	<i>Sphyrna zygaena</i> (Linnaeus, 1758)	○	⊕	⊕	○	○	
	Triakidae						
11	<i>Galeorhinus galeus</i> (Linnaeus, 1758)*	○	⊕	⊕	⊕	○	
12	<i>Mustelus asterias</i> Cloquet, 1821	●	⊕	⊕	⊕	⊕	ESFM-PIS/ 2017-11
13	<i>Mustelus mustelus</i> (Linnaeus, 1758)*	●	⊕	⊕	⊕	○	ESFM-PIS/ 2023-65
14	<i>Mustelus punctulatus</i> Risso, 1827	○	⊕	⊕	○	○	
	Chimaeriformes						
	Chimaeridae						
15	<i>Chimaera monstrosa</i> Linnaeus, 1758*	●	⊕	⊕	⊕	○	ESFM-PIS/ 2023-97
	Hexanchiformes						
	Hexanchidae						

	TAXA	ESFM-PIS	Mediterranean Sea	Aegean Sea	Marmara Sea	Black Sea	Catalog Number
16	<i>Hepttranchias perlo</i> (Bonnaterre, 1788)	●	⊙	⊙	○	○	ESFM-PIS/ 2016-09
17	<i>Hexanchus griseus</i> (Bonnaterre, 1788)	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2002-11
	Lamniformes						
	Alopiidae						
18	<i>Alopias superciliosus</i> Lowe, 1841	○	⊙	⊙	⊙	○	
19	<i>Alopias vulpinus</i> (Bonnaterre, 1788)	○	⊙	⊙	⊙	⊙	
	Cetorhinidae						
20	<i>Cetorhinus maximus</i> (Gunnerus, 1765)	○	⊙	⊙	○	○	
	Lamnidae						
21	<i>Carcharodon carcharias</i> (Linnaeus, 1758)	○	⊙	⊙	⊙	○	
22	<i>Isurus oxyrinchus</i> Rafinesque, 1810*	●	⊙	⊙	○	○	ESFM-PIS/ 2023-34
23	<i>Lamna nasus</i> (Bonnaterre, 1788)	○	⊙	⊙	⊙	○	
	Odontaspidae						
24	<i>Carcharias taurus</i> Rafinesque, 1810	○	⊙	⊙	○	○	
25	<i>Odontaspis ferox</i> (Risso, 1810)	○	⊙	⊙	○	○	
	Myliobatiformes						
	Dasyatidae						
26	<i>Bathytoshia centroura</i> (Mitchill, 1815)	○	⊙	⊙	○	○	
27	<i>Dasyatis marmorata</i> (Steindachner, 1892)	●	⊙	○	○	○	ESFM-PIS/ 2023-93
28	<i>Dasyatis pastinaca</i> (Linnaeus, 1758)*	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 1994-06
29	<i>Dasyatis tortonesei</i> Capapé, 1975	○	⊙	⊙	○	○	
30	<i>Himantura leoparda</i> Manjaji-Matsumoto & Last, 2008	○	⊙	○	○	○	
31	<i>Himantura uarnak</i> (Gmelin, 1789)	○	⊙	○	○	○	
32	<i>Pteroplatytrygon violacea</i> (Bonaparte, 1832)	○	⊙	⊙	○	○	
	Gymnuridae						
33	<i>Gymnura altavela</i> (Linnaeus, 1758)*	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2023-94
	Myliobatidae						
34	<i>Aetomylaeus bovinus</i> (Geoffroy Saint-Hilaire, 1817)*	●	⊙	⊙	○	○	ESFM-PIS/ 2023-96
35	<i>Mobula japonica</i> (Müller & Henle, 1841)	○	⊙	○	○	○	

	TAXA	ESFM-PIS	Mediterranean Sea	Aegean Sea	Marmara Sea	Black Sea	Catalog Number
36	<i>Mobula mobular</i> (Bonnaterre, 1788)	○	⊙	⊙	○	○	
37	<i>Myliobatis aquila</i> (Linnaeus, 1758)*	●	⊙	⊙	⊙	○	ESFM-PIS/ 2023-95
38	<i>Rhinoptera marginata</i> (Geoffroy Saint-Hilaire, 1817)	○	⊙	⊙	○	○	
	Rajiformes						
	Rajidae						
39	<i>Dipturus batis</i> (Linnaeus, 1758)	○	⊙	⊙	⊙	○	
40	<i>Dipturus oxyrinchus</i> (Linnaeus, 1758)	●	⊙	⊙	⊙	○	ESFM-PIS/ 2015-22
41	<i>Leucoraja circularis</i> (Couch, 1838)*	●	⊙	⊙	○	○	ESFM-PIS/ 2008-08
42	<i>Leucoraja fullonica</i> (Linnaeus, 1758)	○	⊙	⊙	○	○	
43	<i>Leucoraja naevus</i> (Müller & Henle, 1841)	●	⊙	⊙	⊙	○	ESFM-PIS/ 2002-09
44	<i>Raja asterias</i> Delaroche, 1809	●	⊙	⊙	⊙	○	ESFM-PIS/ 1994-05
45	<i>Raja clavata</i> Linnaeus, 1758	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 1998-05
46	<i>Raja miraletus</i> Linnaeus, 1758	●	⊙	⊙	⊙	○	ESFM-PIS/ 1994-08
47	<i>Raja montagui</i> Fowler, 1910	○	⊙	⊙	⊙	○	
48	<i>Raja polystigma</i> Regan, 1923	○	○	⊙	○	○	
49	<i>Raja radula</i> Delaroche, 1809*	●	⊙	⊙	⊙	○	ESFM-PIS/ 2023-91
50	<i>Raja undulata</i> Lacepède, 1802	○	⊙	⊙	○	○	
51	<i>Rostroraja alba</i> (Lacepède, 1803)*	●	⊙	⊙	○	○	ESFM-PIS/ 2023-29
	Rhinobatidae						
52	<i>Rhinobatos rhinobatos</i> (Linnaeus, 1758)*	●	⊙	⊙	○	○	ESFM-PIS/ 2022-06
	Rhinopristiformes						
	Glaucostegidae						
53	<i>Glaucostegus cemiculus</i> (Geoffroy Saint-Hilaire, 1817)*	●	⊙	⊙	○	○	ESFM-PIS/ 2023-90
	Squaliformes						
	Centrophoridae						
54	<i>Centrophorus granulosus</i> (Bloch & Schneider, 1801)	●	⊙	⊙	⊙	○	ESFM-PIS/ 2001-04

	TAXA	ESFM-PIS	Mediterranean Sea	Aegean Sea	Marmara Sea	Black Sea	Catalog Number
55	<i>Centrophorus uyato</i> (Rafinesque, 1810) Dalatiidae	○	○	⊙	○	○	
56	<i>Dalatias licha</i> (Bonnaterre, 1788)* Echinorhinidae	●	⊙	⊙	⊙	○	ESFM-PIS/ 2023-77
57	<i>Echinorhinus brucus</i> (Bonnaterre, 1788) Etmopteridae	○	⊙	⊙	⊙	○	
58	<i>Etmopterus spinax</i> (Linnaeus, 1758)* Oxynotidae	●	⊙	⊙	○	○	ESFM-PIS/ 2016-17
59	<i>Oxynotus centrina</i> (Linnaeus, 1758)* Somniosidae	●	⊙	⊙	⊙	○	ESFM-PIS/ 2023-79
60	<i>Somniosus rostratus</i> (Risso, 1827) Squalidae	○	⊙	○	○	○	
61	<i>Squalus acanthias</i> Linnaeus, 1758* Squatiniformes	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2023-87
62	<i>Squalus blainville</i> (Risso, 1827) Squatiniidae	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2022-39
63	<i>Squatina aculeata</i> Cuvier, 1829* Torpediniformes	●	⊙	⊙	○	○	ESFM-PIS/ 2006-14
64	<i>Squatina oculata</i> Bonaparte, 1840* Torpedinidae	●	⊙	⊙	⊙	○	ESFM-PIS/ 2023-88
65	<i>Squatina squatina</i> (Linnaeus, 1758) Torpediniformes	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2006-15
66	<i>Tetronarce nobiliana</i> (Bonaparte, 1835) Torpedinidae	○	⊙	⊙	⊙	○	
67	<i>Torpedo marmorata</i> Risso, 1810	●	⊙	⊙	⊙	○	ESFM-PIS/ 2023-89
68	<i>Torpedo torpedo</i> (Linnaeus, 1758) Rhinobatidae	○	⊙	⊙	⊙	○	
69	<i>Rhinobatos rhinobatos</i> (Linnaeus, 1758) Rhinopristiformes	●	⊙	⊙	○	○	ESFM-PIS/ 2022-06
70	<i>Glaucostegus cemiculus</i> (Geoffroy Saint-Hilaire, 1817) Glaucostegidae	●	⊙	⊙	○	○	ESFM-PIS/ 2023-90

	TAXA	ESFM-PIS	Mediterranean Sea	Aegean Sea	Marmara Sea	Black Sea	Catalog Number
	OSTEICHTHYES						
	Acanthuriformes						
	Pomacanthidae						
71	<i>Pomacanthus imperator</i> (Bloch, 1787)	○	⊙	○	○	○	
	Acipenseriformes						
	Acipenseridae						
72	<i>Acipenser gueldenstaedtii</i> Brandt & Ratzeburg, 1833*	●	○	⊙	⊙	⊙	ESFM-PIS/ 2023-98
73	<i>Acipenser nudiiventris</i> Lovetsky, 1828	○	○	○	⊙	⊙	
74	<i>Acipenser stellatus</i> Pallas, 1771*	●	○	⊙	⊙	⊙	ESFM-PIS/ 2023-99
75	<i>Acipenser sturio</i> Linnaeus, 1758	●	○	⊙	⊙	⊙	ESFM-PIS/ 2023-100
76	<i>Huso huso</i> (Linnaeus, 1758)	○	○	⊙	⊙	⊙	
	Anguilliformes						
	Anguillidae						
77	<i>Anguilla anguilla</i> (Linnaeus, 1758)*	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 1998-06
	Chlopsidae						
78	<i>Chlopsis bicolor</i> Rafinesque, 1810	○	⊙	○	○	○	
	Congridae						
79	<i>Ariosoma balearicum</i> (Delaroche, 1809)	●	⊙	⊙	○	○	ESFM-PIS/ 2015-23
80	<i>Conger conger</i> (Linnaeus, 1758)	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 1974-07
81	<i>Gnathophis mystax</i> (Delaroche, 1809)	●	⊙	⊙	○	○	ESFM-PIS/ 2015-24
	Heterenchelyidae						
82	<i>Panturichthys fowleri</i> (Ben-Tuvia, 1953)	○	⊙	○	○	○	
	Muraenesocidae						
83	<i>Muraenesox cinereus</i> (Forsskål, 1775)	○	⊙	○	○	○	
	Muraenidae						
84	<i>Enchelycore anatina</i> (Lowe, 1838)	○	⊙	⊙	○	○	
85	<i>Gymnothorax unicolor</i> (Delaroche, 1809)	○	⊙	⊙	○	○	
86	<i>Muraena helena</i> Linnaeus, 1758	●	⊙	⊙	⊙	○	ESFM-PIS/ 1992-02
	Nemichthyidae						
87	<i>Nemichthys scolopaceus</i> Richardson, 1848	●	⊙	⊙	○	○	ESFM-PIS/ 2017-14

	TAXA	ESFM-PIS	Mediterranean Sea	Aegean Sea	Marmara Sea	Black Sea	Catalog Number
	Nettastomatidae						
88	<i>Facciolella oxyrhyncha</i> (Bellotti, 1883)	●	⊙	⊙	○	○	ESFM-PIS/ 2017-13
89	<i>Nettastoma melanura</i> Rafinesque, 1810	●	⊙	⊙	○	○	ESFM-PIS/ 2016-18
	Ophichthidae						
90	<i>Apterichtus caecus</i> (Linnaeus, 1758)	○	⊙	○	○	○	
91	<i>Dalophis imberbis</i> (Delaroche, 1809)	○	⊙	⊙	○	○	
92	<i>Echelus myrus</i> (Linnaeus, 1758)	●	⊙	⊙	○	○	ESFM-PIS/ 2003-03
93	<i>Ophichthus rufus</i> (Rafinesque, 1810)	○	⊙	⊙	○	○	
94	<i>Ophisurus serpens</i> (Linnaeus, 1758)	●	⊙	⊙	○	○	ESFM-PIS/ 2013-10
95	<i>Pisodonophis semicinctus</i> (Richardson, 1848)	○	○	⊙	○	○	
	Synaphobranchidae						
96	<i>Dysomma brevirostre</i> (Facciola, 1887)	●	⊙	⊙	○	○	ESFM-PIS/ 2023-101
	Argentiniformes						
	Argentinidae						
97	<i>Argentina sphyraena</i> Linnaeus, 1758	●	⊙	⊙	⊙	○	ESFM-PIS/ 2022-41
98	<i>Glossanodon leioglossus</i> (Valenciennes, 1848)	●	⊙	⊙	○	○	ESFM-PIS/ 2022-42
	Atheriniformes						
	Atherinidae						
99	<i>Atherina boyeri</i> Risso, 1810	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2015-15
100	<i>Atherina hepsetus</i> Linnaeus, 1758	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2001-01
101	<i>Atherinomorus forskalii</i> (Rüppell, 1838)	●	⊙	⊙	○	○	ESFM-PIS/ 2023-21
	Aulopiformes						
	Aulopidae						
102	<i>Aulopus filamentosus</i> (Bloch, 1792)	●	⊙	⊙	○	○	ESFM-PIS/ 2023-107
	Chlorophthalmidae						
103	<i>Chlorophthalmus agassizi</i> Bonaparte, 1840	●	⊙	⊙	○	○	ESFM-PIS/ 2016-22
	Evermannellidae						
104	<i>Evermannella balbo</i> (Risso, 1820)	●	⊙	○	○	○	ESFM-PIS/

	TAXA	ESFM-PIS	Mediterranean Sea	Aegean Sea	Marmara Sea	Black Sea	Catalog Number
							2016-24
	Ipnopidae						
105	<i>Bathypterois mediterraneus</i> Bauchot, 1962	●	○	⊙	○	○	ESFM-PIS/ 2010-11
	Paralepididae						
106	<i>Arctozenus risso</i> (Bonaparte, 1840)	○	⊙	⊙	○	○	
107	<i>Lestidiops jayakari jayakari</i> (Boulenger, 1889)	○	⊙	⊙	○	○	
108	<i>Lestidiops sphyrenoides</i> (Risso, 1820)	●	○	⊙	○	○	ESFM-PIS/ 2023-108
109	<i>Paralepis speciosa</i> Bellotti, 1878	●	⊙	○	○	○	ESFM-PIS/ 2022-10
110	<i>Sudis hyalina</i> Rafinesque, 1810	●	⊙	⊙	○	○	ESFM-PIS/ 2016-23
	Synodontidae						
111	<i>Saurida lessepsianus</i> Russell, Golani & Tikochinski, 2015	●	⊙	⊙	○	○	ESFM-PIS/ 2017-19
112	<i>Synodus saurus</i> (Linnaeus, 1758)	●	⊙	⊙	○	○	ESFM-PIS/ 2013-03
	Beloniformes						
	Belonidae						
113	<i>Ablennes hians</i> (Valenciennes, 1846)	●	⊙	○	○	○	ESFM-PIS/ 2022-07
114	<i>Belone belone</i> (Linnaeus, 1760)	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2023-22
115	<i>Belone euxini</i> Günther, 1866	○	○	○	○	⊙	
116	<i>Belone svetovidovi</i> Collette & Parin, 1970	●	⊙	⊙	○	○	ESFM-PIS/ 2023-33
117	<i>Tylosurus acus</i> (Lacepède, 1803)	○	⊙	⊙	○	○	
118	<i>Tylosurus imperialis</i> (Rafinesque, 1810)	●	⊙	⊙	○	○	ESFM-PIS/ 2010-03
	Exocoetidae						
119	<i>Cheilopogon heterurus</i> (Rafinesque, 1810)	○	⊙	○	○	○	
120	<i>Hirundichthys rondeletii</i> (Valenciennes, 1847)	○	⊙	⊙	⊙	○	
121	<i>Parexocoetus mento</i> (Valenciennes, 1847)	●	⊙	⊙	○	○	ESFM-PIS/ 2010-09
	Hemiramphidae						
122	<i>Hemiramphus far</i> (Forsskål, 1775)	●	⊙	⊙	○	○	ESFM-PIS/ 2018-10
123	<i>Hyporhamphus picarti</i> (Valenciennes, 1847)	○	⊙	○	○	○	

	TAXA	ESFM-PIS	Mediterranean Sea	Aegean Sea	Marmara Sea	Black Sea	Catalog Number
	Scomberesocidae						
124	<i>Scomberesox saurus</i> (Walbaum, 1792)	●	⊙	⊙	⊙	○	ESFM-PIS/2005-03
	Beryciformes						
	Holocentridae						
125	<i>Sargocentron rubrum</i> (Forsskål, 1775)	●	⊙	⊙	○	○	ESFM-PIS/2023-121
	Trachichthyidae						
126	<i>Hoplostethus mediterraneus</i> Cuvier, 1829	●	⊙	⊙	○	○	ESFM-PIS/2023-80
	Callionymiformes						
	Callionymidae						
127	<i>Callionymus fasciatus</i> Valenciennes, 1837	●	⊙	⊙	⊙	○	ESFM-PIS/2023-68
128	<i>Callionymus filamentosus</i> Valenciennes, 1837	●	⊙	⊙	○	○	ESFM-PIS/2016-15
129	<i>Callionymus lyra</i> Linnaeus, 1758	●	⊙	⊙	⊙	⊙	ESFM-PIS/2010-06
130	<i>Callionymus maculatus</i> Rafinesque, 1810	●	⊙	⊙	⊙	○	ESFM-PIS/2002-01
131	<i>Callionymus pusillus</i> Delaroche, 1809	●	⊙	⊙	⊙	⊙	ESFM-PIS/2023-69
132	<i>Callionymus risso</i> Lesueur, 1814	●	⊙	⊙	⊙	⊙	ESFM-PIS/2023-70
133	<i>Diplogrammus randalli</i> Fricke, 1983	○	○	⊙	○	○	
134	<i>Synchiropus phaeton</i> (Günther, 1861)	●	⊙	⊙	○	○	ESFM-PIS/2022-36
135	<i>Synchiropus sechellensis</i> Regan, 1908	●	⊙	○	○	○	ESFM-PIS/2023-71
	Centrarchiformes						
	Terapontidae						
136	<i>Terapon puta</i> Cuvier, 1829	○	⊙	○	○	○	
	Clupeiformes						
	Clupeidae						
137	<i>Alosa caspia</i> (Eichwald, 1838)	○	○	○	⊙	⊙	
138	<i>Alosa fallax</i> (Lacepède, 1803)	●	⊙	⊙	⊙	⊙	ESFM-PIS/1989-04
139	<i>Alosa immaculata</i> Bennett, 1835	○	○	○	○	⊙	
140	<i>Alosa maeotica</i> (Grimm, 1901)	○	○	○	⊙	⊙	
141	<i>Alosa tanaica</i> (Grimm, 1901)	○	○	○	⊙	⊙	

	TAXA	ESFM-PIS	Mediterranean Sea	Aegean Sea	Marmara Sea	Black Sea	Catalog Number
142	<i>Clupeonella cultriventris</i> (von Nordmann, 1840)	○	○	○	⊙	⊙	
143	<i>Herklotsichthys punctatus</i> (Rüppell, 1837)	○	⊙	○	○	○	
144	<i>Sardina pilchardus</i> (Walbaum, 1792)	●	⊙	●	⊙	⊙	ESFM-PIS/ 2002-05
145	<i>Sardinella aurita</i> Valenciennes, 1847	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2010-10
146	<i>Sardinella maderensis</i> (Lowe, 1838)	●	●	⊙	○	○	ESFM-PIS/ 2017-15
147	<i>Sprattus sprattus</i> (Linnaeus, 1758)	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2023-102
	Dussumieriidae						
148	<i>Dussumieria elopsoides</i> Bleeker, 1849	●	●	○	○	○	ESFM-PIS/ 2017-04
149	<i>Etrumeus golanii</i> DiBattista, Randall & Bowen, 2012	●	●	⊙	○	○	ESFM-PIS/ 2022-40
	Engraulidae						
150	<i>Encrasicholina punctifer</i> Fowler, 1938	○	⊙	○	○	○	
151	<i>Engraulis encrasicolus</i> (Linnaeus, 1758)	●	⊙	●	⊙	⊙	ESFM-PIS/ 1989-11
152	<i>Stolephorus insularis</i> Hardenberg, 1933	○	⊙	○	○	○	
	Labridae						
153	<i>Centrolabrus melanocercus</i> (Risso, 1810)	○	⊙	⊙	○	○	
	Priacanthidae						
154	<i>Priacanthus hamrur</i> (Forsskål, 1775)	○	⊙	○	○	○	
155	<i>Priacanthus prolixus</i> Starnes, 1988	○	⊙	○	○	○	
156	<i>Priacanthus sagittarius</i> Starnes, 1988	○	⊙	○	○	○	
	Gadiformes						
	Bregmacerotidae						
157	<i>Bregmaceros nectabanus</i> Whitley, 1941	●	●	⊙	○	○	ESFM-PIS/ 2015-01
	Gadidae						
158	<i>Gadiculus argenteus</i> Guichenot, 1850	●	⊙	⊙	⊙	○	ESFM-PIS/ 2017-24
159	<i>Merlangius merlangus</i> (Linnaeus, 1758)	●	⊙	●	⊙	○	ESFM-PIS/ 2006-12
160	<i>Micromesistius poutassou</i> (Risso, 1827)	●	⊙	⊙	⊙	○	ESFM-PIS/ 2023-118
161	<i>Trisopterus minutus</i>	●	⊙	●	⊙	○	ESFM-

	TAXA	ESFM-PIS	Mediterranean Sea	Aegean Sea	Marmara Sea	Black Sea	Catalog Number
	(Linnaeus, 1758)						PIS/ 1970-09
	Lotidae						
162	<i>Gaidropsarus biscayensis</i> (Collett, 1890)	○	○	⊙	⊙	○	
163	<i>Gaidropsarus mediterraneus</i> (Linnaeus, 1758)	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 1989-03
164	<i>Gaidropsarus vulgaris</i> (Cloquet, 1824)	●	○	⊙	⊙	○	ESFM-PIS/ 2010-12
165	<i>Molva macrophthalma</i> (Rafinesque, 1810)	●	⊙	⊙	○	○	ESFM-PIS/ 2023-119
	Macrouridae						
166	<i>Coelorinchus caelorhincus</i> (Risso, 1810)	●	⊙	⊙	○	○	ESFM-PIS/ 2015-25
167	<i>Hymenocephalus italicus</i> Giglioli, 1884	●	⊙	⊙	○	○	ESFM-PIS/ 2016-25
168	<i>Nezumia aequalis</i> (Günther, 1878)	○	⊙	⊙	⊙	○	
169	<i>Nezumia sclerorhynchus</i> (Valenciennes, 1838)	●	⊙	⊙	⊙	○	ESFM-PIS/ 2015-26
170	<i>Trachyrincus scabrus</i> (Rafinesque, 1810)	○	⊙	⊙	○	○	
	Merlucciidae						
171	<i>Merluccius merluccius</i> (Linnaeus, 1758)	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2023-120
	Moridae						
172	<i>Gadella maraldi</i> (Risso, 1810)	○	⊙	⊙	○	○	
173	<i>Lepidion lepidion</i> (Risso, 1810)	○	○	⊙	○	○	
174	<i>Mora moro</i> (Risso, 1810)	○	⊙	○	○	○	
	Phycidae						
175	<i>Phycis blennoides</i> (Brünnich, 1768)	●	⊙	⊙	○	○	ESFM-PIS/ 2018-11
176	<i>Phycis phycis</i> (Linnaeus, 1766)	●	⊙	⊙	○	○	ESFM-PIS/ 2015-28
	Gasterosteiformes						
	Gasterosteidae						
177	<i>Gasterosteus aculeatus</i> Linnaeus, 1758	○	⊙	⊙	⊙	⊙	
	Gobiesociformes						
	Gobiesocidae						
178	<i>Apletodon dentatus</i> (Facciola, 1887)	○	⊙	⊙	⊙	⊙	
179	<i>Apletodon incognitus</i> Hofrichter & Patzner, 1997	○	⊙	⊙	○	○	
180	<i>Diplecogaster bimaculata</i> (Bonnaterre, 1788)	○	⊙	⊙	⊙	⊙	

	TAXA	ESFM-PIS	Mediterranean Sea	Aegean Sea	Marmara Sea	Black Sea	Catalog Number
181	<i>Gouania willdenowi</i> (Risso, 1810)	○	⊙	⊙	○	○	
182	<i>Lepadogaster candolii</i> Risso, 1810	○	⊙	⊙	⊙	⊙	
183	<i>Lepadogaster lepadogaster</i> (Bonnaterre, 1788)	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2023-29
184	<i>Opeatogenys gracilis</i> (Canestrini, 1864)	○	⊙	⊙	○	○	
	Gobiiformes						
	Gobiidae						
185	<i>Aphia minuta</i> (Risso, 1810)	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2023-06
186	<i>Chromogobius quadrivittatus</i> (Steindachner, 1863)	○	⊙	⊙	⊙	○	
187	<i>Chromogobius zebratus</i> (Kolombatović, 1891)	○	⊙	⊙	○	○	
188	<i>Corcyrogobius liechtensteini</i> (Kolombatovic, 1891)	○	○	⊙	○	○	
189	<i>Cryptocentrus caeruleopunctatus</i> (Rüppell, 1830)	○	⊙	○	○	○	
190	<i>Crystallogobius linearis</i> (Düben, 1845)	○	○	⊙	○	○	
191	<i>Deltentosteus collonianus</i> (Risso, 1820)	○	⊙	○	○	○	
192	<i>Deltentosteus quadrimaculatus</i> (Valenciennes, 1837)	●	⊙	⊙	⊙	○	ESFM-PIS/ 2015-14
193	<i>Didogobius splechnai</i> Ahnelt & Patzner, 1995	○	○	⊙	○	○	
194	<i>Gammogobius steinitzi</i> Bath, 1971	○	○	⊙	○	○	
195	<i>Gobius auratus</i> Risso, 1810	○	⊙	⊙	⊙	○	
196	<i>Gobius bucchichi</i> Steindachner, 1870	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2023-07
197	<i>Gobius cobitis</i> Pallas, 1814	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 1995-10
198	<i>Gobius couchi</i> Miller & El-Tawil, 1974	●	○	⊙	○	○	ESFM-PIS/ 2023-08
199	<i>Gobius cruentatus</i> (Valenciennes, 1837)	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 1995-17
200	<i>Gobius fallax</i> Sarato, 1889	○	⊙	⊙	○	○	
201	<i>Gobius geniporus</i> Valenciennes, 1837	●	⊙	⊙	⊙	○	ESFM-PIS/ 1985-07
202	<i>Gobius kolombatovici</i> Kovačić & Miller, 2000	○	○	⊙	○	○	
203	<i>Gobius niger</i> Linnaeus, 1758	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 1981-01
204	<i>Gobius paganellus</i> Linnaeus,	●	⊙	⊙	⊙	⊙	ESFM-

	TAXA	ESFM-PIS	Mediterranean Sea	Aegean Sea	Marmara Sea	Black Sea	Catalog Number
	1758						PIS/ 2023-09
205	<i>Gobius roulei</i> Buen, 1928	○	⊙	⊙	○	○	
206	<i>Gobius vittatus</i> Vinciguerra, 1883	○	⊙	⊙	○	○	
207	<i>Gobius xanthocephalus</i> Heymer & Zander, 1992	○	○	⊙	○	○	
208	<i>Hazeus ingressus</i> Engin, Larson & Irmak, 2018	○	⊙	○	○	○	
209	<i>Knipowitschia caucasica</i> (Berg, 1916)	●	⊙	●	⊙	○	ESFM-PIS/ 2023-10
210	<i>Knipowitschia longicaudata</i> (Kessler, 1877)	○	○	○	○	⊙	
211	<i>Lesueurigobius friesii</i> (Malm, 1874)	●	⊙	⊙	⊙	○	ESFM-PIS/ 2023-11
212	<i>Lesueurigobius suerii</i> (Risso, 1810)	●	⊙	⊙	○	○	ESFM-PIS/ 2023-12
213	<i>Mesogobius batrachocephalus</i> (Pallas, 1814)	●	○	○	●	⊙	ESFM-PIS/ 1985-03
214	<i>Millerigobius macrocephalus</i> (Kolombatovic, 1891)	○	○	⊙	○	○	
215	<i>Neogobius melanostomus</i> (Pallas, 1814)	●	○	⊙	●	⊙	ESFM-PIS/ 1985-05
216	<i>Ponticola platyrostris</i> (Pallas, 1814)	○	○	○	○	⊙	
217	<i>Odondebuena balearica</i> (Pellegrin & Fage, 1907)	○	○	○	⊙	○	
218	<i>Oxyurichthys petersii</i> (Klunzinger, 1871)	●	⊙	●	○	○	ESFM-PIS/ 2005-02
219	<i>Pomatoschistus bathi</i> Miller, 1982	○	○	⊙	⊙	○	
220	<i>Pomatoschistus marmoratus</i> (Risso, 1810)	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2023-13
221	<i>Pomatoschistus minutus</i> (Pallas, 1770)	●	○	⊙	⊙	⊙	ESFM-PIS/ 2023-14
222	<i>Pomatoschistus quagga</i> (Heckel, 1837)	○	○	⊙	○	○	
223	<i>Ponticola eurycephalus</i> (Kessler, 1874)	○	○	○	○	⊙	
224	<i>Ponticola platyrostris</i> (Pallas, 1814)	○	○	○	○	⊙	
225	<i>Ponticola ratan</i> (von Nordmann, 1840)	○	○	○	○	⊙	
226	<i>Ponticola syrman</i> (von Nordmann, 1840)	○	○	○	⊙	⊙	
227	<i>Pseudaphya ferreri</i> (de Buen & Fage, 1908)	○	○	⊙	○	○	
228	<i>Thorogobius ephippiatus</i> (Lowe, 1839)	○	⊙	⊙	○	○	

	TAXA	ESFM-PIS	Mediterranean Sea	Aegean Sea	Marmara Sea	Black Sea	Catalog Number
229	<i>Thorogobius macrolepis</i> (Kolombatovic, 1891)	○	⊙	⊙	○	○	
230	<i>Trypauchen vagina</i> (Bloch & Schneider, 1801)	○	⊙	○	○	○	
231	<i>Vanderhorstia mertensi</i> Klausewitz, 1974	○	⊙	⊙	○	○	
232	<i>Zebrus zebrus</i> (Risso, 1827)	○	⊙	⊙	○	⊙	
233	<i>Zosterisessor ophiocephalus</i> (Pallas, 1814)	●	⊙	⊙	⊙	⊙	ESFM-PIS/2023-15
	Gonorynchiformes						
	Chanidae						
234	<i>Chanos chanos</i> (Forsskål, 1775)	●	⊙	○	○	○	ESFM-PIS/2023-103
	Kurtiformes						
	Apogonidae						
235	<i>Apogon imberbis</i> (Linnaeus, 1758)	●	⊙	⊙	⊙	○	ESFM-PIS/2010-13
236	<i>Apogonichthyoides pharaonis</i> (Bellotti, 1874)	●	⊙	⊙	○	○	ESFM-PIS/2023-45
237	<i>Cheilodipterus novemstriatus</i> (Rüppell, 1838)	●	⊙	○	○	○	ESFM-PIS/2022-15
238	<i>Jaydia queketti</i> (Gilchrist, 1903)	●	⊙	⊙	○	○	ESFM-PIS/2014-03
239	<i>Jaydia smithi</i> Kotthaus, 1970	●	⊙	○	○	○	ESFM-PIS/2022-29
240	<i>Ostorhinchus fasciatus</i> (White, 1790)	●	⊙	⊙	○	○	ESFM-PIS/2022-30
	Lampriformes						
	Lampridae						
241	<i>Lampris guttatus</i> (Brünnich, 1788)	○	○	⊙	○	○	
	Lophotidae						
242	<i>Lophotus lacepede</i> Giorna, 1809	○	○	⊙	○	○	
	Regalecidae						
243	<i>Regalecus glesne</i> Ascanius, 1772	○	⊙	⊙	○	○	
	Trachipteridae						
244	<i>Trachipterus trachipterus</i> (Gmelin, 1789)	●	⊙	⊙	⊙	○	ESFM-PIS/2023-117
245	<i>Zu cristatus</i> (Bonelli, 1819)	○	⊙	⊙	○	○	
	Lophiiformes						
	Lophiidae						
246	<i>Lophius budegassa</i> Spinola, 1807	●	⊙	⊙	⊙	⊙	ESFM-PIS/2023-38

	TAXA	ESFM-PIS	Mediterranean Sea	Aegean Sea	Marmara Sea	Black Sea	Catalog Number
247	<i>Lophius piscatorius</i> Linnaeus, 1758	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2010-14
	Mugiliformes						
	Mugilidae						
248	<i>Chelon auratus</i> (Risso, 1810)	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2023-24
249	<i>Chelon labrosus</i> (Risso, 1827)	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2007-03
250	<i>Chelon ramada</i> (Risso, 1827)	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2023-25
251	<i>Chelon saliens</i> (Risso, 1810)	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2023-26
252	<i>Mugil cephalus</i> Linnaeus, 1758	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 1992-03
253	<i>Oedalechilus labeo</i> (Cuvier, 1829)	●	⊙	⊙	⊙	○	ESFM-PIS/ 2023-28
254	<i>Planiliza carinata</i> (Valenciennes, 1836)	●	⊙	⊙	○	○	ESFM-PIS/ 2023-27
255	<i>Planiliza haematocheilus</i> (Temminck & Schlegel, 1845)	○	○	⊙	⊙	⊙	
	Myctophiformes						
	Myctophidae						
256	<i>Benthoosema glaciale</i> (Reinhardt, 1837)	●	⊙	⊙	⊙	○	ESFM-PIS/ 2023-109
257	<i>Ceratoscopelus maderensis</i> (Lowe, 1839)	●	⊙	⊙	○	○	ESFM-PIS/ 2023-110
258	<i>Diaphus holti</i> Tåning, 1918	●	⊙	⊙	○	○	ESFM-PIS/ 2023-111
259	<i>Diaphus metopoclampus</i> (Cocco, 1829)	●	⊙	⊙	○	○	ESFM-PIS/ 2017-20
260	<i>Diaphus rafinesquii</i> (Cocco, 1838)	●	⊙	⊙	○	○	ESFM-PIS/ 2017-21
261	<i>Electrona risso</i> (Cocco, 1829)	●	⊙	○	○	○	ESFM-PIS/ 2023-112
262	<i>Gonichthys cocco</i> (Cocco, 1829)	●	⊙	○	○	○	ESFM-PIS/ 2022-43
263	<i>Hygophum benoiti</i> (Cocco, 1838)	●	⊙	⊙	⊙	○	ESFM-PIS/ 2023-113
264	<i>Lampanyctus crocodilus</i> (Risso, 1810)	●	⊙	⊙	⊙	○	ESFM-PIS/ 2017-22
265	<i>Lampanyctus pusillus</i>	○	⊙	○	○	○	

	TAXA	ESFM-PIS	Mediterranean Sea	Aegean Sea	Marmara Sea	Black Sea	Catalog Number
	(Johnson, 1890)						
266	<i>Lobianchia dofleini</i> (Zugmayer, 1911)	●	⊙	⊙	○	○	ESFM-PIS/2023-114
267	<i>Lobianchia gemellarii</i> (Cocco, 1838)	●	○	⊙	○	○	ESFM-PIS/2023-115
268	<i>Myctophum punctatum</i> Rafinesque, 1810	●	⊙	⊙	⊙	○	ESFM-PIS/2023-116
269	<i>Notoscopelus bolini</i> Nafpaktitis, 1975	○	⊙	○	○	○	
270	<i>Notoscopelus elongatus</i> (Costa, 1844)	○	○	⊙	⊙	○	
271	<i>Notoscopelus kroyeri</i> (Malm, 1861)	○	○	⊙	○	○	
272	<i>Symbolophorus veranyi</i> (Moreau, 1888)	○	⊙	○	○	○	
	Notacanthiformes						
	Notacanthidae						
273	<i>Notacanthus bonaparte</i> Risso, 1840	○	⊙	⊙	○	○	
	Ophidiiformes						
	Bythitidae						
274	<i>Bellottia apoda</i> Giglioli, 1883	●	⊙	⊙	○	○	ESFM-PIS/2023-122
	Carapidae						
275	<i>Carapus acus</i> (Brünnich, 1768)	●	⊙	⊙	⊙	○	ESFM-PIS/1995-01
276	<i>Echiodon dentatus</i> (Cuvier, 1829)	○	○	⊙	○	○	
	Ophidiidae						
277	<i>Benthocometes robustus</i> (Goode & Bean, 1886)	○	⊙	⊙	○	○	
278	<i>Ophidion barbatum</i> Linnaeus, 1758	●	⊙	⊙	⊙	⊙	ESFM-PIS/1985-09
279	<i>Ophidion rochei</i> Müller, 1845	○	○	⊙	⊙	⊙	
280	<i>Parophidion vassali</i> (Risso, 1810)	●	⊙	⊙	⊙	○	ESFM-PIS/2009-04
	Osmeriformes						
	Microstomatidae						
281	<i>Microstoma microstoma</i> (Risso, 1810)	●	⊙	⊙	○	○	ESFM-PIS/2017-16
282	<i>Nansenia oblita</i> (Facciola, 1887)	○	○	⊙	○	○	
	Pomacentridae						
283	<i>Chromis chromis</i> (Linnaeus, 1758)	●	⊙	⊙	⊙	⊙	ESFM-PIS/1972-03
	Caproidae						

	TAXA	ESFM-PIS	Mediterranean Sea	Aegean Sea	Marmara Sea	Black Sea	Catalog Number
284	<i>Capros aper</i> (Linnaeus, 1758)	●	⊙	⊙	⊙	○	ESFM-PIS/ 2022-13
	Perciformes						
	Ammodytidae						
285	<i>Gymnammodytes cicereus</i> (Rafinesque, 1810)	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2023-64
	Blenniidae						
286	<i>Aidablennius sphyinx</i> (Valenciennes, 1836)	○	⊙	⊙	⊙	⊙	
287	<i>Blennius ocellaris</i> Linnaeus, 1758	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2022-12
288	<i>Coryphoblennius galerita</i> (Linnaeus, 1758)	○	⊙	⊙	⊙	⊙	
289	<i>Lipophrys trigloides</i> (Valenciennes, 1836)	○	⊙	⊙	⊙	○	
290	<i>Microlipophrys adriaticus</i> (Steindachner & Kolombatovic, 1883)	○	○	⊙	⊙	⊙	
291	<i>Microlipophrys caneuae</i> (Vinciguerra, 1880)	○	⊙	⊙	○	○	
292	<i>Microlipophrys dalmatinus</i> (Steindachner & Kolombatovic, 1883)	○	⊙	⊙	○	○	
293	<i>Microlipophrys nigriceps</i> (Vinciguerra, 1883)	○	○	⊙	○	○	
294	<i>Omobranchus punctatus</i> (Valenciennes, 1836)	○	⊙	○	○	○	
295	<i>Parablennius gattorugine</i> (Linnaeus, 1758)	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2023-32
296	<i>Parablennius incognitus</i> (Bath, 1968)	○	⊙	⊙	⊙	⊙	
297	<i>Parablennius rouxi</i> (Cocco, 1833)	●	⊙	⊙	○	○	ESFM-PIS/ 2023-33
298	<i>Parablennius sanguinolentus</i> (Pallas, 1814)	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 1981-02
299	<i>Parablennius tentacularis</i> (Brünnich, 1768)	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2010-15
300	<i>Parablennius thysanius</i> (Jordan & Seale, 1907)	○	⊙	○	○	○	
301	<i>Parablennius zvonimiri</i> (Kolombatovic, 1892)	○	⊙	⊙	⊙	⊙	
302	<i>Petroscirtes ancyllodon</i> Rüppell, 1835	○	⊙	⊙	○	○	
303	<i>Salaria basilisca</i> (Valenciennes, 1836)	○	⊙	⊙	○	○	
304	<i>Salaria pavo</i> (Risso, 1810)	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2023-35
305	<i>Scartella cristata</i> (Linnaeus, 1758)	○	⊙	⊙	○	○	

	TAXA	ESFM-PIS	Mediterranean Sea	Aegean Sea	Marmara Sea	Black Sea	Catalog Number
	Bramidae						
306	<i>Brama brama</i> (Bonnaterre, 1788)	●	⊙	⊙	○	○	ESFM-PIS/ 2010-07
	Callanthidae						
307	<i>Callanthias ruber</i> (Rafinesque, 1810)	●	⊙	⊙	○	○	ESFM-PIS/ 2023-44
	Carangidae						
308	<i>Alectis alexandrina</i> (Geoffroy Saint-Hilaire, 1817)	●	⊙	⊙	○	○	ESFM-PIS/ 2011-04
309	<i>Alepes djedaba</i> (Forsskål, 1775)	●	⊙	⊙	○	○	ESFM-PIS/ 2007-02
310	<i>Campogramma glaycos</i> (Lacepède, 1801)	○	⊙	⊙	○	○	
311	<i>Caranx crysos</i> (Mitchill, 1815)	●	⊙	⊙	○	○	ESFM-PIS/ 2016-11
312	<i>Caranx rhonchus</i> Geoffroy Saint-Hilaire, 1817	●	⊙	⊙	○	○	ESFM-PIS/ 2017-05
313	<i>Decapterus russelli</i> (Rüppell, 1830)	●	⊙	○	○	○	ESFM-PIS/ 2022-31
314	<i>Lichia amia</i> (Linnaeus, 1758)	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 1978-01
315	<i>Naucrates ductor</i> (Linnaeus, 1758)	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 1989-01
316	<i>Pseudocaranx dentex</i> (Bloch & Schneider, 1801)	●	⊙	⊙	○	○	ESFM-PIS/ 2015-27
317	<i>Seriola dumerili</i> (Risso, 1810)	●	⊙	⊙	○	○	ESFM-PIS/ 2015-09
318	<i>Seriola fasciata</i> (Bloch, 1793)	●	⊙	⊙	○	○	ESFM-PIS/ 2021-01
319	<i>Trachinotus ovatus</i> (Linnaeus, 1758)	●	⊙	⊙	○	○	ESFM-PIS/ 2011-05
320	<i>Trachurus indicus</i> Nekrasov, 1966	○	⊙	○	○	○	
321	<i>Trachurus mediterraneus</i> (Steindachner, 1868)	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2022-32
322	<i>Trachurus picturatus</i> (Bowdich, 1825)	●	⊙	⊙	○	○	ESFM-PIS/ 2022-33
323	<i>Trachurus trachurus</i> (Linnaeus, 1758)	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2016-12
	Centracanthidae						
324	<i>Centracanthus cirrus</i> Rafinesque, 1810	●	⊙	⊙	○	○	ESFM-PIS/ 2016-13

	TAXA	ESFM-PIS	Mediterranean Sea	Aegean Sea	Marmara Sea	Black Sea	Catalog Number
325	<i>Spicara flexuosum</i> Rafinesque, 1810	●	⊙	⊙	○	⊙	ESFM-PIS/1992-01
326	<i>Spicara maena</i> (Linnaeus, 1758)	●	⊙	⊙	⊙	⊙	ESFM-PIS/2023-54
327	<i>Spicara smaris</i> (Linnaeus, 1758)	●	⊙	⊙	⊙	⊙	ESFM-PIS/1995-15
	Centrolophidae						
328	<i>Centrolophus niger</i> (Gmelin, 1789)	●	⊙	⊙	○	○	ESFM-PIS/1989-15
329	<i>Schedophilus ovalis</i> (Cuvier, 1833)	●	⊙	⊙	○	○	ESFM-PIS/2018-04
	Cepolidae						
330	<i>Cepola macrophthalma</i> (Linnaeus, 1758)	●	⊙	⊙	⊙	○	ESFM-PIS/2023-59
	Chaetodontidae						
331	<i>Heniochus intermedius</i> Steindachner, 1893	○	⊙	○	○	○	
	Champsodontidae						
332	<i>Champsodon nudivittis</i> (Ogilby, 1895)	●	⊙	⊙	○	○	ESFM-PIS/2014-02
333	<i>Champsodon vorax</i> Günther, 1867	●	⊙	⊙	○	○	ESFM-PIS/2014-10
	Clinidae						
334	<i>Clinitrachus argentatus</i> (Risso, 1810)	●	⊙	⊙	⊙	○	ESFM-PIS/1980-04
	Coryphaenidae						
335	<i>Coryphaena hippurus</i> Linnaeus, 1758	●	⊙	⊙	○	○	ESFM-PIS/2023-47
	Echeneidae						
336	<i>Echeneis naucrates</i> Linnaeus, 1758	●	⊙	⊙	⊙	○	ESFM-PIS/1991-01
337	<i>Remora osteochir</i> (Cuvier, 1829)	○	⊙	⊙	○	○	
338	<i>Remora remora</i> (Linnaeus, 1758)	○	⊙	⊙	⊙	○	
	Ephippidae						
339	<i>Platax teira</i> (Forsskål, 1775)	●	○	⊙	○	○	ESFM-PIS/2023-36
	Epigonidae						
340	<i>Epigonus constanciae</i> (Giglioli, 1880)	●	⊙	⊙	○	○	ESFM-PIS/2017-08
341	<i>Epigonus denticulatus</i> Dieuzeide, 1950	○	○	⊙	○	○	
342	<i>Epigonus telescopus</i> (Risso,	○	○	⊙	○	○	

	TAXA	ESFM-PIS	Mediterranean Sea	Aegean Sea	Marmara Sea	Black Sea	Catalog Number
	1810)						
343	<i>Microichthys coccoi</i> Rüppell, 1852	●	⊙	⊙	○	○	ESFM-PIS/ 2023-40
	Gempylidae						
344	<i>Ruvettus pretiosus</i> Cocco, 1833	○	⊙	⊙	○	○	
	Haemulidae						
345	<i>Pomadasys incisus</i> (Bowdich, 1825)	●	⊙	⊙	○	○	ESFM-PIS/ 2023-49
346	<i>Pomadasys stridens</i> (Forsskal, 1775)	●	⊙	⊙	○	○	ESFM-PIS/ 2015-07
	Istiophoridae						
347	<i>Istiophorus albicans</i> (Latreille, 1804)	○	⊙	⊙	○	○	
348	<i>Tetrapturus belone</i> Rafinesque, 1810	○	⊙	⊙	○	○	
	Labridae						
349	<i>Acantholabrus palloni</i> (Risso, 1810)	●	⊙	⊙	○	○	ESFM-PIS/ 2011-06
350	<i>Bodianus speciosus</i> (Bowdich, 1825)	○	○	⊙	○	○	
351	<i>Coris julis</i> (Linnaeus, 1758)	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2023-60
352	<i>Ctenolabrus rupestris</i> (Linnaeus, 1758)	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2023-61
353	<i>Labrus bergylta</i> Ascanius, 1767	○	○	⊙	⊙	○	
354	<i>Labrus merula</i> Linnaeus, 1758	●	⊙	⊙	⊙	○	ESFM-PIS/ 1995-14
355	<i>Labrus mixtus</i> Linnaeus, 1758	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 1982-02
356	<i>Labrus viridis</i> Linnaeus, 1758*	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2012-02
357	<i>Lappanella fasciata</i> (Cocco, 1833)	○	○	⊙	○	○	
358	<i>Pteragogus pelycus</i> Randall, 1981	○	⊙	⊙	○	○	
359	<i>Pteragogus trispilus</i> Randall, 2013	●	⊙	⊙	○	○	ESFM-PIS/ 2023-62
360	<i>Symphodus cinereus</i> (Bonnaterre, 1788)	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2023-63
361	<i>Symphodus doderleini</i> Jordan, 1890	○	⊙	⊙	⊙	○	
362	<i>Symphodus mediterraneus</i> (Linnaeus, 1758)	●	⊙	⊙	⊙	○	ESFM-PIS/ 1981-03

	TAXA	ESFM-PIS	Mediterranean Sea	Aegean Sea	Marmara Sea	Black Sea	Catalog Number
363	<i>Symphodus melops</i> (Linnaeus, 1758)	●	○	⊙	○	○	ESFM-PIS/ 1989-05
364	<i>Symphodus ocellatus</i> (Linnaeus, 1758)	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 1995-13
365	<i>Symphodus roissali</i> (Risso, 1810)	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2010-16
366	<i>Symphodus rostratus</i> (Bloch, 1791)	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 1994-02
367	<i>Symphodus tinca</i> (Linnaeus, 1758)	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 1989-07
368	<i>Thalassoma pavo</i> (Linnaeus, 1758)	●	⊙	⊙	⊙	○	ESFM-PIS/ 1996-01
369	<i>Xyrichtys novacula</i> (Linnaeus, 1758)	●	⊙	⊙	⊙	○	ESFM-PIS/ 2015-08
	Leiognathidae						
370	<i>Equulites klunzingeri</i> (Steindachner, 1898)	●	⊙	⊙	○	○	ESFM-PIS/ 2016-10
371	<i>Equulites leuciscus</i> (Günther, 1860)	○	⊙	○	○	○	
372	<i>Equulites popei</i> (Whitley, 1932)	●	⊙	○	○	○	ESFM-PIS/ 2023-37
	Lethrinidae						
373	<i>Monotaxis grandoculis</i> (Forsskål, 1775)	○	⊙	○	○	○	
	Lobotidae						
374	<i>Lobotes surinamensis</i> (Bloch, 1790)	●	⊙	⊙	○	○	ESFM-PIS/ 2011-01
	Lutjanidae						
375	<i>Lutjanus argentimaculatus</i> (Forsskål, 1775)	●	○	⊙	○	○	ESFM-PIS/ 2018-07
	Luvaridae						
376	<i>Luvarus imperialis</i> Rafinesque, 1810	○	⊙	⊙	○	○	
	Moronidae						
377	<i>Dicentrarchus labrax</i> (Linnaeus, 1758)	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2023-41
378	<i>Dicentrarchus punctatus</i> (Bloch, 1792)	○	⊙	⊙	○	○	
	Mullidae						
379	<i>Mullus barbatus</i> Linnaeus, 1758	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2021-05
380	<i>Mullus surmuletus</i> Linnaeus, 1758	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2012-01

	TAXA	ESFM- PIS	Mediterranean Sea	Aegean Sea	Marmara Sea	Black Sea	Catalog Number
381	<i>Parupeneus forsskali</i> (Fourmanoir & Guézé, 1976)	●	⊙	⊙	○	○	ESFM- PIS/ 2021-02
382	<i>Upeneus moluccensis</i> (Bleeker, 1855)	●	⊙	⊙	○	○	ESFM- PIS/ 2016-03
383	<i>Upeneus pori</i> Ben-Tuvia & Golani, 1989	●	⊙	⊙	○	○	ESFM- PIS/ 2005-01
	Nemipteridae						
384	<i>Nemipterus randalli</i> Russell, 1986	●	⊙	⊙	○	○	ESFM- PIS/ 2016-05
	Nomeidae						
385	<i>Cubiceps gracilis</i> (Lowe, 1843)	●	⊙	⊙	○	○	ESFM- PIS/ 2022-01
	Polyprionidae						
386	<i>Polyprion americanus</i> (Bloch & Schneider, 1801)	○	⊙	⊙	⊙	○	
	Pomatomidae						
387	<i>Pomatomus saltatrix</i> (Linnaeus, 1766)*	●	⊙	⊙	⊙	⊙	ESFM- PIS/ 2004-02
	Rachycentridae						
388	<i>Rachycentron canadum</i> (Linnaeus, 1766)	●	○	⊙	○	○	ESFM- PIS/ 2013-02
	Scaridae						
389	<i>Scarus ghobban</i> Forsskål, 1775	●	⊙	⊙	○	○	ESFM- PIS/ 2020-01
390	<i>Sparisoma cretense</i> (Linnaeus, 1758)	●	⊙	⊙	○	○	ESFM- PIS/ 1989-02
	Sciaenidae						
391	<i>Argyrosomus regius</i> (Asso, 1801)	●	⊙	⊙	⊙	⊙	ESFM- PIS/ 2023-55
392	<i>Sciaena umbra</i> Linnaeus, 1758	●	⊙	⊙	⊙	⊙	ESFM- PIS/ 2023-56
393	<i>Umbrina cirrosa</i> (Linnaeus, 1758)*	●	⊙	⊙	⊙	⊙	ESFM- PIS/ 2023-57
	Scombridae						
394	<i>Auxis rochei</i> (Risso, 1810)	●	⊙	⊙	⊙	⊙	ESFM- PIS/ 1991-02
395	<i>Euthynnus alletteratus</i> (Rafinesque, 1810)	●	⊙	⊙	⊙	⊙	ESFM- PIS/ 2023-123
396	<i>Katsuwonus pelamis</i> (Linnaeus, 1758)	○	⊙	⊙	⊙	○	
397	<i>Orcynopsis unicolor</i> (Geoffroy Saint-Hilaire, 1817)	○	⊙	⊙	○	○	

	TAXA	ESFM-PIS	Mediterranean Sea	Aegean Sea	Marmara Sea	Black Sea	Catalog Number
398	<i>Sarda sarda</i> (Bloch, 1793)	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2009-03
399	<i>Scomber colias</i> Gmelin, 1789	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2017-25
400	<i>Scomber scombrus</i> Linnaeus, 1758	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2002-06
401	<i>Scomberomorus commerson</i> (Lacepède, 1800)	●	⊙	⊙	○	○	ESFM-PIS/ 2018-08
402	<i>Thunnus alalunga</i> (Bonnaterre, 1788)	○	⊙	⊙	⊙	⊙	
403	<i>Thunnus thynnus</i> (Linnaeus, 1758)	○	⊙	⊙	⊙	⊙	
	Serranidae						
404	<i>Anthias anthias</i> (Linnaeus, 1758)	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2018-01
405	<i>Cephalopholis taeniops</i> (Valenciennes, 1828)	○	○	⊙	○	○	
406	<i>Epinephelus aeneus</i> (Geoffroy Saint-Hilaire, 1817)	●	⊙	⊙	○	○	ESFM-PIS/ 2017-09
407	<i>Epinephelus caninus</i> (Valenciennes, 1843)	○	⊙	⊙	○	○	
408	<i>Epinephelus coioides</i> (Hamilton, 1822)	○	⊙	○	○	○	
409	<i>Epinephelus costae</i> (Steindachner, 1878)	●	⊙	⊙	○	○	ESFM-PIS/ 1976-01
410	<i>Epinephelus marginatus</i> (Lowe, 1834)	●	⊙	⊙	⊙	○	ESFM-PIS/ 1989-13
411	<i>Hyporthodus haifensis</i> (Ben-Tuvia, 1953)	●	⊙	⊙	○	○	ESFM-PIS/ 2015-20
412	<i>Mycteroperca rubra</i> (Bloch, 1793)	○	⊙	⊙	○	○	
413	<i>Paranthias furcifer</i> (Valenciennes, 1828)	○	⊙	⊙	○	○	
414	<i>Serranus cabrilla</i> (Linnaeus, 1758)	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2023-42
415	<i>Serranus hepatus</i> (Linnaeus, 1758)	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 1989-10
416	<i>Serranus scriba</i> (Linnaeus, 1758)	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2023-43
	Siganidae						
417	<i>Siganus luridus</i> (Rüppell, 1829)	●	⊙	⊙	○	○	ESFM-PIS/ 1997-02
418	<i>Siganus rivulatus</i> Forsskål & Niebuhr, 1775	●	⊙	⊙	○	○	ESFM-PIS/ 2023-84

	TAXA	ESFM-PIS	Mediterranean Sea	Aegean Sea	Marmara Sea	Black Sea	Catalog Number
	Sillaginidae						
419	<i>Sillago suezensis</i> Golani, Fricke & Tikochinski, 2013	●	⊙	⊙	○	○	ESFM-PIS/ 2017-10
	Sparidae						
420	<i>Acanthopagrus bifasciatus</i> (Forsskal, 1775)	○	○	⊙	○	○	
421	<i>Boops boops</i> (Linnaeus, 1758)	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 1995-19
422	<i>Dentex dentex</i> (Linnaeus, 1758)*	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2023-50
423	<i>Dentex gibbosus</i> (Rafinesque, 1810)	●	⊙	⊙	⊙	○	ESFM-PIS/ 2023-51
424	<i>Dentex macrophthalmus</i> (Bloch, 1791)	●	⊙	⊙	○	○	ESFM-PIS/ 2022-34
425	<i>Dentex maroccanus</i> Valenciennes, 1830	●	⊙	⊙	○	○	ESFM-PIS/ 2018-02
426	<i>Diplodus annularis</i> (Linnaeus, 1758)	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 1965-07
427	<i>Diplodus cervinus</i> (Lowe, 1838)	●	⊙	⊙	○	○	ESFM-PIS/ 2023-52
428	<i>Diplodus puntazzo</i> (Walbaum, 1792)	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 1999-02
429	<i>Diplodus sargus</i> (Linnaeus, 1758)	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2002-03
430	<i>Diplodus vulgaris</i> (Geoffroy Saint-Hilaire, 1817)	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 1995-05
431	<i>Lithognathus mormyrus</i> (Linnaeus, 1758)	●	⊙	⊙	⊙	○	ESFM-PIS/ 2023-53
432	<i>Oblada melanura</i> (Linnaeus, 1758)	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 1995-06
433	<i>Pagellus acarne</i> (Risso, 1827)	●	⊙	⊙	⊙	○	ESFM-PIS/ 2005-05
434	<i>Pagellus bogaraveo</i> (Brünnich, 1768)	●	⊙	⊙	⊙	○	ESFM-PIS/ 2013-08
435	<i>Pagellus erythrinus</i> (Linnaeus, 1758)	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 1976-04
436	<i>Pagrus auriga</i> Valenciennes, 1843	●	⊙	⊙	○	○	ESFM-PIS/ 2015-04
437	<i>Pagrus caeruleostictus</i> (Valenciennes, 1830)	●	⊙	⊙	○	○	ESFM-PIS/ 2010-17
438	<i>Pagrus pagrus</i> (Linnaeus,	●	⊙	⊙	⊙	○	ESFM-

	TAXA	ESFM- PIS	Mediterranean Sea	Aegean Sea	Marmara Sea	Black Sea	Catalog Number
	1758)						PIS/ 1980-02
439	<i>Sarpa salpa</i> (Linnaeus, 1758)	●	⊙	⊙	⊙	⊙	ESFM- PIS/ 1971-02
440	<i>Sparus aurata</i> Linnaeus, 1758	●	⊙	⊙	⊙	⊙	ESFM- PIS/ 1989-12
441	<i>Spondyllosoma cantharus</i> (Linnaeus, 1758)	●	⊙	⊙	⊙	⊙	ESFM- PIS/ 1995-23
	Sphyraenidae						
442	<i>Sphyraena chrysotaenia</i> Klunzinger, 1884	●	⊙	⊙	○	○	ESFM- PIS/ 2022-37
443	<i>Sphyraena flavicauda</i> Rüppell, 1838	●	⊙	○	○	○	ESFM- PIS/ 2015-11
444	<i>Sphyraena sphyraena</i> (Linnaeus, 1758)	●	⊙	⊙	⊙	⊙	ESFM- PIS/ 2016-16
445	<i>Sphyraena viridensis</i> Cuvier, 1829	●	⊙	⊙	○	○	ESFM- PIS/ 2014-05
	Stromaetidae						
446	<i>Stromateus fiatola</i> Linnaeus, 1758	○	⊙	⊙	○	○	
	Terapontidae						
447	<i>Pelates quadrilineatus</i> (Bloch, 1790)	●	⊙	○	○	○	ESFM- PIS/ 2017-07
	Trachinidae						
448	<i>Echiichthys vipera</i> (Cuvier, 1829)	●	⊙	⊙	⊙	○	ESFM- PIS/ 2014-07
449	<i>Trachinus araneus</i> Cuvier, 1829	●	⊙	⊙	⊙	○	ESFM- PIS/ 2023-66
450	<i>Trachinus draco</i> Linnaeus, 1758	●	⊙	⊙	⊙	⊙	ESFM- PIS/ 2011-08
451	<i>Trachinus radiatus</i> Cuvier, 1829	●	⊙	⊙	⊙	○	ESFM- PIS/ 2018-05
	Trichiuridae						
452	<i>Lepidopus caudatus</i> (Euphrasen, 1788)	●	⊙	⊙	○	○	ESFM- PIS/ 2022-44
453	<i>Trichiurus lepturus</i> Linnaeus, 1758	●	⊙	⊙	○	○	ESFM- PIS/ 2011-03
	Tripterygiidae						
454	<i>Tripterygion delaisi</i> Cadenat & Blache, 1970	●	⊙	⊙	○	○	ESFM- PIS/ 2023-30
455	<i>Tripterygion melanurus</i> Guichenot, 1850	●	⊙	○	○	○	ESFM- PIS/ 2022-32

	TAXA	ESFM-PIS	Mediterranean Sea	Aegean Sea	Marmara Sea	Black Sea	Catalog Number
456	<i>Tripterygion tripteronotum</i> (Risso, 1810) Uranoscopidae	○	⊙	⊙	⊙	⊙	
457	<i>Uranoscopus scaber</i> Linnaeus, 1758 Xiphiidae	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2023-67
458	<i>Xiphias gladius</i> Linnaeus, 1758 Pleuronectiformes Bothidae	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 1968-01
459	<i>Arnoglossus imperialis</i> (Rafinesque, 1810)	●	⊙	⊙	⊙	○	ESFM-PIS/ 2023-18
460	<i>Arnoglossus kessleri</i> Schmidt, 1915	○	⊙	⊙	⊙	⊙	
461	<i>Arnoglossus laterna</i> (Walbaum, 1792)	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 1969-01
462	<i>Arnoglossus rueppellii</i> (Cocco, 1844)	●	⊙	⊙	○	○	ESFM-PIS/ 2015-17
463	<i>Arnoglossus thori</i> Kyle, 1913	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2016-07
464	<i>Bothus podas</i> (Delaroche, 1809) Citharidae	●	⊙	⊙	○	○	ESFM-PIS/ 2014-08
465	<i>Citharus linguatula</i> (Linnaeus, 1758) Cynoglossidae	●	⊙	⊙	⊙	○	ESFM-PIS/ 1998-04
466	<i>Cynoglossus sinuabici</i> (Chabanaud, 1931)	●	⊙	⊙	○	○	ESFM-PIS/ 2022-11
467	<i>Symphurus nigrescens</i> Rafinesque, 1810 Pleuronectidae	●	⊙	⊙	○	○	ESFM-PIS/ 2023-20
468	<i>Platichthys flesus</i> (Linnaeus, 1758) Scophthalmidae	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 1985-01
469	<i>Lepidorhombus boscii</i> (Risso, 1810)	●	⊙	⊙	⊙	○	ESFM-PIS/ 2023-16
470	<i>Lepidorhombus whiffiagonis</i> (Walbaum, 1792)	●	⊙	⊙	⊙	○	ESFM-PIS/ 2016-06
471	<i>Scophthalmus maximus</i> (Linnaeus, 1758)	●	○	⊙	⊙	⊙	ESFM-PIS/ 2023-17
472	<i>Scophthalmus rhombus</i> (Linnaeus, 1758)	●	⊙	⊙	⊙	○	ESFM-PIS/ 1992-05

	TAXA	ESFM-PIS	Mediterranean Sea	Aegean Sea	Marmara Sea	Black Sea	Catalog Number
473	<i>Zeugopterus regius</i> (Bonnaterre, 1788) Soleidae	○	⊙	⊙	⊙	○	
474	<i>Buglossidium luteum</i> (Risso, 1810)	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2016-08
475	<i>Dicologlossa cuneata</i> (Moreau, 1881)	●	○	⊙	⊙	○	ESFM-PIS/ 2023-78
476	<i>Microchirus ocellatus</i> (Linnaeus, 1758)	●	⊙	⊙	⊙	○	ESFM-PIS/ 1998-01
477	<i>Microchirus variegatus</i> (Donovan, 1808)	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2023-19
478	<i>Monochirus hispidus</i> Rafinesque, 1814	●	⊙	⊙	⊙	○	ESFM-PIS/ 2015-03
479	<i>Pegusa impar</i> (Bennett, 1831)	○	⊙	⊙	⊙	⊙	
480	<i>Pegusa lascaris</i> (Risso, 1810)	●	○	⊙	⊙	⊙	ESFM-PIS/ 1994-04
481	<i>Pegusa nasuta</i> (Pallas, 1814)	○	○	⊙	⊙	⊙	
482	<i>Solea aegyptiaca</i> Chabanaud, 1927	○	⊙	○	○	○	
483	<i>Solea solea</i> (Linnaeus, 1758)	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 1980-01
484	<i>Synapturichthys kleinii</i> (Risso, 1827) Scombriformes Tetragonuridae	○	⊙	⊙	⊙	○	
485	<i>Tetragonurus cuvieri</i> Risso, 1810 Scorpaeniformes Dactylopteridae	○	⊙	○	○	○	
486	<i>Dactylopterus volitans</i> (Linnaeus, 1758) Peristediidae	●	⊙	⊙	⊙	○	ESFM-PIS/ 1996-05
487	<i>Peristedion cataphractum</i> (Linnaeus, 1758) Scorpaenidae	●	⊙	⊙	⊙	○	ESFM-PIS/ 2013-07
488	<i>Pterois miles</i> (Bennett, 1828)	●	⊙	⊙	○	○	ESFM-PIS/ 2017-02
489	<i>Scorpaena elongata</i> Cadenat, 1943	●	⊙	⊙	○	○	ESFM-PIS/ 2017-12
490	<i>Scorpaena loppei</i> Cadenat, 1943	○	⊙	⊙	○	○	
491	<i>Scorpaena maderensis</i> Valenciennes, 1833	●	⊙	⊙	○	○	ESFM-PIS/ 1996-04

	TAXA	ESFM-PIS	Mediterranean Sea	Aegean Sea	Marmara Sea	Black Sea	Catalog Number
492	<i>Scorpaena notata</i> Rafinesque, 1810	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2023-73
493	<i>Scorpaena porcus</i> Linnaeus, 1758	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 1995-11
494	<i>Scorpaena scrofa</i> Linnaeus, 1758	●	⊙	⊙	⊙	○	ESFM-PIS/ 2023-74
	Sebastidae						
495	<i>Helicolenus dactylopterus</i> (Delaroche, 1809)	●	⊙	⊙	⊙	○	ESFM-PIS/ 2023-72
	Synanceiidae						
496	<i>Synanceia verrucosa</i> Bloch & Schneider, 1801	○	⊙	○	○	○	
	Triglidae						
497	<i>Chelidonichthys cuculus</i> (Linnaeus, 1758)	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2022-38
498	<i>Chelidonichthys lastoviza</i> (Bonnaterre, 1788)	●	⊙	⊙	⊙	○	ESFM-PIS/ 2013-09
499	<i>Chelidonichthys lucerna</i> (Linnaeus, 1758)	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2006-09
500	<i>Chelidonichthys obscurus</i> (Walbaum, 1792)	○	⊙	⊙	○	○	
501	<i>Eutrigla gurnardus</i> (Linnaeus, 1758)	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2023-75
502	<i>Lepidotrigla cavillone</i> (Lacepède, 1801)	●	⊙	⊙	⊙	○	ESFM-PIS/ 2006-10
503	<i>Lepidotrigla dieuzeidei</i> Blanc & Hureau, 1973	●	⊙	⊙	⊙	○	ESFM-PIS/ 2015-21
504	<i>Trigla lyra</i> Linnaeus, 1758	●	⊙	⊙	⊙	○	ESFM-PIS/ 2015-21
	Siluriformes						
	Plotosidae						
505	<i>Plotosus lineatus</i> (Thunberg, 1787)	●	⊙	○	○	○	ESFM-PIS/ 2022-03
	Stomiiformes						
	Gonostomatidae						
506	<i>Cyclothone braueri</i> Jespersen & Tåning, 1926	●	⊙	⊙	○	○	ESFM-PIS/ 2023-129
507	<i>Cyclothone pygmaea</i> Jespersen & Tåning, 1926	○	⊙	○	○	○	
508	<i>Gonostoma denudatum</i> Rafinesque, 1810	●	⊙	○	○	○	ESFM-PIS/ 2017-17
	Phosichthyidae						
509	<i>Vinciguerra attenuata</i>	●	⊙	⊙	○	○	ESFM-

	TAXA	ESFM-PIS	Mediterranean Sea	Aegean Sea	Marmara Sea	Black Sea	Catalog Number
	(Cocco, 1838)						PIS/2023-104
510	<i>Vinciguerria poweriae</i> (Cocco, 1838)	●	○	⊙	○	○	ESFM-PIS/2023-105
	Sternoptychidae						
511	<i>Argyroleucus hemigymnus</i> Cocco, 1829	●	⊙	⊙	⊙	○	ESFM-PIS/2016-20
512	<i>Maurolucus muelleri</i> (Gmelin, 1789)	●	⊙	⊙	⊙	○	ESFM-PIS/2016-19
	Stomiidae						
513	<i>Bathophilus nigerrimus</i> Giglioli, 1882	●	⊙	⊙	○	○	ESFM-PIS/2023-106
514	<i>Chauliodus sloani</i> Bloch & Schneider, 1801	●	⊙	⊙	○	○	ESFM-PIS/2016-21
515	<i>Stomias boa</i> (Risso, 1810)	●	⊙	⊙	⊙	○	ESFM-PIS/2017-18
	Syngnathiformes						
	Centriscidae						
516	<i>Macroramphosus scolopax</i> (Linnaeus, 1758)	●	⊙	⊙	○	○	ESFM-PIS/1994-09
	Fistulariidae						
517	<i>Fistularia commersonii</i> Rüppell, 1838	●	⊙	⊙	○	○	ESFM-PIS/2016-26
518	<i>Fistularia petimba</i> Lacepède, 1803	●	⊙	○	○	○	ESFM-PIS/2017-26
	Syngnathidae						
519	<i>Hippocampus fuscus</i> Rüppell, 1838	●	⊙	○	○	○	ESFM-PIS/2023-124
520	<i>Hippocampus guttulatus</i> Cuvier, 1829	●	⊙	⊙	⊙	⊙	ESFM-PIS/2023-125
521	<i>Hippocampus hippocampus</i> (Linnaeus, 1758)	●	⊙	⊙	⊙	⊙	ESFM-PIS/1995-03
522	<i>Nerophis maculatus</i> Rafinesque, 1810	●	○	○	⊙	○	ESFM-PIS/2023-126
523	<i>Nerophis ophidion</i> (Linnaeus, 1758)	●	⊙	⊙	⊙	⊙	ESFM-PIS/2023-127
524	<i>Syngnathus abaster</i> Risso, 1827	●	⊙	⊙	⊙	⊙	ESFM-PIS/2023-128
525	<i>Syngnathus acus</i> Linnaeus, 1758	●	⊙	⊙	⊙	⊙	ESFM-PIS/1997-04
526	<i>Syngnathus phlegon</i> Risso, 1827	●	⊙	⊙	⊙	○	ESFM-PIS/

	TAXA	ESFM-PIS	Mediterranean Sea	Aegean Sea	Marmara Sea	Black Sea	Catalog Number
							2023-02
527	<i>Syngnathus schmidtii</i> Popov, 1928	●	○	○	⊙	⊙	ESFM-PIS/ 2023-03
528	<i>Syngnathus tenuirostris</i> Rathke, 1837	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2023-04
529	<i>Syngnathus typhle</i> Linnaeus, 1758	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2023-85
530	<i>Syngnathus variegatus</i> Pallas, 1814	●	○	○	○	⊙	ESFM-PIS/ 2023-05
	Tetraodontiformes						
	Balistidae						
531	<i>Balistes capriscus</i> Gmelin, 1789*	●	⊙	⊙	⊙	⊙	ESFM-PIS/ 2014-01
	Diodontidae						
532	<i>Cyclichthys spilostylus</i> (Leis & Randall, 1982)	○	⊙	○	○	○	
	Molidae						
533	<i>Mola mola</i> (Linnaeus, 1758)	○	⊙	⊙	⊙	○	
534	<i>Ranzania laevis</i> (Pennant, 1776)	●	⊙	⊙	○	○	ESFM-PIS/ 2023-39
	Monacanthidae						
535	<i>Stephanolepis diaspros</i> Fraser-Brunner, 1940	●	⊙	⊙	⊙	○	ESFM-PIS/ 1997-01
	Tetraodontidae						
536	<i>Lagocephalus guentheri</i> Miranda Ribeiro, 1915	●	⊙	⊙	⊙	○	ESFM-PIS/ 2015-10
537	<i>Lagocephalus lagocephalus</i> (Linnaeus, 1758)	●	⊙	⊙	○	○	ESFM-PIS/ 1973-02
538	<i>Lagocephalus scleratus</i> (Gmelin, 1789)	●	⊙	⊙	⊙	○	ESFM-PIS/ 2015-18
539	<i>Lagocephalus spadiceus</i> (Richardson, 1845)	●	⊙	⊙	⊙	○	ESFM-PIS/ 2022-19
540	<i>Lagocephalus suezensis</i> Clark & Gohar, 1953	●	⊙	⊙	○	○	ESFM-PIS/ 2023-81
541	<i>Sphoeroides pachygaster</i> (Müller & Troschel, 1848)	●	⊙	⊙	○	○	ESFM-PIS/ 1982-01
542	<i>Torquigener flavimaculosus</i> Hardy & Randall, 1983	●	⊙	⊙	○	○	ESFM-PIS/ 2022-14
543	<i>Tylerius spinosissimus</i> (Regan, 1908)	○	⊙	○	○	○	
	Zeiformes						
	Zeidae						

	TAXA	ESFM-PIS	Mediterranean Sea	Aegean Sea	Marmara Sea	Black Sea	Catalog Number
544	<i>Zeus faber</i> Linnaeus, 1758	●	⊙	⊙	⊙	⊙	ESFM-PIS/2017-23

(*Endangered species according to IUCN)

This study draws on specimens from various research and projects in four different Turkish seas. These samples have been integrated into the “Turkish Marine Fish Department” within the Ege University Faculty of Fisheries’ Scientific Material (ESFM), an initiative we started in 2007. Our goal with this initiative is to preserve fish species found in Turkish seas for future generations. We hope that this department will be a valuable resource for scientists interested in fish systematics and fish biology in Türkiye and around the globe.

The Faculty of Fisheries at Ege University has cataloged its marine fish specimen collection in an international system. Information such as collection date, sampling location, quantity, habitat, depth, and project number have been recorded for each specimen. Details of each specimen’s collector and identifier are also logged. The specimens are preserved in glass jars filled with a 10% formalin solution and labeled with standardized ESFM tags. Over the years, a list of fish species in the seas of Türkiye has been compiled. Initially,¹⁸Karataş et al. (2021) reported 530 species. However, new records in subsequent years increased this count to 542, according to²⁸Çınar et al. (2021),²⁵Irmak and Özden (2021),²⁶Manasırılı and Mavruk (2021), and²⁷Ergüden et al. (2022). The ESFM-PIS has registered 360 species, which is about 66% of the total. Among the 67 cartilaginous fish species found in Turkish seas, 35 (52%) are represented in museums. Of the 474 bony fish species, 311 (66%) are in collections. The remaining 197 observed species, largely comprising large, rare, deep-sea, and commercially uncatchable species, are not included in collections. Most specimens originate from the Aegean and Mediterranean Seas, with fewer from the Marmara and Black Seas. Efforts are ongoing to expand the collection to include samples from all fish species in all Turkish seas. The collection includes 32 endangered species, 11 of which are critically endangered, according to the IUCN Red List. The collection also includes 54 species that have invaded the Mediterranean and Southern Aegean Seas from the Red Sea following the opening of the Suez Canal. The continued addition of these species will contribute to the overall species count. The ESFM-PIS, given its species diversity, is a significant resource for researchers studying Turkish marine fish. As missing species are added, the collection will continue growing. The 60-year span of collected samples, organized to museum standards, ensures a clear research path to include all Turkish marine fish species in the ESFM-PIS. This study is based on specimens obtained from various research and projects in four different Turkish seas. These samples have been incorporated into the “Turkish Marine Fish De-

partment” within the Ege University Faculty of Fisheries’ Scientific Material (ESFM), an initiative established in 2007. The goal of this initiative is to preserve fish species found in Turkish seas for future generations. We hope that this department will benefit scientists interested in fish systematics and fish biology in Türkiye and worldwide.

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AUTHOR CONTRIBUTION PER CREDIT

Conceptualization: Bahar Bayhan (Lead), Sencer Akalın (Supporting), Ertan Taşkavak (Supporting). Methodology: Bahar Bayhan (Lead), Sencer Akalın (Supporting), Salim C. Akçınar (Supporting), Murat Kaya (Supporting). Formal Analysis: Bahar Bayhan (Lead), Murat Kaya (Supporting), Okan Özyaydın (Supporting), Tuncay M. Sever (Supporting), Alp Salman (Supporting), Şule Gürkan (Supporting), Dilek İlhan (Supporting), Orçin Uygun (Supporting), Burak Altay (Supporting). Investigation: Bahar Bayhan (Lead), Murat Kaya (Supporting), Okan Özyaydın (Supporting), Tuncay M. Sever (Supporting), Alp Salman (Supporting), Şule Gürkan (Supporting), Dilek İlhan (Supporting), Orçin Uygun (Supporting), Burak Altay (Supporting). Writing – original draft: Bahar Bayhan (Lead), Sencer Akalın (Supporting), Burcu Taylan (Supporting), Murat Kaya (Supporting), Ertan Taşkavak (Supporting). Writing – review & editing: Bahar Bayhan (Lead), Sencer Akalın (Supporting), Ertan Taşkavak (Supporting). Resources: Bahar Bayhan (Equal), Burcu Taylan (Equal). Supervision: Bahar Bayhan (Equal), Ertan Taşkavak (Equal).

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