THE STATE OF THE TURKISH FISHERIES

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Publication No: 34

Istanbul 2012

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Bu kitabın bütün hakları Türk Deniz Araştırma Vakfına aittir. İzinsiz basılamaz, çoğaltılamaz. Kitapta bulunan makalelerin bilimsel sorumluluğu yazarlara aittir.

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ISBN - 978-975-8825-26-4

Citation: Tokaç, A., Gücü, A.C., and Öztürk, B. (Eds.), 2012. The State of the Turkish Fisheries. Publication Number: 34, Published by Turkish Marine Research Foundation, Istanbul, TURKEY.

Available from: Türk Deniz Araştırmaları Vakfı (TÜDAV)

Turkish Marine Research Foundation (TÜDAV)

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TÜDAV yayınları SATILAMAZ

Printed by: Seba Digital Baskı ve Matbacılık Turizm San. Tic. Ltd. Sti.
Eskoop Sanayi Sitesi No:16 İkitelli, Başakşehir, İstanbul
Tel: + 0 90 212 671 36 38

PREFACE

This book aims to make a brief intruduction to the Turkish fisheries. In this concept, some imformation related to the fisheries industry in general have been included along with the current status and potential of fisheries in order to construct a comprehensive resource on Turkish fisheries.

"The State of the Turkish Fisheries" which is a publication of the Turkish Marine Research Foundadion (TUDAV), reflects in 5 chapters the general characteristics and status of the Turkish fisheries as well as some current topics covered in 33 articles by 44 researchers from various institutions and disciplines such as fishery faculties of different universities around Turkey, institutes of marine sciences and technologies, as well as marine scientists, biologists, agricultural engineers, fishery techonologists, nutrition scientists and fishery economists from the national fisheries research institutes of the Turkish Ministry of Food, Agriculture and Livestock.

The first chapter covers the current situation of the live marine resources and a general outlook on the small pelagic fish and fisheries, demersal and deep-sea fisheries resources and alien species in the Turkish seas as well as the Turkish inland fisheries. Chapter 2 discusses the Turkish fisheries sector and covers subject such as classification of gears and methods used in commercial fisheries in Turkey, introduction of fisheries in the seas of Turkey (Black Sea, Sea of Marmara, Agean Sea and Mediterranean Sea), fisheries management and processing technologies. In Chapter 3, different fisheries are discussed in terms of fising gears, such as trawls, purse seines and gill nets through which almost the entire span of marine catch production is realized. Chapter 4 provides details on a species-specific fishery such as tuna, sword fish, bluefish, octopus, turbot, eel, sponge, bivalve, mussel, lobster and blue crab on which there are very limited publications to date. The last chapter of the book mentions some special researches and other related topics.

The publication of this book was decided by the editors in the last days of 2009 and the book was completed in two years (2010-2011). We hereby thank all the authors for their full support and contribution.

We also remember and cherish the memory of our dear friend and one of the authors in this book, Mustafa Erdem, whom we lost very shortly before the publication of this book, whose loss deeply, saddens us.

Adnan TOKAÇ
Ali Cemal GÜCÜ
Bayram ÖZTÜRK
May, 2012

I – CURRENT STATE OF THE MARINE LIVING RESOURCES

Small Pelagic Fish and Fisheries in Turkey……..1
Ali Cemal GÜCÜ

The Status of Fisheries for Small Tunas in Turkey…..18
Abdullah Ekrem KAHRAMAN and F. Saadet KARAKULAK

Demersal and Deep Water Fisheries Resources in the Turkish Seas…….....28
Eyüp Mümtaz TIRAŞIN and Aydın ÜNLÜOĞLU

Alien Species in the Turkish Seas.....92
Bayram ÖZTÜRK and Cemal TURAN

Inland Waters Fishery in Turkey ….....131
Mustafa SARI

II – CURRENT STATE OF THE FISHERIES SECTOR

Classification of Commercial Fishing Gears and Methods in Turkish Fisheries.....154
Adnan TOKAÇ

The Black Sea Fishery …….....182
Orhan AK and Yaşar GENÇ

Fisheries of the Sea of Marmara.....214
C. Çiğdem YIĞIN and Ali İŞMEN

Aegean Sea Fisheries 233
Tuncay KINACIGİL and Akın T. İLKYAZ

Fisheries of the Mediterranean Part of Turkey ……..242
Gökhan GÖKÇE

Small Scale Fishery in Littoral Resources 251
Cengiz METİN and İlker AYDIN

Fisheries Management in Turkey 263
Vahdet ÜNAL and Huriye GÖNCÜOĞLU

Fisheries of the Lake Van and Transition to Sustainable Fisheries Management 289
Mustafa SARI

Seafood Processing in Turkish Fisheries 309
Şükran ÇAKLI and Aslı CADUN

III – FISHERIES BY FISHING GEAR

Trawl Fisheries 316
Hakan KAYKAÇ, Zafer TOSUNOĞLU and Adnan TOKAÇ

Purse Seine Fishery in Turkey.....329
Celalettin AYDIN

Gill Nets and Trammel Nets Used in Turkish Fisheries …….....344
İlker AYDIN and Cengiz METİN

IV –FISHERIES BY SPECIES

Bluefish (Pomatomus saltatrix Linnaeus, 1766*) Fishery*.....354
Tevfik CEYHAN

Swordfish (*Xiphias gladius* Linnaeus, 1758) *Fishery* 364
Okan AKYOL

Some Remarks on the catches of anchovy Engraulis encrasicolus (Linnaeus, 1758)*, in Georgian Waters by Turkish Fleet Between 2003 and 2009* …..372
Bayram ÖZTÜRK, Çetin KESKİN and Semih ERGİN

Atlantic Bluefin Tuna (*Thunnus thynnus thynnus* Linnaeus, 1758) *Fishery in Turkish Waters*.....382
F. Saadet KARAKULAK

Octopus (*Octopus vulgaris* Cuvier, 1797) *Fishery* 391
Ali ULAŞ

Turbot Fisheries 400
Ali KARA

Eel Fisheries …..419
Ali KARA

Sponge Fishery …..433
Bülent TOPALOĞLU

Bivalve Fisheries in Turkish Seas.....440
Adnan TOKAÇ and Serhat ÇOLAKOĞLU

Blue Crab (*Callinectes sapidus* Rathbun, 1896) *Fisheries* ……..453
Mustafa ERDEM

Fishing of Mediterranean Mussel (Mytillus galloprovincialis Lamarc, 1819*) in the Istanbul Strait*.....464
Onur GÖNÜLAL and Esra Billur BALCIOĞLU

Spiny Lobster (Palinurus elephas Fabricus, 1787*) and Common Lobster (Homarus gammarus* Linnaeus, 1758*) Fishing in the Northern Aegean Sea* 468
Onur GÖNÜLAL

V – RESEARCH AND OTHER RELEVANT ISSUES

Set Gill Net and Trammel Net Selectivity 474
Uğur ÖZEKİNCİ and Adnan AYAZ

Survival Studies: Investigating the Survival of Fish Escaping from the Codends of Bottom Trawls 489
F. Ozan DÜZBASTILAR

Artificial Reef Researches and Applications in Turkish Seas 496
Altan LÖK, Benâl GÜL and Aytaç ÖZGÜL

Ghost Fishing ….....503
Adnan AYAZ

DEMERSAL and DEEP WATER FISHERIES RESOURCES IN TURKISH SEAS

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1. Introduction

Turkey is located at the easternmost section of the Mediterranean Sea and surrounded by four large water masses, i.e. the Black Sea, the Marmara Sea, the Aegean Sea and the Mediterranean Sea (the Levantine Sea), all bearing different climatic and hydrographical regimes, geomorphologic structures, oceanographic conditions etc (Oğuz & Tuğrul, 1998; Bilecenoğlu et al., 2002). All these factors induce different ecological conditions with varying habitats in every sea and allow a wide number of species from different taxonomic groups to inhabit them (Kocataş & Bilecik, 1992). Despite this high diversity, only a small fraction of the total number of species is of commercial value. The larger number of these commercial species is directly consumed by humans and a relatively smaller number goes into industrial use as raw material for animal food, pharmaceuticals etc. The majority of the commercially valuable species comprises basically a few major taxonomic groups such as molluscs (clams, sea-snails and squids), crustaceans (shrimps, prawns, lobsters and crabs) and bony fishes. In terms of fishery catch statistics, over 90% of Turkey's total production of seafood is composed of bony fishes (Figure 1) (SIS, 1985-2003; TurkStat, 2004-2009).

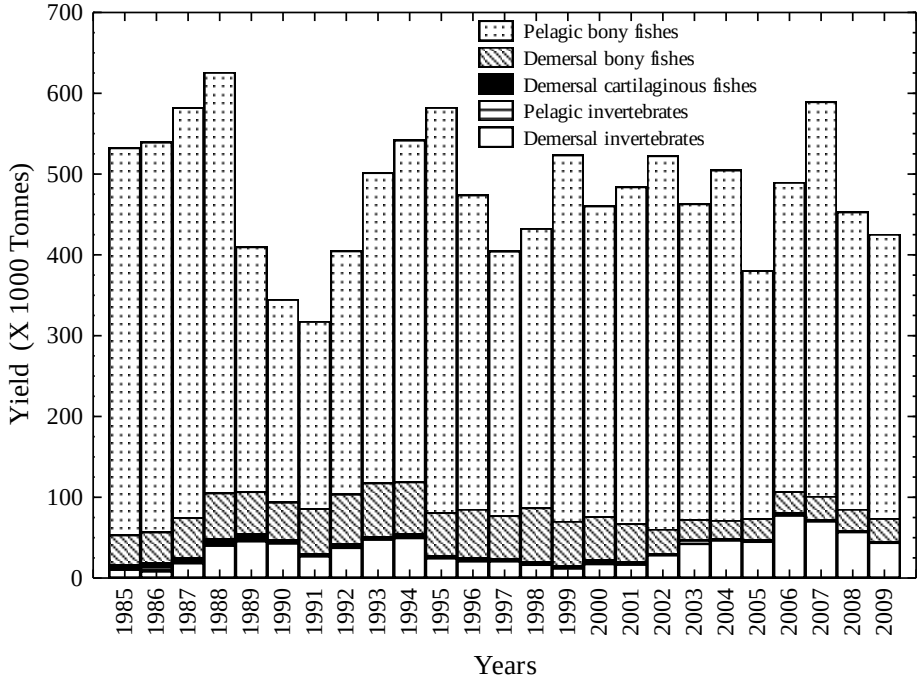


Figure 1. Time series of total annual production of the marine capture fisheries in Turkey from 1985 to 2009 (SIS, 1985-2003; TurkStat, 2004-2009).

Based upon recent reviews of Bilecenoğlu et al. (2002), Fricke et al. (2007) and Çınar et al. (2011) the present number of bony fish species living in the Turkish seas is 415 (Appendix 1). This figure may, however, still increase in the near future as a result of the Lessepsian migration and ongoing ichthyofaunal investigations. The species richness in the Turkish Seas decreases from south to north. With a total number of 359 species, the most diverse bony fish fauna is observed in the Mediterranean Sea. The Aegean Sea bony fish fauna is almost as rich as the Mediterranean and includes a total of 344 species. A considerably lesser number of bony fish species, 222, live in the Marmara Sea. Finally, the Black Sea is inhabited by the least diverse bony fish fauna consisting of a total of only 147 species, less than half of that recorded for the Mediterranean and the Aegean Seas. Interestingly, in spite of this low species richness, nearly ¾ of the total marine fish catch of Turkey is taken from the Black Sea (SIS, 1985-2003; TurkStat, 2004-2009).

The majority of the 415 bony fish species in the Turkish Seas are demersal in habitat selection and lives on or close to the bottom (Table 1). While some of

these species dwell in shallow waters nearby the shore (many gobies, blennies, wrasses etc), some live at depths down to 200-300 m (some soles, sea breams, goatfishes etc), and still others (mesopelagics, bathypelagics and bathydemersals) inhabit even deeper zones (anglerfish, grenadiers etc). All these species are often caught by bottom trawling and constitute a large portion of Turkey's demersal fishery resources.

Despite this striking richness of demersal bony fish fauna, in terms of biomass, on average above 70% of the overall annual marine fish catch in Turkey is made up of a few small pelagic species such as anchovy, pilchard and horse mackerels (Figure 1) (SIS, 1985-2003; TurkStat, 2004-2009). The demersal fishes have, on the other hand, much higher commercial value compared with the pelagics. For instance, according to the 2009 statistics (TurkStat, 2009), the monetary value of one kg of red mullet was more than that of ten kg of anchovy. Therefore, even though the demersal bony fishes, on average, account for less than 10% of the annual total marine fish catch (Figure 1), they make a significant contribution to Turkey's fisheries due to their high commercial value.

Table 1. Distribution of Turkey's bony fish fauna by sea and habitat selection (BS: the Black Sea, MS: the Marmara Sea, AS: the Aegean Sea, MTS: the Mediterranean Sea, N: the number of individual species).

		BS		MS		AS		MTS		All Seas	
		N	%	N	%	N	%	N	%	N	%
Pelagics	Epipelagic	33	22.4	42	18.9	60	17.4	68	18.9	77	18.6
	Semi-pelagic	3	2.0	4	1.8	6	1.7	6	1.7	7	1.7
	Mesopelagic	0	0.0	3	1.4	3	0.9	4	1.1	5	1.2
	Bathypelagic	0	0.0	10	4.5	30	8.7	27	7.5	37	8.9
Demersals	Benthopelagic	16	10.9	22	9.9	42	12.2	40	11.1	44	10.6
	Benthic	93	63.3	137	61.7	189	54.9	204	56.8	229	55.2
	Bathydemersal	2	1.4	4	1.8	14	4.1	10	2.8	16	3.9
Total Bony Fish		147		222		344		359		415	

The most recent Turkish official fishery statistics provides catch information on only a total of 84 commercially important marine organisms (TurkStat, 2009): 62 bony fish species, 3 cartilaginous fish groups and 19 invertebrate species. Of these 62 species of bony fish, 41 are demersal species (Table 2). It should be noted, however, that the organism names given in these statistics do not always strictly correspond to the distinct biological species. Sometimes, data on several closely related species are merged and presented under one name only, such as gobies, combers, flounders, groupers etc. The same applies to the cartilaginous fishes. Although there are 54 demersal cartilaginous fish species in the Turkish Seas (Appendix 1), solely a total of 3 groups are referred to in the official statistics: sharks, rays and angle sharks (TurkStat, 2009). Thus, the actual total demersal fish catch in the Turkish Seas is much more diverse than that stated in the statistics. The demersal cartilaginous fishes, on average, comprise barely 1% of the annual total marine fish landings (Figure 1) (SIS, 1985-2003; TurkStat, 2004-2009). By considering this low catch ratio and their low commercial value, the overall contribution of these fish to Turkey's fisheries is quite negligible. The 19 commercial invertebrate species included in the most recent official statistics are all demersal in nature. Striped venus, sea snail, deep water rose shrimp, giant gamba prawn and cuttlefish are the most notable invertebrate species by total production and commercial value (TurkStat, 2009).

Table 2. The common (English and Turkish) and Latin names and distributions of commercially important bony fish species in Turkish seas whose catch data are collected and published by the Turkish official fishery statistics (TurkStat, 2009). The common names are presented here as they appeared in TurkStat (2009) (BS: the Black Sea, MS: the Marmara Sea, AS: the Aegean Sea, MTS: the Mediterranean Sea)

TurkStat Name	Species Name	BS	MS	AS	MTS
Hake-European hake Bakalorya-Berlam	*Merluccius merluccius*	*	*	*	*
Red mullet Barbunya	*Mullus barbatus*	*	*	*	*
Golden banded Barbunya-Paşa barbunu	*Upeneus moluccensis*			*	*
Seabream Çipura	*Sparus aurata*	*	*	*	*

Table 2 continued

Common sole Dil-Pisi	*Solea solea*	*	*	*	*
John dory Dülger	*Zeus faber*	*	*	*	*
Common seabream Fangri	*Pagrus pagrus*		*	*	*
Angler fish Fener balığı	*Lophius piscatorius*	*	*	*	*
Shore rockling Gelincik	*Gaidropsarus mediterraneus*	*	*	*	*
Meagre Grenyüz	*Argyrosomus regius*	*	*	*	*
Painted comber Hani	*Serranus scriba*	*	*	*	*
Black scorpion fish İskorpit	*Scorpaena porcus*	*	*	*	*
Annular bream İsparoz	*Diplodus annularis*	*	*	*	*
Brown meagre İşkine	*Sciaena umbra*	*	*	*	*
Picarel İzmarit	*Spicara smaris*	*	*	*	*
Turbot Kalkan	*Scophthalmus maximus*	*	*	*	*
Two banded bream Karagöz	*Diplodus vulgaris*	*	*	*	*
Gobies Kayabalığı	*Gobius niger*	*	*	*	*
Red gurnard Kırlangıç	*Chelidonichthys cuculus*	*	*	*	*
Trigla lineate Kırlangıç - Mazak	*Chelidonichthys lastoviza*		*	*	*
Bogue Kupez	*Boops boops*	*	*	*	*
Waker Lahoz	*Epinephelus aeneus*			*	*
Seabass Levrek	*Dicentrarchus labrax*	*	*	*	*
Small-scalled Lipsöz	*Scorpaena notata*	*	*	*	*

Table 2 continued

Saddled seabream Melanurya	*Oblada melanura*	*	*	*	*
Striped bream Mercan	*Pagellus erythrinus*	*	*	*	*
Whiting Mezgit	*Merlangius merlangus euxinus*	*	*	*	
European conger Mığrı	*Conger conger*	*	*	*	*
Striped seabream Mırmır	*Lithognathus mormyrus*		*	*	*
Croaker Minekop	*Umbrina cirrosa*	*	*	*	*
Dusky grouper Orfoz	*Epinephelus marginatus*		*	*	*
Piper Öksüz	*Trigla lyra*		*	*	*
Large-eye dentex Patlakgöz mercan	*Dentex macrophthalmus*			*	*
Flounder Pisi	*Citharus linguatula*		*	*	*
Black sea bream Sarıgöz	*Spondyliosoma cantharus*	*	*	*	*
Saupe Sarpa	*Sarpa salpa*	*	*	*	*
Dentex Sinagrit	*Dentex dentex*	*	*	*	*
Sharpsnout seabream Sivriburun karagöz	*Diplodus puntazzo*	*	*	*	*
Striped red Tekir	*Mullus surmuletus*	*	*	*	*
Blue spotted bream Trança	*Dentex gibbosus*		*	*	*
Saury Zurna	*Synodus saurus*			*	*

The present chapter attempts to evaluate the recent state of Turkey's demersal fishery resources. Based upon the official fishery statistics from 1985 to 2009, it furthermore reviews the fluctuations in the annual catches of the demersal fishes as a total resource and also for some commercially important species for each of the Turkish seas. Some of the large-scale research studies carried out on Turkey's demersal fisheries are presented as well.

2. Catch Statistics of the Major Demersal Fishery Resources

According to the catch records from the official fishery statistics from 1985 to 2009, the yields from demersal fishery resources, averaged over 25 years, constituted about 18% of the annual total marine fisheries production (Figure 1) (SIS, 1982-2003; TurkStat, 2004-2009). A similar ratio of 17% was also observed when only the most recent 2009 fishery statistics were considered (TurkStat, 2009).

A review of the data from the last 25 years' statistics (SIS, 1985-2003; TurkStat, 2004-2009) on the basis of each Turkish sea, revealed that while the demersal bony fish catches fluctuated irregularly and showed variations for each sea over the years (Figure 2), the cartilaginous fish and invertebrate production varied less and both groups were caught almost consistently more in the Black Sea (Figures 3 and 4). For instance, the demersal bony fish catches in the Mediterranean Sea began to increase from 1985 and attained a maximum of nearly 20 thousand tonnes in 1993, then in subsequent years, they declined sharply and finally reached a more or less steady plateau of 3-6 thousand tonnes starting from 2000 (Figure 2). A somewhat similar trend of increasing yields of demersal bony fishes from 1985 to 1994 was also discerned in the Aegean Sea. After two peaks of above 19 thousand tonnes in 1994 and 1998, the landings commenced to shrink and in 2003 the total production was less than 4 thousand tonnes. The last considerable rise in yield, 8.5 thousand tonnes, was recorded in

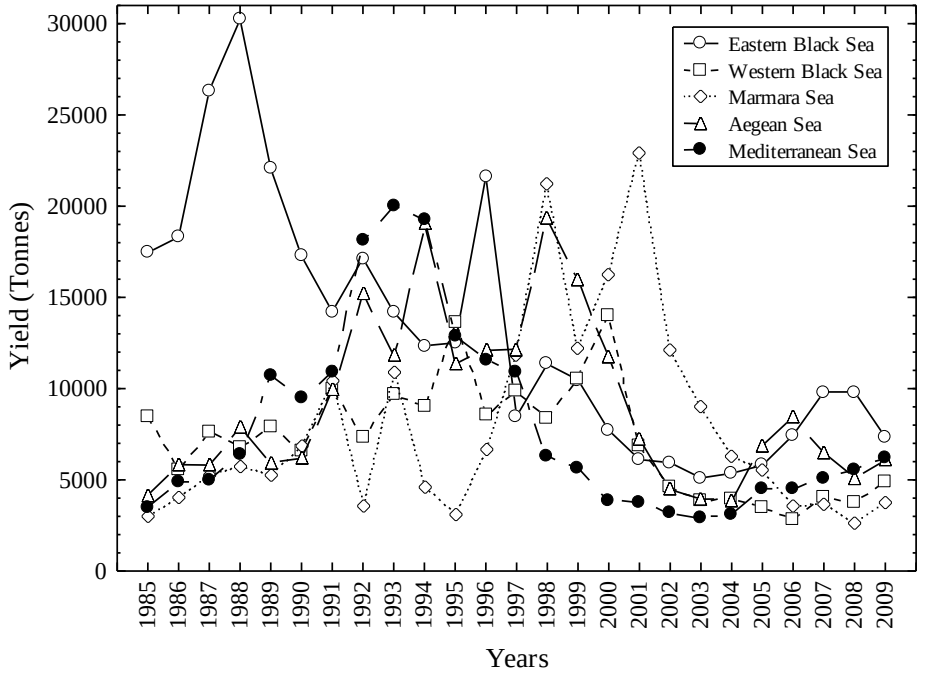


Figure 2. Annual total catch statistics of the marine demersal bony fish for each Turkish sea from 1985 to 2009 (SIS, 1985-2003; TurkStat, 2004-2009).

2006 in the Aegean Sea. The total demersal bony fish catch was just over 6 thousand tonnes in this region in 2009 (Figure 2). The demersal bony fish production in the Eastern Black Sea was much higher than in all other seas until 1992. The last biggest yield, exceeding 21.5 thousand tonnes, was registered in 1996, thereafter a trend of decrease in catches was clearly seen (Figure 2). In the Western Black Sea, relatively small oscillations in the demersal bony fish catches were detected between 1985 and 1994. There was a peak in the production in 1995, surpassing 13.5 thousand tonnes. The largest reported yield was close to 14 thousand tonnes in 2000. In the years following, the production in this region was reduced to more or less half of that in the previous decade (Figure 2). The prevalent trend of decline in landings observed in almost every sea in the recent decade is obviously portrayed in the overall total production of demersal bony fishes in Turkey (Figures 1 and 2). After the maximum of 66.5 thousand tonnes in 1998, the annual total catch levels have fallen to below 30 thousand tonnes in the last seven years.

For the greater part of the past two decades, the major portion of the production of demersal cartilaginous fishes and invertebrates originated from

the Black Sea (Figures 3 and 4). The biggest fluctuations in yields were also documented in this region. From 1991 to 1994, a tremendous increase in demersal invertebrate catches was seen in the Western Black Sea (Figure 4). Following a peak of slightly above 30 thousand tonnes in 1994, the catches fell drastically in subsequent years to less than 4 thousand tonnes in 1999, and thereafter suddenly rose to a maximum of over 50 thousand tonnes in 2007 (Figure 4). The total demersal invertebrate catch was around 30 thousand tonnes in this region in 2009, still substantially lower than that in 2007 (Figure 4). Yet, this amount from the Western Black Sea made up just roughly ⅔ of the total production of demersal invertebrates in Turkey (Figure 4).

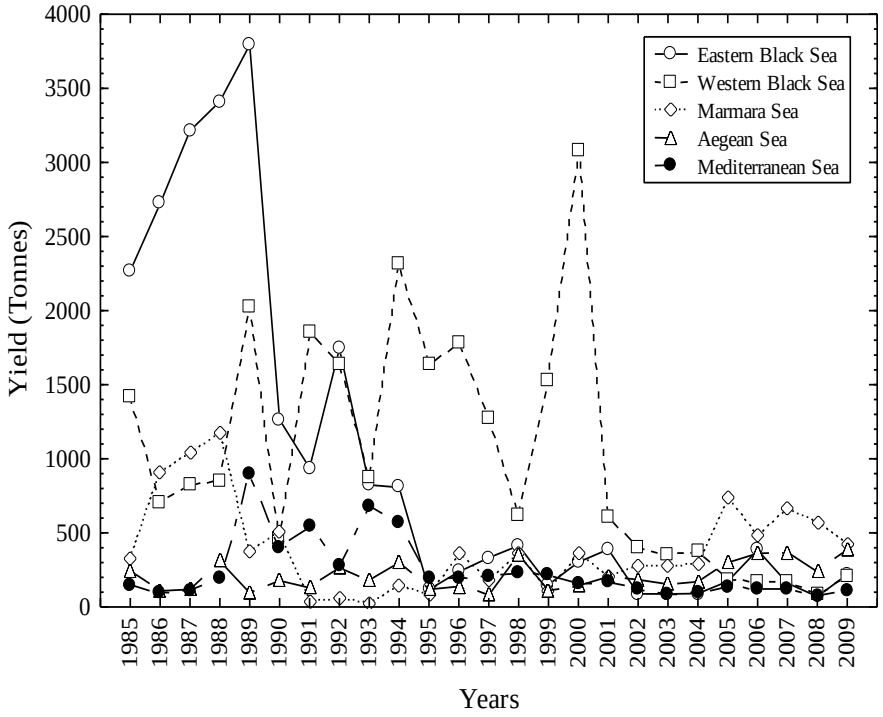


Figure 3. Annual total catch statistics of the marine demersal cartilaginous fish for each Turkish sea from 1985 to 2009 (SIS, 1985-2003; TurkStat, 2004-2009).

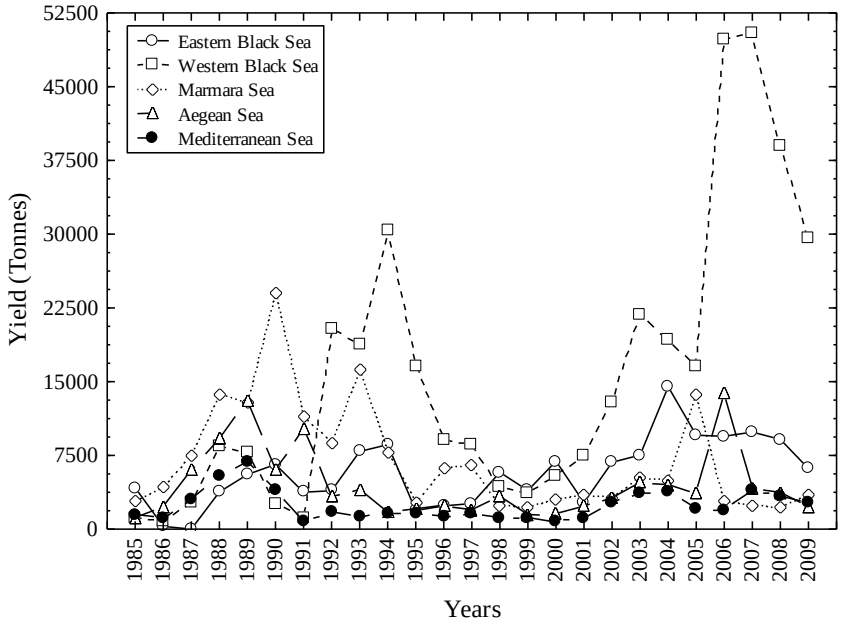


Figure 4. Annual total catch statistics of the marine demersal invertebrates for each Turkish sea from 1985 to 2009 (SIS, 1985-2003; TurkStat, 2004-2009).

3. Regional Catch Statistics

In parallel with the changing ecological conditions in Turkish seas from north to south, the components of the demersal fishery resources naturally vary from one sea to another. Therefore, a closer and more detailed evaluation of the resources for each region is presented here.

3.1. The Eastern Black Sea

The Eastern Black Sea is the most productive fisheries region in Turkey. The last 25 years' official fishery statistics (SIS, 1985-2003; TurkStat, 2004-2009) show that over half of the country's total marine fisheries catch came from this area. According to the same statistics, the yields from demersal fishery resources in this region, averaged over 25 years, constituted 4% of Turkey's total marine fisheries production. When only the total demersal fisheries production in the country was considered, the average percentage contribution from the region was 24%. In this time period, the average share of the demersal catches in the total fisheries in the region was about 9%. The highest and lowest

percentage portions of the demersal resources in the region's total fisheries were 22% in 1990 and 4% in 2001, respectively. The total demersal landings corresponding to these years were 25.1 and 9.2 thousand tonnes, respectively (Figure 5) (SIS, 1985-2003; TurkStat, 2004-2009).

Bony fishes were the major component of the demersal fisheries in the Eastern Black Sea, and on average, they made up around 64% of the annual total catches in the past 25 years. Demersal invertebrates were also an important resource and their average proportion was 32% in the same time period. The average share of cartilaginous fishes in the total demersal fisheries was as low as 4% (Figure 5).

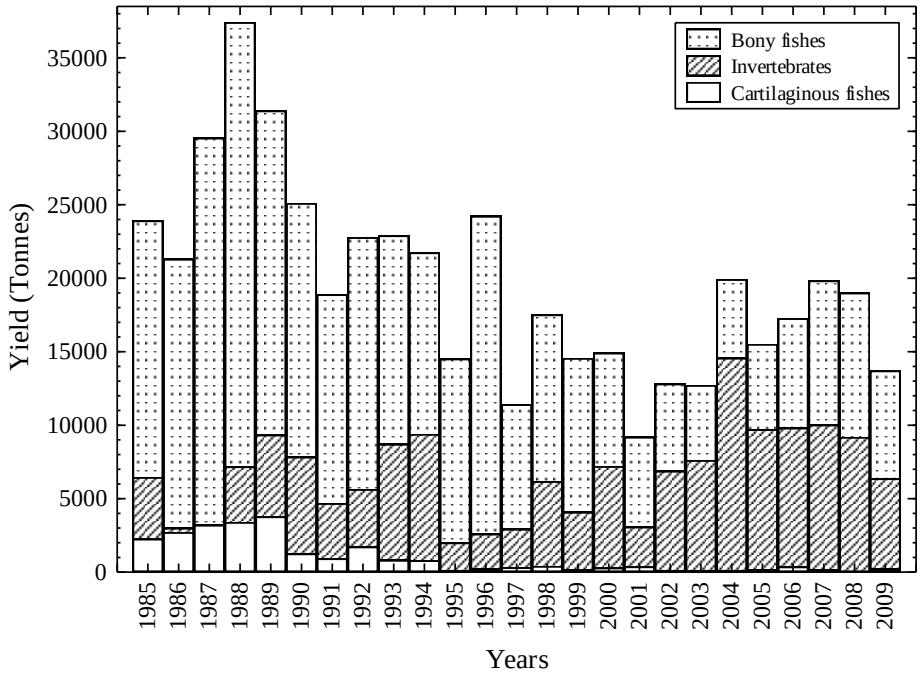


Figure 5. Annual total marine demersal fisheries production in the Eastern Black Sea from 1985 to 2009 (SIS, 1985-2003; TurkStat, 2004-2009).

The composition of the demersal fisheries production in the Eastern Black Sea varied considerably from 1985 to 2009 (SIS, 1985-2003; TurkStat, 2004-2009). The total demersal bony fish landings were much larger than in all other seas until 1992. Then after a peak of 30.2 thousand tonnes in 1989, it began to fall. The substantial catch of 21.6 thousand tonnes in 1996 was the only strong deviation from this trend (Figure 2). The total catch of demersal bony fishes

amounted to 7.3 thousand tonnes in 2009 (Figures 2 and 5). While the yields from demersal bony fishes were decreasing, the production of demersal invertebrates in the region started to show a general trend of increase after 1987, and surpassed the total catch of demersal bony fishes in 2002 (Figures 4 and 5). The total catches from both resources attained a similar quantity of almost 10 thousand tonnes in 2007, and since then the catch levels have remained quite close to each other (Figure 5). Until 1989, the majority of demersal cartilaginous fish catches in Turkey were taken from this region (Figure 3). After a historically high yield of approximately 4 thousand tonnes in that particular year, the landings declined sharply, and since 1995 they have never exceeded 500 tonnes (Figures 3 and 5). Thus, the contribution of these fish to the region's fisheries became rather negligible.

Since 1985 one single species, whiting (*Merlangius merlangus*) conspicuously dominated the catches of demersal bony fishes (and the overall demersal fisheries till 2000) in the Eastern Black Sea (SIS, 1985-2003; TurkStat, 2004-2009). Over the course of 25 years, the average share of whiting in the total demersal bony fish production was about 78%. According to the official catch records, the quantity of whiting caught in the region rose rapidly from 11 thousand tonnes in 1985 to the historical maximum of 25 thousand tonnes in 1988. Thereafter the landings started to drop. A linear trend line fitted to these data suggested an annual decline rate of circa 550 tonnes (Figure 6). The catch amounting to nearly 16 thousand tonnes in 1996 was the only exception to this general trend (Figure 6). A close comparison of Figures 2 and 6 will also clearly illustrate the dominance of whiting in the demersal bony fish production, as the annual variations in the yields of demersal bony fishes can be primarily accounted for by the changes in the quantities of whiting catches. Based upon the fishery statistics from 1985 to 2009, whiting was by far the demersal fish species with the highest production in Turkey's fisheries, and the Eastern Black Sea was the principal region for the production of whiting in the country (SIS, 1985-2003; TurkStat, 2004-2009).

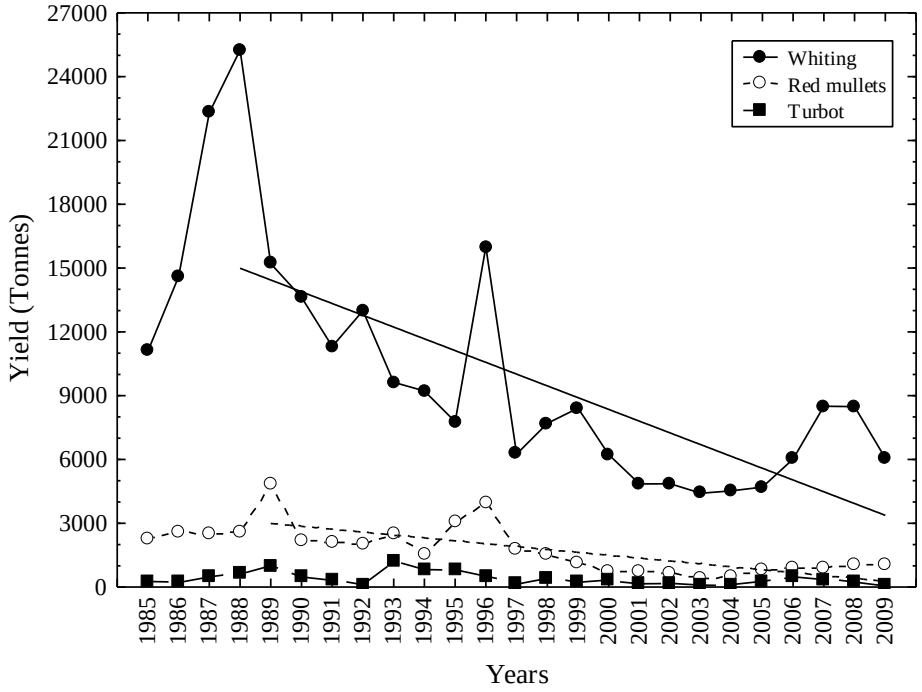


Figure 6. Annual total catch statistics of the major demersal bony fish species in the Eastern Black Sea from 1985 to 2009. These species together composed, on average, over 94% of the total demersal bony fish production in the region (SIS, 1985-2003; TurkStat, 2004-2009). The fitted linear trend lines were explained in the text.

Two closely related demersal bony fish species red mullet (*Mullus barbatus*) and striped red mullet (*M. surmuletus*) followed whiting in the catch statistics (SIS, 1985-2003; TurkStat, 2004-2009). Of these two commercially highly valued species, red mullet was more abundant in the catches and formed, on average, almost 10% of the annual total demersal fish production in the region during the last 25 years. The average contribution of striped red mullet was much lower, a little more than 3%. Since these two congener species are often mistaken for one another and since their common names are also recurrently swapped locally, their catches have been combined and presented as one in Figure 6. The catch history of red mullets fairly resembles that of whiting. The maximum recorded yield of red mullets was 4.8 thousand tonnes in 1989, after when, like for whiting the landings began to diminish (Figure 6). Again in 1996 there was an exceptional catch of approximately 4 thousand tonnes. The linear trend line fitted to the landings data indicated an annual decline rate of roughly 135 tonnes (Figure 6). In spite of the reduced landings in the last decade, the

overall total production of red mullets in the Eastern Black Sea was the biggest among all the regions.

Turbot (*Scopthalmus maximus*) was the fourth and commercially most valuable species, comprising an average of 3% of the annual total demersal bony fish catches in the Eastern Black Sea from 1985 to 2009. The turbot landings, after a peak of 1.2 thousand tonnes in 1993, commenced to decrease and since 1995 have remained at a level below 500 tonnes (Figure 6) (SIS, 1985-2003; TurkStat, 2004-2009).

Starting from 1988, the most copious species in the demersal invertebrate fisheries in the region was sea snail (*Rapana thomasiana*). This gastropod species composed, on average, over 78% of the annual total demersal invertebrate catches and the largest recorded yield was 12.1 thousand tonnes in 2004 (SIS, 1985-2003; TurkStat, 2004-2009). The landings were above 9 thousand tonnes between 2005 and 2008, but came down to 4.9 thousand tonnes in 2009. Carpet shell (*Tapes decussatus*) and black mussel (*Mytilus galloprovincialis*) were the two other notable demersal invertebrate species in the Eastern Black Sea.

3.2. The Western Black Sea

This is the second most productive fisheries region in Turkey. According to the last 25 years' fishery statistics, on average, 22% of the country's total marine fisheries catch originated from the Western Black Sea (SIS, 1985-2003; TurkStat, 2004-2009). During this time period, the average share of the yields from demersal fisheries in the Western Black Sea was 5% of Turkey's total marine fisheries production, and 25% of the total fisheries in the region. The Western Black Sea was the country's leading demersal fisheries region by biomass, and provided more than 28% of Turkey's total demersal fisheries production from 1985 to 2009 (SIS, 1985-2003; TurkStat, 2004-2009). On the other hand, compared with other seas, the largest fluctuations in demersal landings were also seen in the Western Black Sea. They ranged from 7.1 thousand tonnes in 1986 to 54.7 thousand tonnes in 2007, corresponding to the percentage contributions of 14% and 54%, respectively, from the demersal resources into the total fisheries in the region. The production was very high particularly between 2006 and 2008 (Figure 7).

Unlike in the Eastern Black Sea, the major component of the demersal fisheries in the west in the past 25 years was demersal invertebrates with an

average proportion of 53%. However, because the mentioned big variation in the demersal landings was due to the invertebrate catches (Figure 4), the composition of the demersal fisheries production in this region altered accordingly. The percentages of demersal invertebrates in the total were as low as 9% in 1991, and as high as 94% in 2006 (Figure 7). The last total demersal invertebrate catch taken from the Western Black Sea in 2009 was around 30 thousand tonnes and made up approximately ⅔ of the annual total production of demersal invertebrates in Turkey (Figure 4).

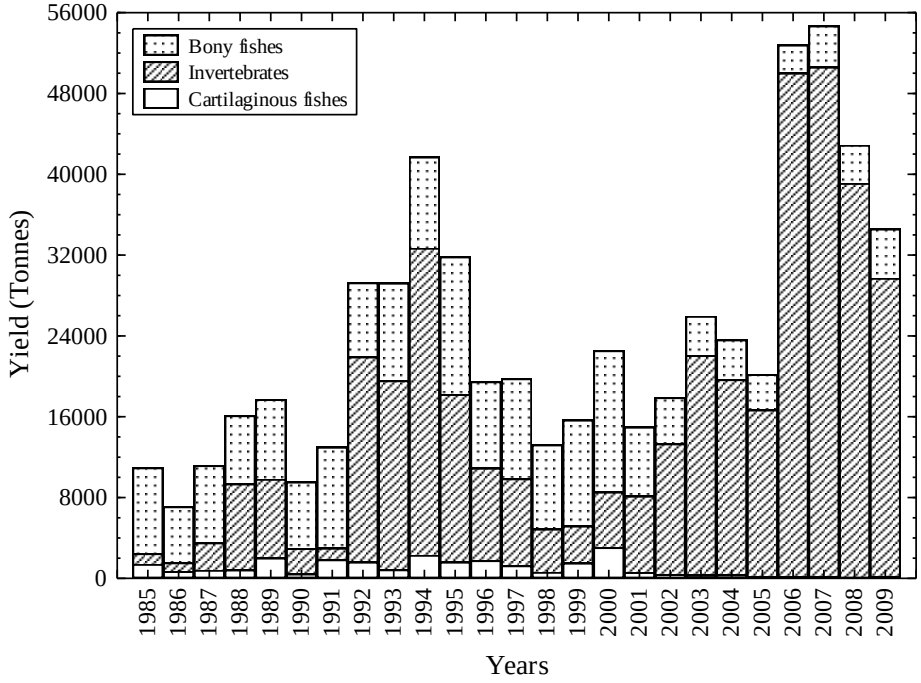


Figure 7. Annual total marine demersal fisheries production in the Western Black Sea from 1985 to 2009 (SIS, 1985-2003; TurkStat, 2004-2009).

The species composition of demersal invertebrates in the landings varied a lot throughout the years (SIS, 1985-2003; TurkStat, 2004-2009). Sea snail, the most abundant demersal invertebrate species in the Eastern Black Sea, was rather negligible in this region's fisheries except maybe in the yields of 5.1 and 6 thousand tonnes in 1988 and 1989, respectively (Figure 8). There was an immense increase in carpet shell catches in the Western Black Sea from 1.1 thousand tonnes in 1991 to 30.3 thousand tonnes in 1994 (Figure 8). After this historical maximum, the carpet shell landings dropped in subsequent years down to 2.4 thousand tonnes in 1999. Thereafter, the landings began to rise

again to the second top yield of 16.9 thousand tonnes in 2003. The last recorded catch of carpet shell was 10.9 thousand tonnes in 2005. In 2006 a new bivalve species, striped venus (*Chamelea gallina*) suddenly appeared in the official fishery statistics (TurkStat, 2006) with an outstanding amount of 48.3 thousand tonnes. Although the catches of striped venus started to fall drastically the following year, it still continued to dominate the demersal fisheries in the region until the present (Figure 8). Like in the east, black mussel was another noteworthy demersal invertebrate species in the Western Black Sea.

Bony fish catches, averaged over 25 years, formed 41% of the total demersal fisheries landings in this region (SIS, 1985-2003; TurkStat, 2004-2009). The highest catch was observed in 2000 and was close to 14 thousand tonnes. After this peak, the landings fell steeply, and the production of demersal bony fishes was as low as 2.8 thousand tonnes in 2006 (Figure 2). The catches taken in the region did not much improve since then and the latest one was merely 4.9 thousand tonnes in 2009 (Figure 2). The amounts of cartilaginous fishes caught in the Western Black Sea were low and, on average, accounted for barely 6% of the region's total demersal production (Figure 7). Yet, they constituted just about 36% of the total production of demersal cartilaginous fishes in Turkey (Figure 3).

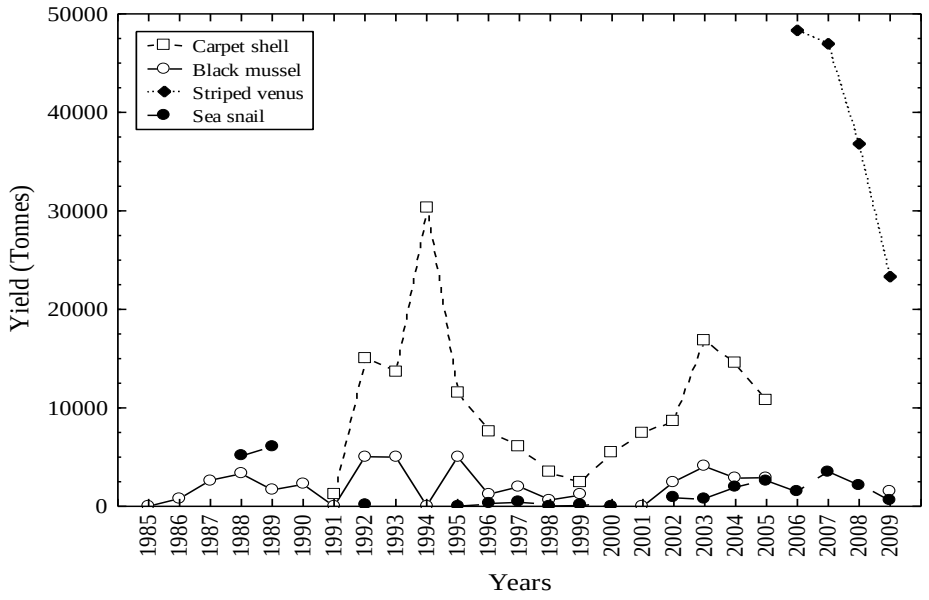


Figure 8. Annual total catch statistics of the major demersal invertebrate species in the Western Black Sea from 1985 to 2009 (SIS, 1985-2003; TurkStat, 2004-2009).

Whiting was the most dominant species in the demersal bony fish catches in the Western Black Sea as well. From 1985 to 2009 the average proportion of whiting in the total demersal bony fish production was around 60% (SIS, 1985-2003; TurkStat, 2004-2009). Compared to the east, the whiting production was far more moderate in this region, only the landings in 1995 and in 2000 exceeded those from the east. In addition, these two years corresponded to the two peaks in the whiting production, 9.8 and 9.1 thousand tonnes, respectively in the west (Figure 9). Until the last peak in 2000, the whiting catches oscillated annually. Then, after a final severe fall to 2.9 thousand tonnes in 2001, the catches became more stable and have since remained within a range between 1.8 and 2.9 thousand tonnes (Figure 9). In terms of regional total whiting production, the Western Black Sea ranked second in Turkey (SIS, 1985-2003; TurkStat, 2004-2009).

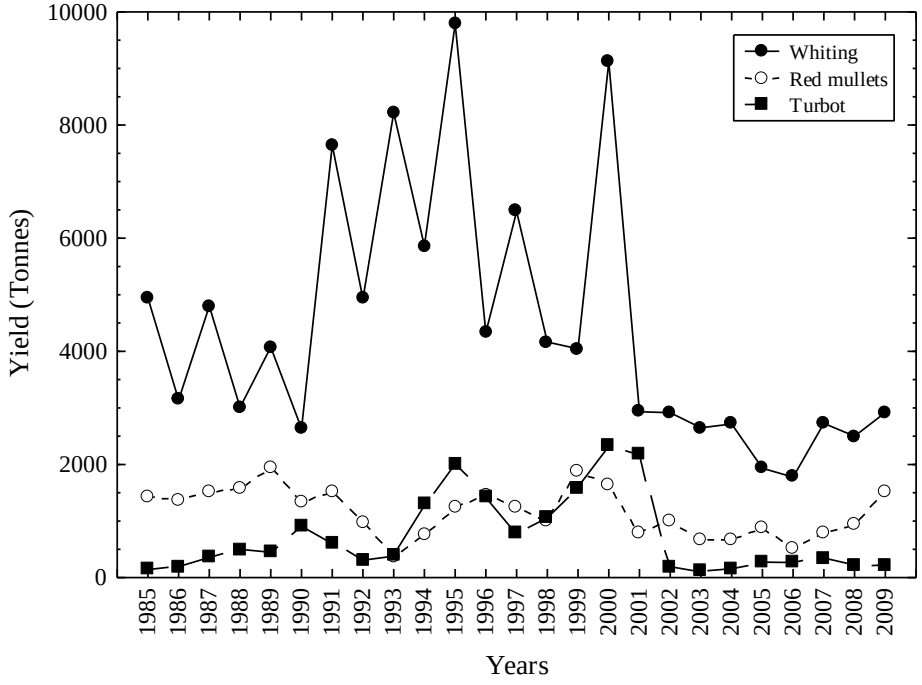


Figure 9. Annual total catch statistics of the major demersal bony fish species in the Western Black Sea from 1985 to 2009. These species together composed, on average, almost 87% of the total demersal bony fish production in the region (SIS, 1985-2003; TurkStat, 2004-2009).

Red mullets followed whiting in the catch statistics in the Western Black Sea too (SIS, 1985-2003; TurkStat, 2004-2009). Here though, according to the statistics, striped red mullet was more abundant and composed, on average, 11%

of the annual total demersal fish production in the region. The average portion of red mullet was smaller, a bit more than 6%. The catches of red mullets were substantially lower in the west than those taken in the east until 1999. The production of 1.9 thousand tonnes in that year was also the second major peak in the catch history of red mullets in the region (Figure 9). After 1999, the landings began to decline and the yield in 2006 was not more than 500 tonnes. Nevertheless, since then there seemed to be a steady increase in the landings of red mullets (Figure 9). The catch levels of red mullets were quite alike in both regions in the Black Sea in the last decade (Figures 6 and 9).

Turbot was again the fourth main species constituting an average of 9% of the annual total demersal bony fish catches in the Western Black Sea during the past 25 years. Although the turbot catch levels in both parts of the Black Sea did not differ much between 1985 and 1992, from 1994 to 2001, the landings in the west were remarkably bigger (Figure 9). Two outstanding peaks of turbot production in the region were also observed in this particular time period, the first in 1995, 2 thousand tonnes and the second in 2000, 2.3 thousand tonnes (SIS, 1985-2003; TurkStat, 2004-2009). After 2002, the annual yields in both regions were in rather similar quantities (Figure 9).

3.3. The Marmara Sea

The official fishery statistics from 1985 to 2009 ranks the Marmara Sea as Turkey's third most productive fisheries region. In this time period, the region's total fisheries production and its demersal constituent, on average, formed 12% and, a little more than 3% of the country's total marine fisheries catch, respectively (SIS, 1985-2003; TurkStat, 2004-2009). Again in the same period, the average share of the demersal fisheries in the Marmara Sea was 19% of the country's total marine demersal fisheries production, and 27% of the total fisheries in the region. The highest and lowest contributions from the demersal resources to the region's total fisheries were 47% in 1990 and 10% in 2006. Moreover, the total production of 31.4 thousand tonnes in 1990 was the historical maximum (Figure 10).

Invertebrates dominated the demersal landings in the Marmara Sea between 1986 and 1994, and made up as much as 77% of the region's total demersal fisheries in 1990 (Figure 10). In addition, demersal invertebrate production in this region was greater than all other seas between 1986 and 1991 (Figure 4). Yet, starting from 1995, and particularly between 1997 and 2003, bony fishes became more abundant in the demersal catches in the region (Figure 10). Two

exceptional peaks in the demersal bony fish landings, the first 21.2 thousand tonnes in 1998, and the second almost 23 thousand tonnes in 2001, occurred in this time period (Figures 2 and 10). After the second peak, the yields began to decline steeply and the total catch in 2009 was only 3.8 thousand tonnes. The annual total demersal fish production in the Marmara Sea was higher than in all other regions in 1998 and also between 2000 and 2004, however, after 2007 it was the lowest among all the regions (Figure 2). In the past 25 years, bony fishes and invertebrates, on average, composed around 52% and 45% of the annual total demersal catches, respectively. The average share of cartilaginous fishes in the region's total demersal fisheries was merely 3% (Figure 10) (SIS, 1985-2003; TurkStat, 2004-2009).

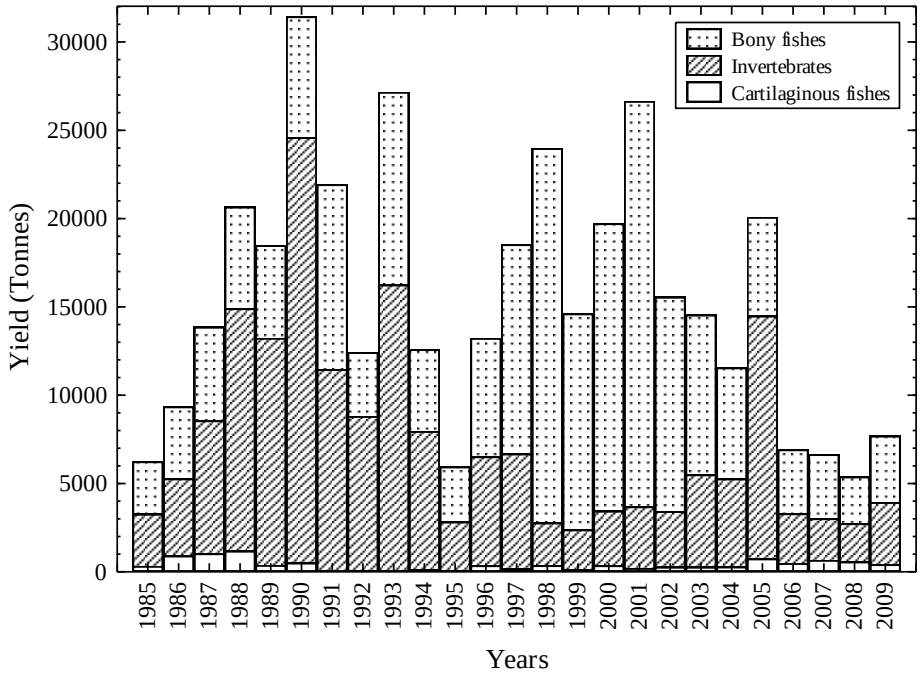


Figure 10. Annual total marine demersal fisheries production in the Marmara Sea from 1985 to 2009 (SIS, 1985-2003; TurkStat, 2004-2009).

When averaged over 25 years, with a proportion of 38%, hake (*Merluccius merluccius*) was the most abundant bony fish species in the demersal fisheries in the Marmara Sea (SIS, 1985-2003; TurkStat, 2004-2009). The hake landings in the region increased rapidly from 1.3 thousand tonnes in 1995 to 15.9 thousand tonnes in 1998 (Figure 11). After two years of relatively low catches, the historical maximum of 18.5 thousand tonnes was recorded in 2001.

Thereafter the landings started to drop severely; the last one in 2009 was no more than 780 tonnes (Figure 11). Examination of Figures 2 and 11 will further show the dominance of hake in the demersal bony fish production in the Marmara Sea, since the annual variations in the demersal bony fish landings can chiefly be accounted for by the differences in the amounts of hake catches. According to the official fishery statistics from 1985 to 2009, after whiting, hake came in as the second most caught demersal bony fish species in Turkey. The Marmara Sea was the principal region for hake production in the country (SIS, 1985-2003; TurkStat, 2004-2009).

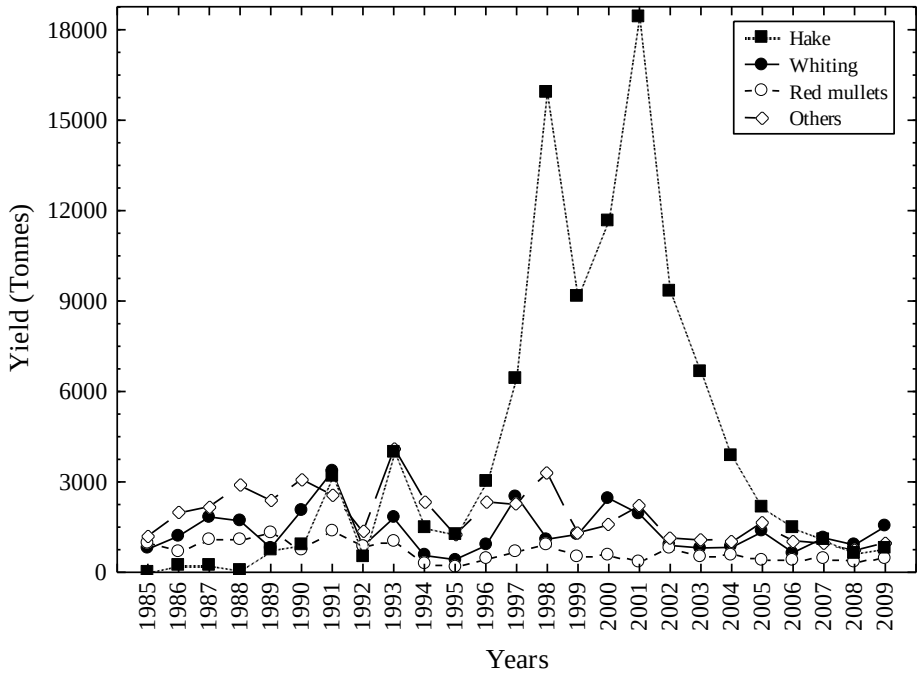


Figure 11. Annual total catch statistics of the major demersal bony fish species in the Marmara Sea from 1985 to 2009 (SIS, 1985-2003; TurkStat, 2004-2009).

Whiting was the second most abundant demersal bony fish species in the Marmara Sea with an average portion of nearly 21%. However, the sizes of whiting catches in the region were quite moderate compared to those from both of the Black Sea regions. The largest catch was 3.3 thousand tonnes and taken in 1991. Two other notable landings, both about 2.5 thousand tonnes, were registered in 1997 and 2000 (Figure 11). Since 2002, the whiting catches have

remained within a range of 8 to 15 hundred tonnes (SIS, 1985-2003; TurkStat, 2004-2009).

Whiting was also followed here by red mullets in terms of abundance in the demersal bony fish catches. Like in the Western Black Sea, striped red mullet was more copious than its congener and comprised, on average, 9% of the annual total demersal fish production in the region. The average share of red mullet was much smaller, just close to 3%. During the past 25 years, the biggest yield of red mullets was observed in 1991 and amounted to 1.4 thousand tonnes. After 1991 the landings of red mullets began to diminish and in the last decade they ranged from only 200 to 400 tonnes (Figure 11). Similar to the case of whiting, the production of red mullets in this region was less than that in the Black Sea. In addition, turbot which was the fourth abundant species in both regions of the Black Sea was caught in trivial quantities in the Marmara Sea forming merely 1% of the total demersal bony fish catches (SIS, 1985-2003; TurkStat, 2004-2009).

As previously presented, the total contributions of the major fish species to the overall demersal bony fish production in both regions of the Black Sea were very high, namely 94% in the east and 87% in the west. However, in the Marmara Sea, the four major fish species mentioned so far, together on average, made up almost 71% of the region's total demersal bony fish production. This substantial remaining portion was mainly due to the increased diversity of demersal fishes in the region (Table 1). An appreciable number of demersal bony fish species, such as picarel (*Spicara smaris*) and sole (*Solea solea*), were included in the catches in the region as well, but their individual contributions were minor and varied a great deal from one year to another. These fish were collectively shown as "others" in Figure 11.

Shrimps, predominantly deep water rose shrimp (*Parapenaeus longirostris*), were the most abundant and commercially important demersal invertebrate group in the region with an average proportion of 45%. The landings of shrimps fluctuated considerably throughout the years with three major peaks in 1989, 1993 and 2003 with the corresponding amounts of 6.2, 3.5 and 4 thousand tonnes (Figure 12). During the six years after this last peak, the average annual catch of shrimps in the region was 2.2 thousand tonnes. The Marmara Sea was the principal region for the shrimp production in Turkey. Averaged over 25 years, 62% of the overall total shrimp production in the country originated here (SIS, 1985-2003; TurkStat, 2004-2009). Black mussel was the second copious

species and on average, about 19% of the demersal invertebrate catches consisted of this bivalve. The biggest catch was 9.5 thousand tonnes and taken in 2005. The other notable yields were 3.1, 3.4 and 3.3 thousand tonnes in 1987, 1990 and 1997, respectively (Figure 12) (SIS, 1985-2003; TurkStat, 2004-2009).

Carpet shell followed black mussel in the catch statistics with an average share of 17%. Like in the Western Black Sea, a sudden huge rise in carpet shell catches was also recorded in this region from 658 tonnes in 1988 to 13.2 thousand tonnes in 1990 (Figure 12). The next landing in large quantity was 11.1 thousand tonnes in 1993. After a yield of 1 thousand tonnes registered in 1999, this bivalve species more or less disappeared from the official catch statistics (SIS, 1985-2003; TurkStat, 2004-2009). Oyster (*Ostrea edulis*) was another noteworthy commercially important demersal invertebrate species in the Marmara Sea. The highest yield of oyster in the region was 2.1 thousand tonnes in 1990 (Figure 12).

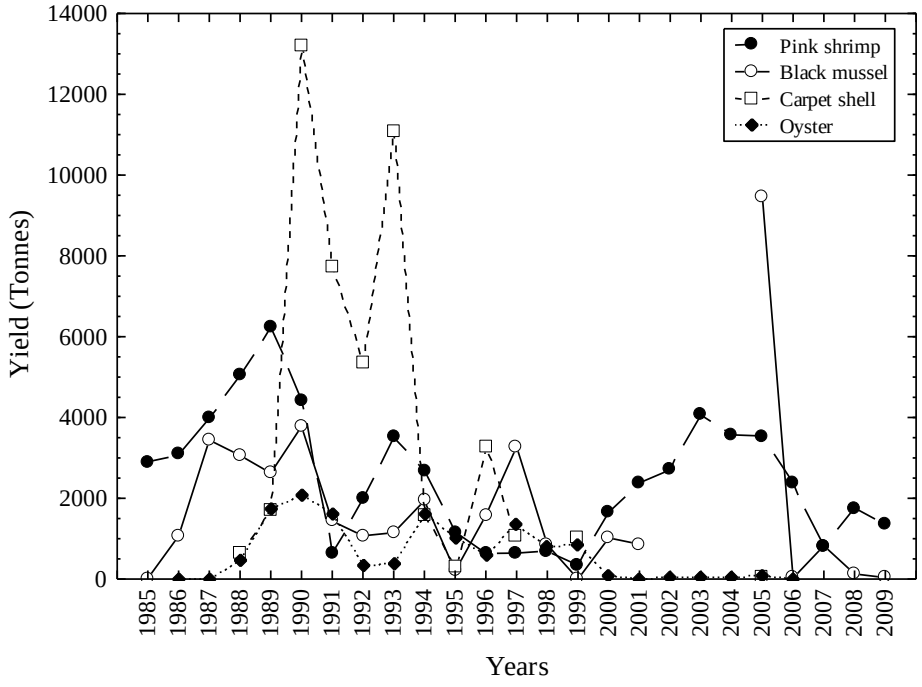


Figure 12. Annual total catch statistics of the major demersal invertebrate species in the Marmara Sea from 1985 to 2009 (SIS, 1985-2003; TurkStat, 2004-2009).

3.4. The Aegean Sea

The Aegean Sea is the fourth most productive fisheries region in Turkey. According to the last 25 years' statistics (SIS, 1985-2003; TurkStat, 2004-2009), nearly 10% of the country's total marine fisheries production originated from this region. The yields from demersal fishery resources in this region, averaged over 25 years, provided approximately 3% of Turkey's total marine fisheries production. In the same period, the average percentage contribution from the region to the total demersal fisheries production in the country was 16%. The average portion of the demersal catches in the region's total fisheries was about 31%. This ratio was bigger than those calculated for previous regions. From 1985 to 2009, the highest yield from the demersal resources in the region was 23 thousand tonnes in 1998, and the other years with landings exceeding 20 thousand tonnes were 1991, 1994 and 2006 (Figure 13) (SIS, 1985-2003; TurkStat, 2004-2009).

Bony fishes were the major component of the demersal fisheries in the Aegean Sea like in the Eastern Black Sea, and in the past 25 years, on average, they made up 65% of the annual total catches. The average proportion of demersal invertebrates in the same time period was around 33%. These ratios were also almost identical to those computed for the Eastern Black Sea. Bony fishes dominated the demersal landings in the region especially from 1992 to 2002, and formed as much as 91% of the region's total demersal fisheries in 1999 (Figure 13). There were three significant peaks in the demersal bony fish landings in this time period, the first 15.2 thousand tonnes in 1992, and the second 19.1 thousand tonnes in 2004, and the third 19.3 thousand tonnes in 2004. After this last peak, the catches started to fall and the annual total yield was only 3.8 thousand tonnes in 2004 (Figures 2 and 13). Invertebrates were more abundant in the demersal landings in 1988, 1989 and 2006. These last two years additionally corresponded to two remarkable peaks of 13 and 13.9 thousand tonnes in the demersal invertebrate production. The remaining component of the demersal fisheries, cartilaginous fishes, on average, composed barely 2% of the annual total catches in the region (Figure 13). The contribution from the Aegean Sea to the Turkey's overall total production of cartilaginous fishes was the minimum (SIS, 1985-2003; TurkStat, 2004-2009).

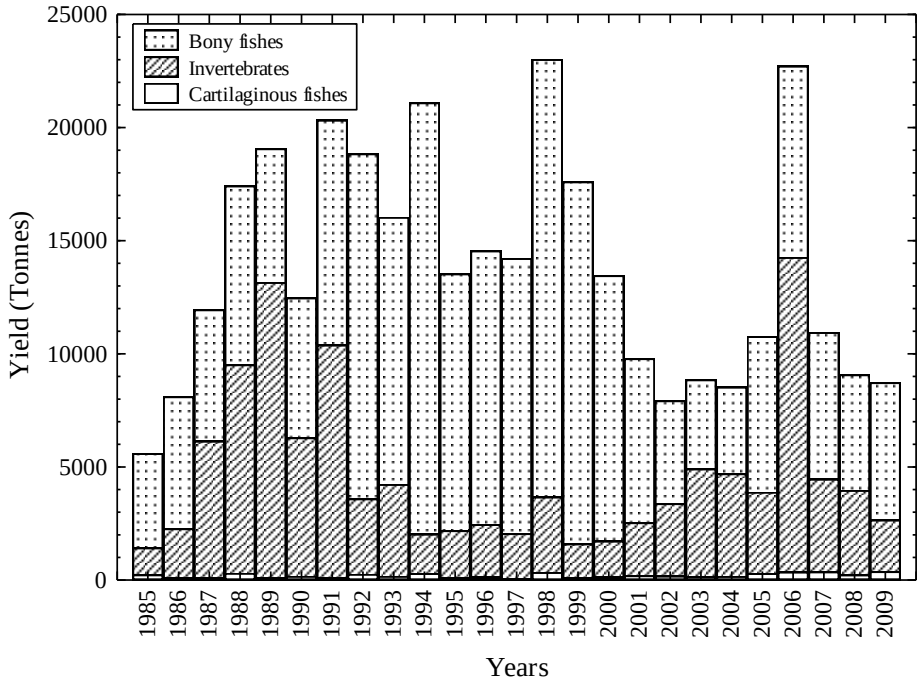


Figure 13. Annual total marine demersal fisheries production in the Aegean Sea from 1985 to 2009 (SIS, 1985-2003; TurkStat, 2004-2009).

Hake was the most abundant bony fish species in the demersal fisheries in the Aegean Sea like in the Marmara Sea (SIS, 1985-2003; TurkStat, 2004-2009). However, over the course of 25 years, the average share of hake in the region's total demersal bony fish production was 22%, a figure much lower than that in the Marmara Sea. The dominance of hake in the demersal bony fish landings was more pronounced between 1992 and 2000 (Figure 14). This period contained three top years, 1992, 1994 and 1998, in hake production with the respective quantities of 5.5, 6.3 and 9.1 thousand tonnes. Following the historical maximum catch in 1998, the landings commenced to decrease. The registered amount of hake caught in 2004 was as low as 392 tonnes (Figure 14). Starting from 2005, the hake landings somewhat increased, up to above 2 thousand tonnes in 2007. Yet, the annual total yields in 2008 and 2009 were again down, just 546 and 644 tonnes, respectively (Figure 14). The second largest total production of hake in Turkey originated from the Aegean Sea (SIS, 1985-2003; TurkStat, 2004-2009).

Like in the Eastern Black Sea, red mullet was the second most abundant demersal bony fish species in the Aegean Sea. From 1985 to 2009, red mullet constituted, on average, close to 11% of the total demersal bony fish production

in the region. The average contribution of striped red mullet, on the other hand, was only slightly more than 4%. These two ratios were quite similar to those estimated for the Eastern Black Sea. Besides these two congener species, another one, a Lessepsian migrant species from the same family Mullidae, golden banded goatfish (*Upeneus moluccensis*) is also caught mainly in the southern Aegean Sea. Although it is fairly easy to distinguish this new species from the other two, separate catch information for golden banded goatfish were provided only in the last three years' official statistics (TurkStat, 2007-2009). During these years, this species formed a little more than 1% of the total demersal bony fish landings. For further evaluation, the catches of these three mullid species were pooled and referred to as red mullets. The top years for production of red mullets in the region were especially 1992, 1994 and 2001 with the corresponding yields of 2.2, 2.7 and 1.7 thousand tonnes (Figure 14). In addition, the landings of red mullets in the region in these years surpassed those registered in all other seas (SIS, 1985-2003; TurkStat, 2004-2009). After 2002, the landings diminished and fluctuated within a range of about 6 to 13 hundred tonnes (Figure 14).

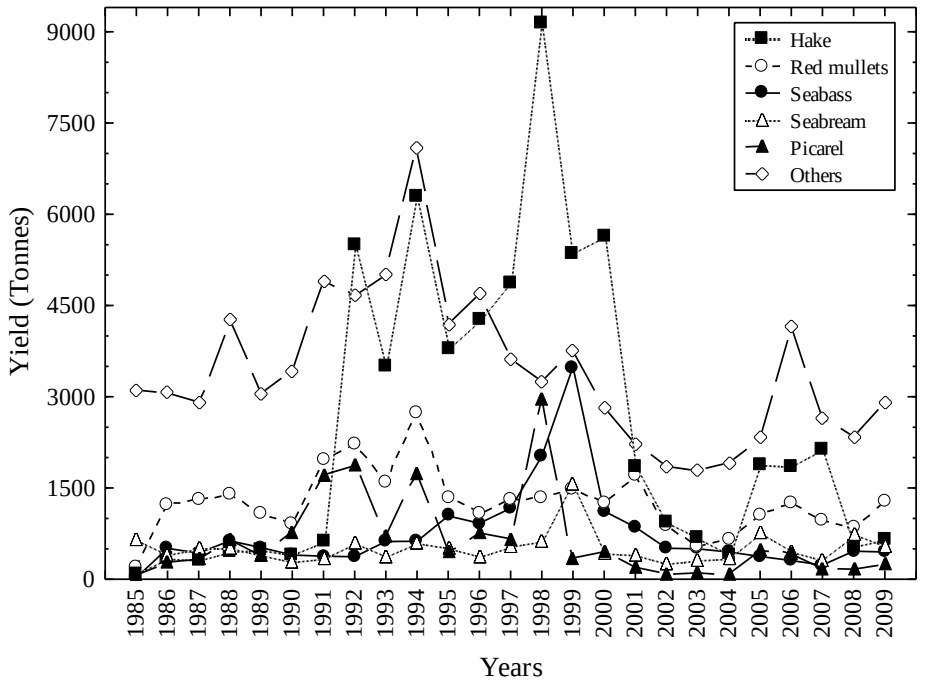


Figure 14. Annual total catch statistics of the major demersal bony fish species in the Aegean Sea from 1985 to 2009 (SIS, 1985-2003; TurkStat, 2004-2009).

Seabass (*Dicentrarchus labrax*) followed red mullets in the catch statistics with an average proportion of 8% (SIS, 1985-2003; TurkStat, 2004-2009). The seabass landings ascended gradually from a trivial amount of 28 tonnes in 1985 to 1 thousand tonnes in 1995. The increase became steeper after 1996 and the catch taken in 1999 was 3.5 thousand tonnes (Figure 14). After this historical maximum, the seabass landings fell as rapidly as they had previously risen, and since 2002 they have ranged between 230 and 510 tonnes (Figure 14). The Aegean Sea was the region with the highest seabass production in the country (SIS, 1985-2003; TurkStat, 2004-2009).

Another commercially highly valued species seabream (*Sparus aurata*) was behind seabass with respect to its abundance in the demersal bony fish catches. Seabream comprised, on average, nearly 7% of the annual total demersal fish production in the region. Like in the case of seabass, the biggest seabream catch was taken in 1999 and its amount was circa 1.6 thousand tonnes (Figure 14). Picarel came after seabream with an average share of 6% in the region's total demersal bony fish landings. The largest picarel yield was roughly 3 thousand tonnes in 1998 (Figure 14) (SIS, 1985-2003; TurkStat, 2004-2009). The catches of whiting, the most dominant demersal bony fish in the Black Sea and the second in the Marmara Sea, were in trivial quantities in the Aegean Sea and on average, hardly 2% of the annual total demersal bony fish landings consisted of this species (SIS, 1985-2003; TurkStat, 2004-2009).

Even though the number of major demersal bony fish species grew in the Aegean Sea, the cumulative contribution of these six species to the region's total demersal bony fish production was down to 58%. This was in accordance with the increased diversity of demersal fishes in the region (Table 1). Consequently, compared to the previous regions, there were many more commercial demersal bony fish species, such as saupe (*Sarpa salpa*), striped bream (*Pagellus erythrinus*), sole and two banded bream (*Diplodus vulgaris*), which were included in the fisheries in the Aegean Sea albeit with relatively minor catch levels. The individual catch statistics belonging to these species were combined and shown as "others" in Figure 14.

A new group of invertebrates, cephalopods, which were caught in negligible quantities in the previous regions, were abundant in the demersal fisheries in the Aegean Sea. Averaged over 25 years, octopus (*Octopus vulgaris*) was the most dominant and commercially important cephalopod species and composed 19% of the annual total demersal invertebrate landings in the region (SIS, 1985-2003; TurkStat, 2004-2009). The octopus catches somewhat oscillated with three

notable peaks of 1.6, 1.3 and 1 thousand tonnes in 1989, 1998 and 2001, respectively. Black mussel was the second most abundant species here like in the Marmara Sea. The catch levels in this region, however, were mostly lower than those in the previous region. This bivalve made up, on average, approximately 18% of the demersal invertebrate catches in the Aegean Sea. The biggest black mussel catch in the region was 9.2 thousand tonnes in 2006, exactly one year later than 2005, the likewise record catch year for the same species in the Marmara Sea (SIS, 1985-2003; TurkStat, 2004-2009).

Shrimps were the next most copious invertebrate group in the region's demersal fisheries with an average proportion of 15%. But the sizes of the annual catches in the region were much smaller than those in the Marmara Sea. The largest recorded yield was 1.8 thousand tonnes in 2005. Deep water rose shrimp was probably the most dominating species in this group. Two other cephalopod species, cuttlefish (*Sepia officinalis*) and squid (*Loligo vulgaris*) followed shrimps in terms of abundance in the demersal invertebrate landings, both with similar average shares of around 12%. Interestingly, the highest yields for both species, 2.3 and 3.4 thousand tonnes, respectively, were registered in the same year 1989, which was again the top year in octopus production (SIS, 1985-2003; TurkStat, 2004-2009). Octopus, cuttlefish and squid collectively accounted for 55% of the total yield of demersal invertebrates in 2009 with corresponding amounts of 540, 327 and 384 tonnes (TurkStat, 2009). Carpet shell was also an important species and on average, 11% of the demersal invertebrate catches taken in the region consisted of this clam (SIS, 1985-2003; TurkStat, 2004-2009).

3.5. The Mediterranean Sea

This is the least productive fisheries region in Turkey. From 1985 to 2009, the region's total marine fisheries production and its demersal constituent, on average, formed 5% and a bit more than 2% of the country's total marine fisheries catch, respectively (SIS, 1985-2003; TurkStat, 2004-2009). Over the course of 25 years, the average percentage contribution from the Mediterranean Sea to the total demersal fisheries production in Turkey was 13%. In the same period, the average share of the demersal catches in the total fisheries landings in the region was above 45%. This was so far the biggest ratio estimated. The observed increase in this ratio from north to south was also a lucid illustration of how the fishery resources hence the characteristics of fisheries changed from a more pelagic nature to a demersal one.

The dominating component of the demersal fisheries in the Mediterranean Sea was clearly bony fishes. From 1985 to 2009, the landings of demersal bony fishes in the region exceeded those of demersal invertebrates every year except for in 2003 and 2004 (Figure 15).

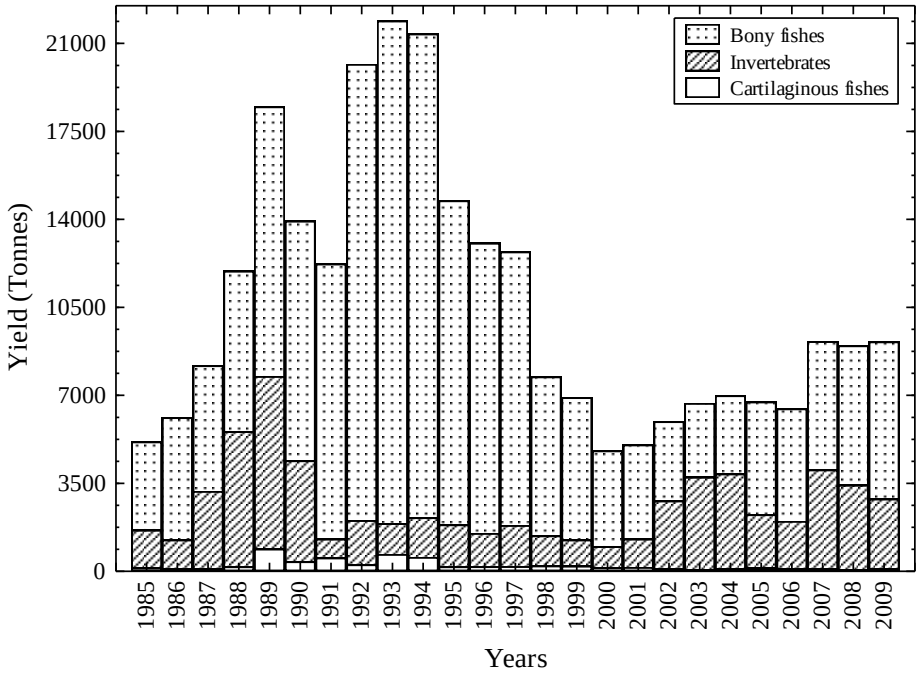


Figure 15. Annual total marine demersal fisheries production in the Mediterranean Sea from 1985 to 2009 (SIS, 1985-2003; TurkStat, 2004-2009).

Bony fishes comprised, on average, 72% of the annual total demersal landings. Starting from 1985, the demersal bony fish catches showed a rapid and almost continuous rise and reached the historical maximum yield of around 20 thousand tonnes in 1993. The annual total demersal fish production in the Mediterranean Sea was higher than in all other regions between 1992 and 1994 (Figure 2). After 1994, however, the catches diminished sharply to less than 3 thousand tonnes in 2003. In subsequent years, they again began to increase but in a rather slow fashion compared with the earlier period from 1985 to 1993 (Figure 2). Between 1998 and 2004, the annual total demersal fish production was the lowest among all the regions (Figure 2) (SIS, 1985-2003; TurkStat, 2004-2009).

Red mullet was the most abundant species, composing an average of nearly 9% of the annual total demersal bony fish catches in the Mediterranean Sea from 1985 to 2009. The average portion of striped red mullet was much lower, a little more than 2%. Like in the Aegean Sea, only the last three years' statistics contained separate catch data for golden banded goatfish (TurkStat, 2007-2009). During these years, this mullid species made up close to 2% of the total demersal bony fish landings in the region. There were two peaks in the production of red mullets, the first 2.3 thousand tonnes in 1989, and the second 4 thousand tonnes in 1993 (Figure 16). After this highest recorded yield, catches of red mullets dropped drastically down to 9 hundred tonnes in 1996. The trend of decline continued gradually until 2003 when the total production was just slightly above 3 hundred tonnes. Thereafter the landings started to go up again; the last one in 2009 was over 1.2 thousand tonnes (Figure 16). The Mediterranean Sea ranked as the second region in Turkey in terms of overall total production of red mullets (SIS, 1985-2003; TurkStat, 2004-2009).

Hake was the second most abundant bony fish species in the demersal fisheries in the Mediterranean Sea with an average proportion of 7%. The landings in this region, however, were typically much smaller than those in the Marmara and the Aegean Seas. The amounts of hake caught in the region rose fast from 3 hundred tonnes in 1991 to roughly 4 thousand tonnes in 1995 (Figure 16). After this historical maximum, for a couple of more years, substantial catch levels of about 3.5 thousand tonnes were maintained. In the following years the landings commenced to shrink and the catch in 2004 was no more than 42 tonnes. The production in the region has remained small ever since (Figure 16) (SIS, 1985-2003; TurkStat, 2004-2009).

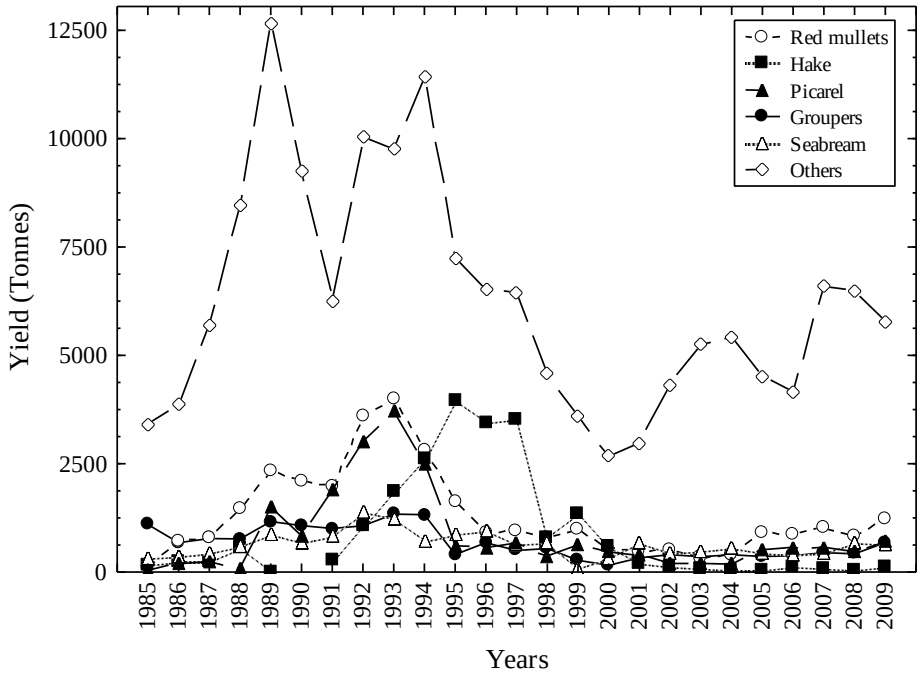


Figure 16. Annual total catch statistics of the major demersal bony fish species in the Aegean Sea from 1985 to 2009 (SIS, 1985-2003; TurkStat, 2004-2009).

Picarel followed hake constituting an average of almost 7% of the annual total demersal bony fish landings in the Mediterranean Sea during the past 25 years. The picarel production in this region was all together much greater than both in the Marmara and the Aegean Seas. The picarel catches increased from a trivial amount of 40 tonnes in 1985 to 1.5 thousand tonnes in 1989. After a slight fall in 1990, they again ascended, this time steeper, and reached to the historical maximum of 3.7 thousand tonnes in 1993. Interestingly, the largest catch of red mullets in this region was registered in the same year as well. In subsequent years, the landings declined and since 1995 they have ranged from around 2 to 7 hundred tonnes (Figure 16) (SIS, 1985-2003; TurkStat, 2004-2009).

A group of commercially highly valued demersal bony fish, containing five species from the genus *Epinephelus*, referred to as groupers were also abundant in the fisheries in the Mediterranean Sea. In this group especially two species, dusky grouper (*E. marginatus*) and waker (*E. aeneus*) were more numerous than the others. Averaged over 25 years, groupers composed nearly 7% of the annual

total demersal fish production in the region (SIS, 1985-2003; TurkStat, 2004-2009). The top years for production of groupers in the region were 1985, 1989, 1993 and 1994 with landings between 1 and 1.3 thousand tonnes (Figure 16). After 1994, the catches diminished and the lowest was 1.5 hundred tonnes in 2000. In the following years, the production of groupers in the region went up a bit and oscillated in the vicinity of 4 hundred tonnes until 2008. The yield in 2009 was approximately 7 hundred tonnes (Figure 16). Groupers were also caught in the Aegean Sea albeit in smaller quantities (SIS, 1985-2003; TurkStat, 2004-2009). Seabream came after groupers with an average share of above 6% in the region's total demersal bony fish landings. During the past 25 years, the recorded maximum and minimum catches of seabream were 1.3 thousand tonnes in 1992 and 83 tonnes in 1999 (Figure 16). From 2000 to 2009, the average annual amount of seabream caught in the region was 5 hundred tonnes. The Mediterranean Sea was the region with the highest seabream production in Turkey (SIS, 1985-2003; TurkStat, 2004-2009).

The average cumulative contribution of the bony fish species, referred as "others" in Figure 16, to the region's demersal fisheries was close to 62%. In other words, instead of a strong dominance of one or a few demersal bony fish species and more or less a very uniform catch composition like in the Black Sea and also, to a lesser extent in the Marmara Sea, there was a more diverse catch composition in the Mediterranean Sea consisting of a significant number of bony fish species contributing to the total demersal fisheries with comparatively minor amounts. Sole, striped bream, red gurnard (*Chelidonichthys cuculus*), seabass, two banded bream and striped seabream (*Lithognathus mormyrus*) were among the more notable demersal bony fish species in the Mediterranean Sea (SIS, 1985-2003; TurkStat, 2004-2009).

According to the fishery statistics (SIS, 1985-2003; TurkStat, 2004-2009), invertebrates, on average, accounted for 26% of the demersal fisheries in the Mediterranean Sea. The greatest yield was about 7 thousand tonnes in 1989 (Figures 4 and 15). Subsequently, the catches fell sharply to 7.5 hundred tonnes in 1991. From 1992 to 2001, they fluctuated within a range between 8 and 18 thousand tonnes (Figure 4). Thereafter, the production increased to 3.7 and 3.8 thousand tonnes in two consecutive years 2003 and 2004, respectively. In addition, only in these two years, the demersal invertebrate landings in the region exceeded those of demersal bony fishes (Figure 15). After 2004 the demersal invertebrate catches again began to rise and fall, and the last substantial catch was 3.9 thousand tonnes in 2007. The Mediterranean Sea was

the region with the lowest demersal invertebrate production in the country (SIS, 1985-2003; TurkStat, 2004-2009).

Like in the Aegean Sea, cephalopods were the most abundant and commercially important invertebrate group in the demersal fisheries in the region with an average combined proportion of 45%. Over the course of 25 years, cuttlefish was the most dominant cephalopod species and composed 27% of the annual total demersal invertebrate landings in the Mediterranean Sea (SIS, 1985-2003; TurkStat, 2004-2009). The cuttlefish landings ascended rapidly from a small amount of 78 tonnes in 1985 to 3 thousand tonnes in 1989. However, after this historical maximum yield, the catches dropped to 162 tonnes in 1991. From 1992 to 2003, the landings ranged from roughly 3 to 6.5 hundred tonnes. The last sizable catch was 1.1 thousand tonnes in 2004. In the subsequent five years, the average annual quantity of cuttlefish caught in the region was 850 tonnes. The other cephalopods squid and octopus made up, on average, 11% and 7% of the region's demersal invertebrate catches. The top years for production of squid and octopus in the region were 1988 and 1989, respectively, with corresponding amounts of nearly 8.5 and 4.5 hundred tonnes. The overall total yield of cephalopods in the Mediterranean Sea was less than that in the Aegean Sea (SIS, 1985-2003; TurkStat, 2004-2009).

Shrimps also followed cephalopods here like in the Aegean Sea. The average share of this invertebrate group in the demersal fisheries in the region was 32%. The shrimp production in the region was a bit bigger than that in the Aegean Sea, but much smaller than that in the Marmara Sea. There were two outstanding peaks in the catch history of shrimps in the region, the first 1.7 thousand tonnes in 1989, and the second 1.6 thousand tonnes in 2007 (SIS, 1985-2003; TurkStat, 2004-2009). Crabs, particularly blue crab (*Callinectes sapidus*), were another important and commercially highly valued species and on average, formed 5% of the demersal invertebrate production in the region. The largest recorded yield for crabs in the region was nearly 626 tonnes in 1988. Ever since, however, the crab production has been very little. Black mussel which was the second most abundant species in the Marmara and the Aegean Seas was also caught in the Mediterranean Sea, yet in lesser quantities. The average proportion of this bivalve in the region's total demersal invertebrate production was 5% (SIS, 1985-2003; TurkStat, 2004-2009).

Cartilaginous fishes, the remaining component of the demersal fisheries, on average, comprised slightly more than 2% of the annual total catches in the region (Figure 15) (SIS, 1985-2003; TurkStat, 2004-2009).

4. A Brief Review of the Previous Studies on the Demersal Fish Stocks in Turkish Seas

Although a majority of the scientific studies for the assessment of the demersal fish stocks in Turkish seas have been carried out during the last 20-25 years, investigations on fish and fisheries along the Turkish coasts have quite a long history. The first documented work on the country's marine fishes is Deveciyan's book entitled "Fish and Fishery in Turkey (Pêche et Pêcheries en Turquie)". The first edition of this book was published in 1915 and re-edited in 1926. In this book, Deveciyan presented rather detailed information on fishes that were distributed in both marine and inland waters in Turkey. The fishing methods used then to catch those fishes were also described in the book.

From 1926 to the 1930s, except for a few studies done by Russian scientists in the Black Sea there were no remarkable publications on the demersal fisheries resources in Turkey. Between 1940 and 1950, numerous inventory studies were carried out especially in the Marmara and Black Seas by various researchers from the Hydrobiology Department of Istanbul University. In the 1950s, some biological properties of several commercial fish species, the migration of some schooling pelagic fish and the pollution in fishing areas were studied in addition to other inventory studies (Bilecik, 1969). Besides these studies, between 1955 and 1960, the Meat and Fish Organization (established in 1952, and the Fish division was opened in 1955) demonstrated a special interest in the fisheries and initiated various investigations to determine trawlable areas, the potential of available demersal fishery resources and the selectivity of fishing nets in the seas surrounding Turkey. Most of the research covered larger areas compared to the studies in the previous years. Unfortunately, some of these investigations were never completed because the Fisheries Research Centre of the Meat and Fish Organization was closed down in 1961 (Bilecik, 1969).

In the early 1970s, investigations on the demersal fisheries resources were mostly focused on some commercial invertebrates such as mussels, sea snails and sea urchins in the Black Sea. In one remarkable study on the demersal fishes in the Central Black Sea between 1969 and 1973, Kutaygil & Bilecik (1976) evaluated the season and depth related variations in bottom trawl catch compositions on a percentage basis.

However, none of these studies were in fact related to the estimation of stock sizes of marine resources. The first stock assessment study was conducted in 1972 within the scope of a FAO/UNDP project and the stock sizes of small pelagics such as anchovy and horse mackerel in the Black Sea were investigated by using acoustic methods (Johannesson & Losse, 1977). Another acoustic survey was also carried out on horse mackerel in the Northern Aegean Sea around Gökçeada in 1973 (Kara et al., 1975).

Perhaps the first comprehensive attempt to assess the stock sizes of demersal fishes along the Turkish coastal area was made by the Institute of Marine Sciences of the Middle East Technical University (METU-IMS) from 1981 to 1984 using the swept area method between Anamur and İskenderun in the Eastern Mediterranean Sea. In these surveys, the depths down to 100 m in Mersin Bay were studied in detail and the biomass of commercially valuable species was estimated. The total demersal fish production was reported as ranging from 15 kg/ha to 49 kg/ha (with a mean of 29 kg/ha) in this period (Bingel et.al. 1993; Gücü & Bingel, 1994; Bingel & Gücü, 2010).

Another significant survey for the appraisal of demersal marine resources was carried out through a collaboration among the Institute of Marine Sciences and Technology of Dokuz Eylül University (DEU-IMST) and the College of Fisheries and the Faculty of Science of Ege University in the Central and Eastern Black Sea between 1985 and 1986. In this study, trawlable fishing grounds and the effects of bottom trawl fishing on the demersal resources were also investigated (DEU-IMST, 1986). Whiting was found as the dominant species and its standing biomass was reported as nearly 59 tonnes per square nautical mile in this region.

In the late 1980s, the Scientific and Technological Research Council of Turkey (TÜBİTAK) and the Ministry of Agriculture and Rural Affairs of the Republic of Turkey (MARA) focused on the assessment of fish stocks in Turkish Seas. Thus, several research projects targeting stock assessment in different Turkish seas were supported. In all of these projects, demersal fishery resources were sampled by bottom trawl and the swept area method was used to estimate available biomass of the commercial species caught.

The first of the mentioned stock assessment projects was conducted within a collaboration between METU-IMS and the Trabzon Fisheries Research Institute of MARA from 1989 to 1992 with the financial support from international and national bodies such as NATO-Science for Stability Programme, The State Planning Organization (SPO), TÜBİTAK and MARA. Bottom trawl surveys

were carried out with R/V Bilim and R/V Sürat 1. Whiting and striped mullet were the most abundant species in the surveyed areas, their biomasses showed very high spatial and temporal variations (TÜBİTAK, DEBAG 12/G, DEBAG 74/G, DEBAG 115/G & DEBÇAG 139/G, 1996).

The other stock assessment project was done again through a collaboration between the Institute of Marine Sciences and Management of Istanbul University (IU-IMSM) and the Bodrum Fisheries Research Institute of MARA in the Marmara Sea from 1990 to 1995. Bottom trawl surveys were conducted with R/V Arar. Hake was the most dominating species and made up, on average over five years, about 56% of the total available biomass in the surveyed area. Other abundant demersal fishes were whiting and red mullets (TÜBİTAK-DEBAG 75/G-116/G, 1997).

The aim of another similar research project funded by TUBİTAK and MARA was to determine and monitor the potential exploitable demersal fisheries resources in the Aegean Sea. DEU-IMST and the Bodrum Fisheries Research Institute of MARA were collaborators in this project and they divided the Aegean Sea into five subareas including both the Turkish and international waters by considering geographical, hydrographic and topographical conditions. Seasonal bottom trawl surveys started in 1990 with R/V K. Piri Reis (TÜBİTAK-DEBAG 14/G, 1991). Meanwhile in 1991 MARA and Japan International Cooperation Agency (JICA) mutually agreed to initiate a research project on the demersal fishery resources in Turkish seas. Following this agreement, large-scale research surveys were conducted in the Marmara, the Aegean and the Mediterranean Seas between 1991 and 1993 by a team of Japanese and Turkish researchers (DEU-IMST) with R/V K. Piri Reis. In order to estimate the stock sizes more accurately, each region was stratified to three depth zones as 20-100, 101-200 and 201-500 m. The stratified zones were divided into 3 square mile blocks and trawl sampling stations inside each block were selected randomly. The biomasses of about 50 demersal species were estimated. However, the major part of the total biomass was composed by a small number of taxa. Red mullet and hake were the most abundant species in most of the surveyed areas. Estimated biomasses of several other copious species, such as axillary seabream, common pandora, annular seabream, large-eye dentex, rose shrimp, octopus and squid, varied according to sampling area, depth and season (JICA, 1993).

After the completion of the JICA project, investigations on the demersal fish stocks were continued in the Aegean Sea until 1996 with the support from

TÜBİTAK. Information provided by the JICA and TÜBİTAK projects was of great importance for monitoring and management of the demersal fisheries resources in terms of multispecies and ecosystem-based approach (Benli et al., 2000).

METU-IMS carried out an important study on the Lessepsian fishes in the northeastern Mediterranean Sea in 1996. Biomasses of not only the Lessepsian fishes but also the demersal fishes along the coasts of the Turkish Republic of Northern Cyprus (TRNC), İskenderun and Mersin Bays were estimated (YDABÇAG-449/G, 1997).

The Trabzon Fisheries Research Institute of MARA conducted a research project on the demersal fisheries in the eastern Black Sea from 1997 to 2000. The stock sizes of dominant fishes such as whiting, red mullet, turbot and picarel were evaluated (TAGEM/IY/97/17/03/006, 2002).

Two projects funded by MARA evaluating the industrial fisheries in the Aegean and Mediterranean Seas were completed in 1998 and 2000, respectively (Kara & Gurbet, 1999; Kara & Aktas, 2001). In these studies, commercial trawlers were used for bottom trawl samplings and biomass estimates for various demersal resources were provided together with the comprehensive landing-site surveys.

The research on the demersal fish and fisheries during the 2000s consisted mostly of relatively small-scale studies concentrated on a particular bay or an area, like the TUBITAK funded projects done in Saros Bay by the Faculty of Fisheries of Çanakkale 18 Mart University and in Izmir Bay by the Faculty of Fisheries of Ege University (TUBITAK 106Y029, 2009; TUBITAK 106Y035, 2010).

5. Conclusion

The only continuous and main source of information regarding the state of fisheries in Turkey is the official fishery statistics collected, compiled and published annually by the Turkish Statistical Institute. However, accuracy, precision, coverage and representability of these catch statistics have long been debated. Not only many fisheries scientists but also a considerable number of people involved otherwise in the fisheries sector in the country are very skeptical to the official statistics. There seems to be more or less a general consensus that the catch figures reported in these statistics are underestimates of the fish actually caught and that a substantial amount goes unreported. Yet, so far there has been no agreement upon the magnitude of the bias. Another

additional concern is the inaccuracy of the provided information particularly on the species level. The organism names given in these statistics do not always strictly correspond to the distinct biological species. Sometimes, data on several closely related species are merged and presented under only one name. Again the statistics for some similar looking species are considered somewhat doubtful because these species are often mistaken for one another and their common names are also recurrently swapped locally. Although all these concerns are duly shared, the official catch statistics are still considered here as a useful index reflecting the overall variations in the stocks of major fisheries resources. Thus, the evaluation made and the trends deduced so far on the state of demersal fisheries on the basis of the official statistics are regarded as reasonably valid.

According to the catch records from the official fishery statistics from 1985 to 2009, in terms of biomass, bony fishes were the chief component of the demersal fisheries in Turkish seas, and they composed almost 55% of the overall total demersal production in this period. Demersal invertebrates followed them with a proportion of 42%. The remaining 3% of the total demersal fisheries production in Turkey was formed by cartilaginous fishes (SIS, 1985-2003; TurkStat, 2004-2009).

Despite the appreciable richness of Turkey's demersal bony fish fauna, almost 67% of the country's overall demersal bony fish production in the past 25 years was made up of two species, whiting (36%) and hake (17%), and a combined group, red mullets (14%). On a more regional basis, whiting was dominant in the Black Sea, hake in the Marmara and the Aegean Seas and red mullets in the Mediterranean Sea (SIS, 1985-2003; TurkStat, 2004-2009).

Even though the demersal bony fish production showed temporal and regional variations, after 1998 there was an obvious trend of decline in the overall landings. This may be attributed to several reasons: fishery operations (fleet modernization, overfishing, non-selective and illegal fishing), pollution (eutrophication and chemical pollution), habitat destruction (physical changes in habitats, increased urbanization along the coastal areas) and invasion of alien species.

Organisms distributed deeper than 300-400 m should be considered as alternative demersal fishery resources. Although trawlers operating in the coastal waters occasionally shift their activity to deeper waters, their equipment is mostly not very appropriate, and furthermore there is no specific interest for deep-sea fishery in Turkey. However, various commercially valuable species,

such as hake, anglerfish, megrim, Norway lobster, deep water rose shrimp and giant red shrimp have been encountered in trawl hauls between 400 and 500 m depth (JICA, 1993). In even deeper waters, available species from myctphidae, macrouridae, gadidae and bothidae may become an important resource (Kaya, 1993). Since reliable information (catch, landings, fishing effort, area and depth) is scarce, detailed research studies need to be carried out on the deep-sea fisheries resources in Turkish Seas.

Although a great deal of effort and funds have been invested in the research activities on the demersal fishery resources in Turkey at the regional and national level over the past 25 years, the data obtained have been somewhat limited and not very dependable for a sustainable management of the demersal fisheries. For a successful and sustainable management, more comprehensive data with higher precision and accuracy must be collected on a regular basis (Tokaç et al., 2010).

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Appendix 1: The list of the Latin and common (English and Turkish) names of Turkey's marine fish species by sea and habitat selection (BS: the Black Sea, MS: the Marmara Sea, AS: the Aegean Sea, MTS: the Mediterranean Sea)

Species Name	English Name	Turkish Name	BS	MS	AS	MTS	Habitat
Heptranchias perlo	Sharpnose sevengill shark	Boz camgöz			*	*	Bathydemersal
Hexanchus griseus	Bluntnose sixgill shark	Boz camgöz	*	*	*	*	Bathydemersal
Carcharias taurus	Sand tiger shark	Pamuk balığı			*	*	Reef-associated
Odontaspis ferox	Smalltooth sand tiger	Pamuk balığı			*	*	Benthopelagic
Carcharodon carcharias	Great white shark	Büyük beyaz köpekbalığı		*	*	*	Pelagic
Isurus oxyrinchus	Shortfin mako	Dik burun canavar			*	*	Pelagic
Lamna nasus	Porbeagle	Dik burun karkaryas		*	*	*	Pelagic
Cetorhinus maximus	Basking shark	Büyük camgöz			*	*	Pelagic
Alopias vulpinus	Thintail thresher	Sapan balığı	*	*	*	*	Pelagic
Alopias superciliosus	Bigeye thresher	Sapan balığı			*		Pelagic
Galeus melastomus	Blackmouth catshark	Lekeli kedibalığı		*	*	*	Bathydemersal
Scyliorhinus canicula	Small-spotted catshark	Kedi balığı	*	*	*	*	Demersal
Scyliorhinus stellaris	Nursehound	Kedi balığı		*	*	*	Reef-associated
Carcharhinus brevipinna	Spinner shark	Sivriburun camgöz			*	*	Epipelagic
Carcharhinus limbatus	Blacktip shark	Köpekbalığı				*	Epipelagic
Carcharhinus melanopterus	Blacktip reef shark	Siyah yüzgeçli köpekbalığı				*	Reef-associated
Carcharhinus altimus	Bignose shark	Büyük burun köpekbalığı				*	Reef-associated

Carcharhinus plumbeus	Sandbar shark	Kum köpekbalığı			*	*	Benthopelagic
Prionace glauca	Blue shark	Pamuk balığı			*	*	Benthopelagic
Galeorhinus galeus	Tope shark	Camgöz			*	*	Benthopelagic
Mustelus asterias	Starry smooth-hound	Benekli köpekbalığı			*	*	Demersal
Mustelus mustelus	Smooth-hound	Adi köpekbalığı		*	*	*	Demersal
Mustelus punctulatus	Blackspotted smooth-hound	Benekli köpekbalığı			*	*	Demersal
Sphyrna tudes	Smalleye hammerhead	Çekiç balığı				*	Epipelagic
Sphyrna zygaena	Smooth hammerhead	Çekiç balığı			*	*	Epipelagic
Oxynotus centrina	Angular roughshark	Domuz balığı		*	*	*	Bathydemersal
Squalus acanthias	Picked dogfish	Mahmuzlu camgöz	*	*	*	*	Benthopelagic
Squalus blainville	Longnose spurdog	Mahmuzlu camgöz	*	*	*	*	Demersal
Centrophorus granulosus	Gulper shark	Köpekbalığı		*	*	*	Bathydemersal
Centrophorus uyato	Little gulper shark	Köpekbalığı		*			Bathydemersal
Dalatias licha	Kitefin shark	Küt burunlu köpekbalığı		*	*		Bathydemersal
Echinorhinus brucus	Bramble shark	Çivili köpekbalığı			*	*	Bathydemersal
Etmopterus spinax	Velvet belly	Kadife köpekbalığı		*	*	*	Bathydemersal
Squatina aculeata	Sawback angelshark	Keler				*	Demersal
Squatina oculata	Smoothback angelshark	Keler		*	*	*	Demersal
Squatina squatina	Angelshark	Keler			*	*	Demersal
Rhinobatos cemiculus	Blackchin guitarfish	Kemane balığı		*	*	*	Demersal
Rhinobatos rhinobatos	Common guitarfish	Kemane balığı		*	*	*	Demersal

Torpedo marmorata	Marbled electric ray	Elektrik balığı, Çarpan	*	*	*	*	Reef-associated
Torpedo torpedo	Common torpedo	Elektrik balığı, Çarpan		*	*	*	Demersal
Torpedo nobiliana	Electric ray	Elektrik balığı, Çarpan		*	*	*	Benthopelagic
Raja batis	Blue skate	Vatoz	*	*	*	*	Demersal
Raja oxyrinchus	Longnosed skate	Uzun burunlu vatoz		*	*	*	Bathydemersal
Raja naevus	Cuckoo ray	Vatoz			*	*	Demersal
Raja asterias	Mediterranean starry ray	Vatoz		*	*	*	Demersal
Raja clavata	Thornback ray	Dikenli vatoz	*	*	*	*	Demersal
Raja miraletus	Brown ray	Benekli vatoz		*	*	*	Demersal
Raja montagui	Spotted ray	Vatoz		*	*	*	Demersal
Raja polystigma	Speckled ray	Benekli vatoz			*		Demersal
Raja radula	Rough ray	Vatoz			*	*	Demersal
Raja alba	White skate	Beyaz vatoz			*	*	Demersal
Raja undulata	Undulate ray	Dalgalı vatoz			*	*	Demersal
Leucoraja circularis	Sandy ray	Kum vatozu			*		Demersal
Leucoraja fullonica	Shagreen ray	Dikenli vatoz			*	*	Bathydemersal
Dasyatis centroura	Roughtail stingray	Rina, İğneli vatoz			*	*	Demersal
Dasyatis pastinaca	Common stingray	Rina, İğneli vatoz	*	*	*	*	Demersal
Dasyatis tortonesei	Tortonese's stingray	Rina, İğneli vatoz			*	*	Demersal
Dasyatis violacea	Pelagic stingray	Rina, İğneli vatoz			*	*	Pelagic
Himantura uarnak	Honeycomb stingray	Uzun kuyruklu rina				*	Reef-associated

Taeniura grabata	Round stingray	Yuvarlak rina				*	Demersal
Gymnura altavela	Spiny butterfly ray	Kazıkkuyruk	*	*	*	*	Demersal
Myliobatis aquila	Common eagle ray	Çuçuna		*	*	*	Benthopelagic
Pteromylaeus bovinus	Bull ray	Çuçuna			*	*	Benthopelagic
Rhinoptera marginata	Lusitanian cownose ray	Çuçuna			*	*	Benthopelagic
Mobula mobular	Devil fish	Kulaklı folya, Manta			*	*	Pelagic
Chimaera monstrosa	Rabbit fish	Tavşan balığı, Fare balığı			*	*	Bathydemersal
Acipenser gueldenstaedtii	Danube sturgeon	Rus mersini	*	*			Benthic
Acipenser nudiventris	Fringebarbel sturgeon	Şip balığı, uzun burun	*	*			Benthic
Acipenser stellatus	Starry sturgeon	Mersin balığı	*	*			Benthic
Acipenser sturio	Sturgeon	Kolan balığı	*	*	*		Benthic
Huso huso	Beluga	Mersin morinası	*	*			Semi-pelagic
Notacanthus bonaparte	Shortfin spiny eel					*	Bathypelagic
Facciolella oxyrhyncha	Facciola's sorcerer				*	*	Benthic
Anguilla anguilla	European eel	Avrupa yılan balığı	*	*	*	*	Benthic
Chlopsis bicolor	Bicoloured false moray	Yalancı mıgrı				*	Benthic
Enchelycore anatina	Fangtooth moray	Sivridişli müren				*	Benthic
Gymnothorax unicolor	Brown moray	Kahverengi müren			*	*	Benthic
Muraena helena	Mediterranean moray	Müren		*	*	*	Benthic
Dalophis imberbis	Armless snake eel	Mığrı, yılanbalığı			*	*	Benthic

Echelus myrus	Painted eel	Mırmır yılanbalığı			*	*	Benthic
Ophichthus rufus	Rufus snake eel	Yılankurdu balığı			*	*	Benthic
Ophisurus serpens	Serpent eel	Dikenli yılanbalığı			*	*	Benthic
Ariosoma balearicum	Bandtooth conger	Balerik mığrısı			*	*	Benthic
Conger conger	European conger	Mığrı	*	*	*	*	Benthic
Gnathophis mystax	Thinlip conger	Mığrı			*	*	Benthic
Nettastoma melanurum	Blackfin sorcerer	Gagalı yılanbalığı				*	Bathydemersal
Nemichthys scolopaceus	Slender snipe eel				*		Bathypelagic
Pisodonophis semicinctus						*	Benthic
Alosa fallax nilotica	Twaita shad	Tirsi	*	*	*	*	Epipelagic
Alosa immaculata	Pontic shad	Ringa balığı	*	*			Epipelagic
Alosa maeotica	Blacksea shad	Ringa balığı	*	*			Epipelagic
Alosa pontica	Danube shad	Ringa balığı	*	*			Epipelagic
Alosa tanaica	Azov shad	Tirsi	*				Epipelagic
Clupeonella cultriventris	Blacksea sprat	Filisa	*	*			Epipelagic
Chirocentrus dorab	Dorab wolf-herring					*	Epipelagic
Dussumieria elopsoides	Slender rainbow sardine	Hint sardalyası				*	Epipelagic
Etrumeus teres	Red-eye round herring	Akdeniz hamsisi				*	Epipelagic
Herklotsichthys punctatus	Spotback herring	Benekli sardalya				*	Epipelagic
Bregmaceros atlanticus	Antenna codlet				*	*	Epipelagic
Sardina pilchardus	European pilchard	Sardalya	*	*	*	*	Epipelagic

Sardinella aurita	Round sardinella	Yuvarlak sardalya	*	*	*	*	Epipelagic
Sardinella maderensis	Madeiran sardinella	Tirsi sardalya				*	Epipelagic
Sprattus sprattus	European sprat	Çaça	*	*	*	*	Epipelagic
Engraulis encrasicolus	Anchovy	Hamsi	*	*	*	*	Epipelagic
Argentina sphyraena	Argentine	Derinsu gümüşbalığı			*	*	Bathydemersal
Glossanodon leioglossus	Smalltoothed argentine				*		Bathydemersal
Microstoma microstoma	Slender argentine				*	*	Bathypelagic
Nansenia oblita	Shining argentine				*		Epipelagic
Salmo labrax	Blacksea salmon	Deniz alası	*				Benthic
Cyclothone braueri	Garrick	Işıldak balığı			*	*	Bathypelagic
Cyclothone pygmaea	Pygmy garrick	Işıldak balığı				*	Bathypelagic
Maurolicus muelleri	Silvery lightfish	Işıldak balığı		*	*		Bathypelagic
Argyropelecus hemigymnus	Half-naked hatchetfish	Işıldak balığı, gümüş balta			*	*	Bathypelagic
Vinciguerria attenuata	Slender lightfish	Işıldak balığı			*	*	Bathypelagic
Vinciguerria poweriae	Power's deep-water bristle-mouth fish	Işıldak balığı			*		Bathypelagic
Chauliodus sloani	sloane's viperfish	Engerek balığı			*		Bathypelagic
Stomias boa	Scaly dragonfish	Kocaağız balığı		*	*		Bathypelagic
Aulopus filamentosus	Royal flagfin	Filamentli zurna balığı		*	*	*	Benthic
Chlorophthalmus agassizi	Shortnose greeneye	Yeşilgöz balığı			*	*	Bathydemersal
Bathypterois dubius	Mediterranean spiderfish	Akdeniz örümcekbalığı			*	*	Bathydemersal

Saurida undosquamis	Brushtooth lizardfish	Lokum balığı			*	*	Benthic
Synodus saurus	Atlantic lizardfish	Zurna balığı			*	*	Benthic
Arctozenus risso	Ribbon barracudina				*	*	Bathypelagic
Lestidiops jayakari	Jayakar’s barracudina				*	*	Bathypelagic
Lestidiops sphyrenoides	Barracuda barracudina				*		Bathypelagic
Sudis hyalina	Longfin barracuda	Yalancı zargana			*	*	Bathypelagic
Benthosema glaciale	Glacier lantern fish	Işıldak balığı		*	*	*	Mesopelagic
Ceratoscopelus maderensis	Madeira lantern fish	Işıldak balığı			*	*	Bathypelagic
Diaphus holti	Small lantern fish	Işıldak balığı			*	*	Bathypelagic
Diaphus metopoclampus	Spothead lantern fish	Işıldak balığı			*		Bathypelagic
Diaphus rafinesquii	White-spotted lantern fish	Işıldak balığı			*		Bathypelagic
Electrona risso	Electric lantern fish	Işıldak balığı				*	Bathypelagic
Gonichthys cocco	Silver lanternfish	Işıldak balığı				*	Bathypelagic
Hygophum benoiti	Benoit's lanternfish	Işıldak balığı		*	*	*	Bathypelagic
Lampanyctus crocodilus	Jewel lanternfish	Işıldak balığı		*	*	*	Bathypelagic
Lampanyctus pusillus	Pygmy lanternfish	Işıldak balığı				*	Bathypelagic
Lobianchia dofleini	Dofleini's lantern fish	Işıldak balığı			*	*	Bathypelagic
Lobianchia gemellarii	Cocco's lantern fish	Işıldak balığı			*		Bathypelagic
Myctophum punctatum	Spotted lanternfish	Işıldak balığı		*	*	*	Bathypelagic
Notoscopelus bolini	Bolin’s lanternfish	Işıldak balığı				*	Mesopelagic
Notoscopelus elongatus	Elongate lanternfish	Işıldak balığı		*			Mesopelagic

Symbolophorus veranyi	Large-scale lantern fish	Işıldak balığı				*	Bathypelagic
Lampris guttatus	Opah			*	*	*	Bathypelagic
Lophotus lacepede	Crested oarfish	Tepeli kağıt balığı			*		Bathypelagic
Trachipterus trachypterus	Mediterranean dealfish	Kağıt balığı		*	*	*	Bathypelagic
Zu cristatus	Scalloped ribbonfish	Tepeli kağıt balığı			*	*	Bathypelagic
Regalecus glesne	King of herrings	Büyük kurdela balığı		*	*	*	Mesopelagic
Trachyrincus scabrus	Roughsnout grenadier	Uzun burunlu fare balığı			*	*	Bathydemersal
Caelorhynchus caelorhynchus	Hollowsnout grenadier	Fare balığı			*	*	Benthopelagic
Hymenocephalus italicus	Glasshead grenadier	Kılkuyruk fare balığı, zarkafa			*	*	Benthopelagic
Nezumia aequalis	Common Atlantic grenadier	Fare balığı		*	*	*	Benthopelagic
Nezumia sclerorhynchus	Roughtip grenadier	Fare balığı		*	*	*	Bathypelagic
Gadella maraldi	Gadella	Kara mezgit			*	*	Benthopelagic
Mora moro	Common mora					*	Bathypelagic
Benthocometes robustus	Robust cusk-eel				*		Bathydemersal
Gadiculus argenteus argenteus	Silvery pout	Pamukçuk balığı		*	*	*	Bathypelagic
Merlangius merlangus euxinus	Whiting	Mezgit	*	*	*		Benthopelagic
Micromesistius poutassou	Blue whiting	Derinsu mezgiti		*	*	*	Bathypelagic
Trisopterus minutus	Poor cod	Tavuk balığı		*	*	*	Benthopelagic
Gaidropsarus biscayensis	Mediterranean bigeye rockling	Küçük gelincik balığı		*	*		Benthopelagic
Gaidropsarus mediterraneus	Shore rockling	Gelincik balığı	*	*	*	*	Benthic

Gaidropsarus vulgaris	Three-bearded rockling	Gelincik balığı		*	*	*	Benthic
Molva macrophthalma	Spanish ling	Uzun gelincik balığı			*	*	Benthic
Phycis blennoides	Greater forkbeard	Gelincik balığı			*	*	Benthopelagic
Phycis phycis	Forkbeard	Gelincik balığı			*	*	Benthopelagic
Merluccius merluccius	European hake	Bakalyaro, berlam	*	*	*	*	Benthic
Ophidion barbatum	Snake blenny	Kayış balığı	*	*	*	*	Benthic
Ophidion rochei	Snake blenny	Kayış balığı	*	*	*		Benthic
Parophidion vassali	Vassal's snake blenny	Kayış balığı	*	*			Benthic
Carapus acus	Pearl fish	İnci balığı		*	*	*	Benthic
Bellottia apoda	Footless brotula	İnci balığı			*		Bathydemersal
Lophius budegassa	Blackbellied angler	Fener balığı	*	*	*	*	Bathydemersal
Lophius piscatorius	Angler	Fener balığı	*	*	*	*	Bathydemersal
Apletodon dentatus	Small-headed clingfish	Ördek balığı		*			Benthic
Apletodon incognitus		Ördek balığı				*	Benthic
Diplecogaster bimaculata	Two-spotted clingfish	Çift benekli ördek balığı	*	*	*	*	Benthic
Gouania willdenowi	Blunt-snouted clingfish	Küt burunlu ördek balığı			*	*	Benthic
Lepadogaster candollei	Connemarra clingfish	Ördek balığı	*	*	*	*	Benthic
Lepadogaster lepadogaster lepadogaster	Shore clingfish	Ördek balığı	*	*	*	*	Benthic
Atherina boyeri	Big-scale sand smelt	Gümüş balığı, Çamuka	*	*	*	*	Epipelagic
Atherina hepsetus	Mediterranean sand smelt	Gümüş balığı	*	*	*	*	Epipelagic

Atherinomorus forskalii	Hardyhead silverside	Gümüş balığı			*	*	Epipelagic
Lebias fasciatus	Mediterranean banded killifish	Dişli sazancık		*	*	*	Benthic
Scomberesox saurus	Atlantic saury	Pinnüllü zargana		*	*	*	Epipelagic
Belone belone	Garfish	Zargana	*	*	*	*	Epipelagic
Belone svetovidovi	Garfish	Zargana			*		Epipelagic
Tylosurus acus imperialis	Garfish	Zargana			*	*	Epipelagic
Hemiramphus far	Blackbarred halfbeak	Çomak balığı			*	*	Epipelagic
Hyporhamphus affinis	Tropical halfbeak	Çomak balığı				*	Epipelagic
Hyporhamphus picarti	African halfbeak	Çomak balığı			*	*	Epipelagic
Cheilopogon heterurus	Mediterranean flyingfish	Uçan balığı				*	Epipelagic
Hirundichthys rondeletii	Black-wing flyingfish	Uçan balığı		*	*	*	Epipelagic
Parexocoetus mento	African flyingfish	Uçan balığı			*	*	Epipelagic
Hoplostethus mediterraneus	Mediterranean slimehead	Kütük balığı			*	*	Benthopelagic
Sargocentron rubrum	Redcoat	Hindistan balığı			*	*	Benthic
Zeus faber	John dory	Peygamber balığı, Dülger	*	*	*	*	Benthopelagic
Capros aper	Boarfish	Peri balığı		*	*	*	Benthic
Gasterosteus aculeatus	Three-spined stickleback	Dikence balığı	*	*	*	*	Benthopelagic
Pungitius platygaster	Southern ninespine stickleback	Dikence balığı	*				Benthopelagic
Fistularia commersonii	Bluespotted cornetfish	Külah balığı				*	Epipelagic
Macroramphosus scolopax	Longspine snipefish	Trompet balığı, boru balığı			*	*	Benthic
Macroramphosus gracilis	Slender snipefish	Trompet balığı, boru balığı				*	Benthic

Nerophis maculatus	Spotted worm pipefish	Deniz iğnesi		*			Benthic
Nerophis ophidion	Straightnose pipefish	Deniz iğnesi	*	*	*	*	Benthic
Syngnathus abaster	Black-striped pipefish	Deniz iğnesi	*	*	*	*	Benthic
Syngnathus acus	Greater pipefish	Deniz iğnesi	*	*	*	*	Benthic
Syngnathus phlegon	Phlegon pipefish	Deniz iğnesi			*	*	Epipelagic
Syngnathus schmidti	Schmidt's pipefish	Deniz iğnesi	*	*			Epipelagic
Syngnathus tenuirostris	Narrow-snouted pipefish	Deniz iğnesi	*	*	*	*	Benthic
Syngnathus typhle	Broadnosed pipefish	Geniş burunlu deniz iğnesi	*	*	*	*	Benthic
Syngnathus variegatus	Pipefish	Deniz iğnesi	*				Benthic
Syngnathus rostellatus	Nilsson's pipefish	Deniz iğnesi					Benthic
Hippocampus hippocampus	Short snouted seahorse	Deniz atı	*	*	*	*	Benthic
Hippocampus guttulatus	Long-snouted seahorse	Deniz atı	*	*	*	*	Benthic
Hippocampus fuscus	Sea pony	Deniz atı				*	Benthic
Helicolenus dactylopterus	Blackbelly rosefish	Derinsu iskorpiti		*	*	*	Bathydemersal
Scorpaena elongata	Slender rockfish	Kırmızı iskorpit			*	*	Benthic
Scorpaena maderensis	Madeira rockfish	İskorpit			*	*	Benthic
Scorpaena notata	Small red scorpionfish	Benekli iskorpit	*	*	*	*	Benthic
Scorpaena porcus	Black scorpionfish	Lipsoz	*	*	*	*	Benthic
Scorpaena scrofa	Red scorpionfish	Adabeyi	*	*	*	*	Benthic
Scorpaena loppei	Cadenat's rockfish						Benthic
Dactylopterus volitans	Flying gurnard	Uçan kırlangıç		*	*	*	Benthic

Chelidonichthys cuculus	Red gurnard	Dikenli kırlangıç	*	*	*	*	Benthic
Chelidonichthys gurnardus	Grey gurnard	Benekli kırlangıç	*	*	*	*	Benthic
Chelidonichthys lastoviza	Streaked gurnard	Mazak		*	*	*	Benthic
Chelidonichthys lucerna	Tub gurnard	Kırlangıç	*	*	*	*	Benthic
Chelidonichthys obscurus	Longfin gurnard	Antenli kırlangıç			*	*	Benthic
Lepidotrigla cavillone	Large-scaled gurnard	Kırlangıç		*	*	*	Benthic
Lepidotrigla dieuzeidei	Spiny gurnard	Dikenli kırlangıç			*		Benthic
Trigla lyra	Piper gurnard	Öksüz		*	*	*	Benthic
Peristedion cataphractum	African armoured searobin	Dikenli öksüz		*	*	*	Benthic
Dicentrarchus labrax	European seabass	Levrek	*	*	*	*	Benthic
Dicentrarchus punctatus	Spotted seabass	Levrek			*	*	Benthic
Champsodon nudivittis	Gaper					*	Epipelagic
Polyprion americanus	Wreckfish	İskorpit hanisi, kaya lagosu		*	*	*	Benthic
Serranus cabrilla	Comber	Asıl hani, hanoz	*	*	*	*	Benthic
Serranus hepatus	Brown comber	Benekli hani	*	*	*	*	Benthic
Serranus scriba	Painted comber	Yazılı hani, Ali bereket	*	*	*	*	Benthic
Anthias anthias	Swallowtail seaperch	Berber balığı		*	*	*	Benthic
Epinephelus aeneus	White grouper	Lagod, Grida			*	*	Benthic
Epinephelus caninus	Dogtooth grouper	Çizgili taş hanisi			*	*	Benthic
Epinephelus costae	Goldblotch grouper	Çizgili taş hanisi			*	*	Benthic
Ephinephelus haifensis	Haifa grouper	Taş hanisi, Pörtlek				*	Benthic

Epinephelus marginatus	Dusky grouper	Orfoz		*	*	*	Benthic
Mycteroperca rubra	Mottled grouper	Dudaklı zuber			*	*	Benthic
Callanthias ruber	Parrot seaperch	Kırmızı berber balığı			*	*	Benthic
Pelates quadrilineatus	Fourlined terapon	İspinoz				*	Benthic
Apogon imberbis	Cardinal fish	Kardinal balığı		*	*	*	Benthic
Apogon nigripinnis	Bullseye	Kardinal balığı				*	Benthic
Apogon pharaonis	Pharao cardinalfish	Kardinal balığı			*	*	Benthic
Apogon fasciatus	Broadbanded cardinalfish	Kardinal balığı				*	Benthic
Apogon queketti	Spotfin cardinal	Kardinal balığı			*	*	Benthopelagic
Apogon smithi	Smith's cardinalfish	Kardinal balığı				*	Benthic
Epigonus denticulatus	Pencil cardinal	Küçük kardinal balığı			*		Bathydemersal
Epigonus telescopus	Black cardinal fish	Küçük kardinal balığı			*		Bathydemersal
Epigonus constanciae	Deepwater cardinalfish	Derinsu kardinal balığı			*		Bathydemersal
Microichthys coccoi	Cocco’s bulls-eye	Derinsu kardinal balığı			*		Benthopelagic
Sillago sihama	Silver sillago	Deniz sudağı			*	*	Benthic
Pomatomus saltatrix	Bluefish	Lüfer	*	*	*	*	Epipelagic
Echeneis naucrates	Live sharksucker	Vantuz balığı		*	*	*	Epipelagic
Remora australis	Whalesucker	Vantuz balığı			*	*	Epipelagic
Remora remora	Common remora	Vantuz balığı		*	*	*	Epipelagic
Alectis alexandrinus	African threadfish	İskender balığı			*	*	Epipelagic
Alepes djedaba	Shrimp scad	Çatal balığı			*	*	Epipelagic

Campogramma glaycos	Vadigo	Çıplak			*	*	Epipelagic
Caranx crysos	Blue runner	Kral balığı			*	*	Epipelagic
Caranx hippos	Crevalle jack	İstavritbozması balığı			*	*	Epipelagic
Caranx rhonchus	False scad	Kral balığı			*	*	Epipelagic
Lichia amia	Leerfish	Akya, avcı	*	*	*	*	Epipelagic
Naucrates ductor	Pilotfish	Malta palamudu, kılavuz balığı	*	*	*	*	Epipelagic
Pseudocaranx dentex	White trevally	Kral balığı			*	*	Semi-pelagic
Seriola dumerili	Greater amberjack	Sarıkuyruk, kuzu balığı			*	*	Semi-pelagic
Trachinotus ovatus	Derbio	Çıplak, yaladerma		*	*	*	Semi-pelagic
Trachurus mediterraneus	Mediterranean horse mackerel	Sarıkuyruk istavrit	*	*	*	*	Semi-pelagic
Trachurus picturatus	Blue jack mackerel	Derinsu istavridi			*	*	Semi-pelagic
Trachurus trachurus	Atlantic horse mackerel	Karagöz istavrit	*	*	*	*	Semi-pelagic
Trachurus indicus	Arabian scad					*	Epipelagic
Decapterus russelli	Indian scad					*	Benthopelagic
Coryphaena hippurus	Common dolphinfish	Lambuga		*	*	*	Epipelagic
Equulites klunzingeri	Klunzinger's pony fish	Pul balığı, Itsi balığı			*	*	Benthic
Brama brama	Atlantic pomfret	Baltabaş balığı			*	*	Epipelagic
Lobotes surinamensis	Tripletail	Üçkuyruk			*	*	Benthopelagic
Pomadasys incisus	Bastard grunt	Gargur			*	*	Benthic
Pomadasys stridens	Striped piggy					*	Benthic

Boops boops	Bogue	Kupes	*	*	*	*	Benthopelagic
Dentex dentex	Common dentex	Sinagrit	*	*	*	*	Benthopelagic
Dentex gibbosus	Pink dentex	Trança		*	*	*	Benthopelagic
Dentex macrophthalmus	Large-eye dentex	Patlakgöz mercan			*	*	Benthopelagic
Dentex maroccanus	Morocco dentex	Fas mercanı			*	*	Benthic
Diplodus annularis	Annular seabream	Isparoz	*	*	*	*	Benthopelagic
Diplodus cervinus cervinus	Zebra seabream	Çizgili ısparoz			*	*	Benthic
Diplodus puntazzo	Sharpsnout seabream	Sivriburun karagöz	*	*	*	*	Benthopelagic
Diplodus sargus sargus	White seabream	Sargoz	*	*	*	*	Benthic
Diplodus vulgaris	Common two-banded seabream	Karagöz	*	*	*	*	Benthopelagic
Lithognathus mormyrus	Sand steenbras	Mırmır		*	*	*	Benthic
Oblada melanura	Saddled seabream	Melanur	*	*	*	*	Benthopelagic
Pagellus acarne	Axillary seabream	Yabani mercan		*	*	*	Benthopelagic
Pagellus bogaraveo	Blackspot seabream	Mandagöz mercan		*	*	*	Benthopelagic
Pagellus erythrinus	Common pandora	Kırma mercan	*	*	*	*	Benthopelagic
Pagrus auriga	Redbanded seabream	Kınalı mercan			*	*	Benthopelagic
Pagrus caeruleostictus	Bluespotted seabream	Antenli mercan			*	*	Benthopelagic
Pagrus pagrus	Red porgy	Fangri		*	*	*	Benthopelagic
Sarpa salpa	Salema	Salpa	*	*	*	*	Benthopelagic
Sparus aurata	Gilthead seabream	Çipura	*	*	*	*	Benthic
Spondyliosoma cantharus	Black seabream	İskatari	*	*	*	*	Benthopelagic

Monotaxis grandoculis	Humpnose big-eye bream					*	Benthic
Nemipterus randalli	Randall's threadfin bream					*	Benthic
Centracanthus cirrus	Curled picarel	İstrangiloz			*	*	Benthopelagic
Spicara maena	Blotched picarel	Beyazgöz izmarit	*	*	*	*	Benthopelagic
Spicara smaris	Picarel	İzmarit	*	*	*	*	Benthopelagic
Argyrosomus regius	Meagre	Sarıağız	*	*	*	*	Benthopelagic
Sciaena umbra	Brown meagre	Eşkine, Mağruşkil	*	*	*	*	Benthic
Umbrina cirrosa	Shi drum	Minakop, Kötek	*	*	*	*	Benthic
Mullus barbatus	Red mullet	Barbun	*	*	*	*	Benthic
Mullus surmuletus	Striped red mullet	Tekir	*	*	*	*	Benthic
Upeneus moluccensis	Goldband goatfish	Paşa barbunu			*	*	Benthic
Upeneus pori	Por's goatfish	Nil barbunu				*	Benthic
Parupeneus forsskali	Red Sea goatfish	Kızıldeniz barbunu				*	Benthic
Pempheris vanicolensis	Vanikoro sweeper	Üçgen balığı, Gölge balığı			*	*	Benthic
Heniochus intermedius	Red Sea bannerfish					*	Benthic
Platax teira	Teira batfish					*	Benthic
Cepola rubescens	Red bandfish	Kurdela balığı		*	*	*	Benthic
Chelon labrosus	Thicklip grey mullet	Kefal balığı, mavraki	*	*	*	*	Epipelagic
Liza aurata	Golden grey mullet	Altinbaşkefal balığı	*	*	*	*	Epipelagic
Liza carinata	Keeled mullet	Kefal balığı, bıldırcın kefal			*	*	Epipelagic
Liza ramada	Thinlip mullet	Pulatarina balığı, ceran	*	*	*	*	Epipelagic

Liza saliens	Leaping mullet	Kefal balığı, kobar, kastros	*	*	*	*	Epipelagic
Mugil cephalus	Flathead mullet	Haskefal balığı, topan kefal	*	*	*	*	Epipelagic
Mugil soiuy	So-iuy mullet	Rus kefali, pelingas	*	*	*		Epipelagic
Oedalechilus labeo	Boxlip mullet	Dudaklı kefal balığı		*	*	*	Epipelagic
Chromis chromis	Damselfish	Papaz balığı	*	*	*	*	Benthic
Acantholabrus palloni	Scale-rayed wrasse	Derinsu lapini			*	*	Benthic
Coris julis	Mediterranean rainbow wrasse	Güneş balığı, Gelin balığı	*	*	*	*	Benthic
Ctenolabrus rupestris	Goldsinny-wrasse	Çırçır, Ot balığı	*	*	*	*	Benthic
Labrus bergylta	Ballan wrasse	Çırçır, Ot balığı	*	*	*	*	Benthic
Labrus mixtus	Cuckoo wrasse	Lapin, Ot balığı	*	*	*	*	Benthic
Labrus viridis	Green wrasse	Lapin	*	*	*	*	Benthic
Pteragogus pelycus	Sideburn wrasse	Filamentli çırçır			*	*	Benthic
Symphodus cinereus	Grey wrasse	Gri çırçır	*	*	*	*	Benthic
Symphodus doderleini	Doderlein's wrasse	Çırçır, Ot balığı		*	*	*	Benthic
Symphodus mediterraneus	Axillary wrasse	Çırçır, Ot balığı	*	*	*	*	Benthic
Symphodus melanocercus	Black-tailed wrasse	Siyah kuyruklu çırçır		*	*	*	Benthic
Symphodus melops	Corkwing wrasse	Çırçır, Ot balığı			*		Benthic
Symphodus ocellatus	Ocellated wrasse	Benekli çırçır	*	*	*	*	Benthic
Symphodus roissali	Five-spotted wrasse	Çırçır	*	*	*	*	Benthic
Symphodus rostratus	Long snout wrasse	Sivriburunlu çırçır	*	*	*	*	Benthic
Symphodus tinca	Peacock wrasse	Lekeli çırçır	*	*	*	*	Benthic

Thalassoma pavo	Ornate wrasse	Gün balığı, Aykuyruk		*	*	*	Benthic
Xyrichthys novacula	Pearly razorfish	Ustura balığı		*	*	*	Benthic
Sparisoma cretense	Parrotfish	Papağan balığı			*	*	Benthic
Gymnammodytes cicerelus	Mediterranean sand eel	Kum balığı	*	*	*	*	Benthic
Echiichthys vipera	Lesser weever	Varsam		*	*	*	Benthic
Trachinus araneus	Spotted weever	Kum trakonyası		*	*	*	Benthic
Trachinus draco	Greater weever	Trakonya	*	*	*	*	Benthic
Trachinus radiatus	Starry weever	Çarpan		*	*	*	Benthic
Uranoscopus scaber	Stargazer	Tiryaki, kurbağa balığı	*	*	*	*	Benthic
Tripterygion delaisi	Black-faced blenny	Karabaş balığı			*	*	Benthic
Tripterygion melanurus	Small triplefin	Karabaş balığı			*	*	Benthic
Tripterygion tripteronotus	Red triplefin	Karabaş balığı	*	*	*	*	Benthic
Clinitrachus argentatus	Cline	Arı balığı, Pullu horozbina		*	*	*	Benthic
Aidablennius sphynx	Sphynx blenny	Horozbina	*	*	*	*	Benthic
Blennius ocellaris	Butterfly blenny	Benekli horozbina	*	*	*	*	Benthic
Coryphoblennius galerita	Montagu's blenny	Horozbina	*	*	*	*	Benthic
Lipophrys adriaticus	Blenny	Horozbina	*	*	*	*	Benthic
Lipophrys dalmatinus	Dalmation blenny	Horozbina			*	*	Benthic
Lipophrys nigriceps nigriceps	Black-headed blenny	Horozbina			*		Benthic
Parablennius gattorugine	Tompot blenny	Horozbina	*	*	*	*	Benthic
Parablennius incognitus	Pygmy blenny	Horozbina	*	*	*	*	Benthic

Parablennius rouxi	Stripped blenny	Şeritli horozbina			*	*	Benthic
Parablennius sanguinolentus	Rusty blenny	Horozbina	*	*	*	*	Benthic
Parablennius zvonimiri	Red blenny	Horozbina	*	*	*	*	Benthic
Paralipophrys trigloides	Bullhead blenny	Horozbina		*	*	*	Benthic
Petroscirtes ancylodon	Arabian fangblenny	Horozbina				*	Benthic
Salaria basilisca	Basilisk blenny	Horozbina			*	*	Benthic
Salaria pavo	Peacock blenny	İbikli horozbina	*	*	*	*	Benthic
Scartella cristata	Molly miller	Horozbina			*	*	Benthic
Callionymus fasciatus	Barred dragonet	Üzgün balığı	*	*	*	*	Benthic
Callionymus filamentosus	Blotchfin dragonet	Üzgün balığı				*	Benthic
Callionymus lyra	Dragonet	Üzgün balığı	*	*	*	*	Benthic
Callionymus maculatus	Spotted dragonet	Üzgün balığı		*	*	*	Benthic
Callionymus pusillus	Festive dragonet	Üzgün balığı	*	*	*	*	Benthic
Callionymus risso	Risso's dragonet	Üzgün balığı	*	*	*	*	Benthic
Synchiropus phaeton	Deepwater dragonet	Üzgün balığı			*	*	Benthic
Aphia minuta	Transparent goby	Beyaz kayabalığı	*	*	*	*	Epipelagic
Chromogobius quadrivittatus	Chestnut goby	Kahverengi kayabalığı		*	*	*	Benthic
Crystallogobius linearis	Crystal goby	Kristal kayabalığı			*		Benthic
Deltentosteus collonianus	Toothed goby	Dişli kayabalığı				*	Benthic
Deltentosteus quadrimaculatus	Four-spotted goby	Dört benekli kayabalığı		*	*	*	Benthic
Gobius auratus	Golden goby	Altın kayabalığı		*	*	*	Benthic

Gobius bucchichi	Bucchich's goby	Kayabalığı	*	*	*	*	Benthic
Gobius cobitis	Giant goby	Büyük kayabalığı	*	*	*	*	Benthic
Gobius cruentatus	Red-mouthed goby	Kırmızı dudaklı kayabalığı		*	*	*	Benthic
Gobius geniporus	Slender goby	İnce kayabalığı		*	*	*	Benthic
Gobius niger	Black goby	Kömürcü kayabalığı	*	*	*	*	Benthic
Gobius paganellus	Rock goby	Kayabalığı	*	*	*	*	Benthic
Gobius vittatus	Striped goby	Çizgili kayabalığı			*	*	Benthic
Gobius couchi	Couch's goby				*		Benthic
Trypauchen vagina	Burrowing goby					*	Benthic
Vanderhorstia mertensi	Mertens' prawn-goby						Benthic
Knipowitschia caucasica	Caucasian dwarf goby	Kayabalığı	*	*	*	*	Benthic
Lesueurigobius friesii	Fries's goby	Kayabalığı		*	*	*	Benthic
Lesueurigobius suerii	Lesueur's goby	Kayabalığı			*	*	Benthic
Mesogobius batrachocephalus	Knout goby	Yassıkafalı kayabalığı	*	*	*	*	Benthic
Ponticola eurycephalus	Mushroom goby	Kayabalığı	*				Benthic
Neogobius melanostomus	Round goby	Kum kayabalığı	*	*	*		Benthic
Neogobius ratan	Ratan goby	Kayabalığı	*				Benthic
Ponticola kessleri	Bighead goby	Büyükbaşlı kayabalığı	*				Benthic
Ponticola syrman	Syrman goby	Kayabalığı	*	*			Benthic
Oxyurichthys papuensis	Frogface goby	Sivrikuyruk kayabalığı			*	*	Benthic
Pomatoschistus bathi	Bath's goby	Küçük kayabalığı		*	*		Benthic

Pomatoschistus marmoratus	Marbled goby	Küçük kayabalığı	*	*	*	*	Benthic
Pomatoschistus minutus	Sand goby	Küçük kayabalığı	*	*	*	*	Benthic
Pomatoschistus pictus adriaticus	Painted goby	Küçük kayabalığı		*			Benthic
Thorogobius ephippiatus	Leopard-spotted goby	Leopar kayabalığı			*	*	Benthic
Zebrus zebrus	Zebra goby	Kayabalığı			*	*	Benthic
Millerigobius macrocephalus					*	*	Benthic
Zosterisessor ophiocephalus	Grass goby	Saz kayabalığı	*	*	*	*	Benthic
Siganus luridus	Dusky spinefoot	Esmer sokar			*	*	Benthic
Siganus rivulatus	Marbled spinefoot	Beyaz sokar, Sokkan			*	*	Benthic
Luvarus imperialis	Luvar	İmparator balığı			*	*	Mesopelagic
Sphyraena chrysotaenia	Yellowstripe barracuda	Iskarmoz			*	*	Epipelagic
Sphyraena flavicauda	Yellowtail barracuda	Iskarmoz				*	Epipelagic
Sphyraena sphyraena	European barracuda	Iskarmoz	*	*	*	*	Epipelagic
Sphyraena viridensis	Yellowmouth barracuda	Iskarmoz			*	*	Epipelagic
Ruvettus pretiosus	Oilfish	Kalas balığı			*	*	Benthopelagic
Lepidopus caudatus	Silver scabbardfish	Palaska balığı, Kayış balığı			*	*	Benthopelagic
Trichiurus lepturus	Largehead hairtail	Kılkuyruk balığı			*	*	Benthopelagic
Xiphias gladius	Swordfish	Kılıç balığı	*	*	*	*	Epipelagic
Istiophorus albicans	Atlantic sailfish				*	*	Epipelagic
Tetrapturus belone	Mediterranean spearfish	Kılıç balığı			*	*	Epipelagic
Auxis rochei	Bullet tuna	Gobene, tombik, tulina	*	*	*	*	Epipelagic

Euthynnus alletteratus	Little tunny	Yazılı orkinoz	*	*	*	*	Epipelagic
Katsuwonus pelamis	Skipjack tuna	Çizgili orkinoz		*	*	*	Epipelagic
Orcynopsis unicolor	Plain bonito	Akpalamut		*	*	*	Epipelagic
Sarda sarda	Atlantic bonito	Palamut	*	*	*	*	Epipelagic
Scomber japonicus	Mediterranean chub mackerel	Kolyoz	*	*	*	*	Epipelagic
Scomber scombrus	Atlantic mackerel	Uskumru	*	*	*	*	Epipelagic
Scomberomorus commerson	Narrow-barred Spanish mackerel	Ceylan balığı, tombak			*	*	Epipelagic
Thunnus alalunga	Albacore	Orkinoz	*	*	*	*	Epipelagic
Thunnus thynnus	Northern bluefin tuna	Orkinoz, ton balığı	*	*	*	*	Epipelagic
Centrolophus niger	Rudderfish	Karabalık			*	*	Bathypelagic
Schedophilus ovalis	Imperial blackfish	Karabalık			*	*	Benthopelagic
Stromateus fiatola	Blue butterfish	Mavi yağ balığı, Yıldız balığı			*	*	Benthopelagic
Citharus linguatula	Spotted flounder	Kancaağız pisi balığı		*	*	*	Benthic
Lepidorhombus boscii	Four-spot megrim	Benekli pisi		*	*	*	Benthic
Lepidorhombus whiffiagonis	Megrim	Pisi balığı		*	*	*	Bathydemersal
Zeugopterus regius	Eckström's topknot	Küçük pisi balığı		*	*	*	Benthic
Scophthalmus maximus	Turbot	Kalkan	*	*	*	*	Benthic
Scophthalmus rhombus	Brill	Dişi kalkan, Çivisiz kalkan	*	*	*	*	Benthic
Arnoglossus grohmanni	Grohmann’s scaldfish	Küçük pisibalığı		*	*	*	Benthic
Arnoglossus imperialis	Imperial scaldfish	Küçük pisi balığı		*	*	*	Benthic

Arnoglossus kessleri	Scaldback	Küçük pisi balığı	*	*	*	*	Benthic
Arnoglossus laterna	Mediterranean scaldfish	Şeffaf pisi balığı	*	*	*	*	Benthic
Arnoglossus rueppelii	Rüppell's scaldback	Küçük pisi balığı			*	*	Benthic
Arnoglossus thori	Thor's scaldfish	Küçük pisi balığı	*	*	*	*	Benthic
Bothus podas	Wide-eyed flounder	Pisi balığı			*	*	Benthic
Platichthys flesus luscus	European flounder	Pisi balığı	*	*	*	*	Benthic
Buglossidium luteum	Solenette	Küçük dil balığı	*	*	*	*	Benthic
Dicologoglossa cuneata	Wedge sole	Dil balığı		*	*	*	Benthic
Microchirus azevia	Azevia sole	Dil balığı		*	*	*	Benthic
Microchirus ocellatus	Foureyed sole	Dört benekli dil balığı		*	*	*	Benthic
Microchirus variegatus	Thickback sole	Lekeli dil balığı	*	*	*	*	Benthic
Monochirus hispidus	Whiskered sole	Küçük dil balığı		*	*	*	Benthic
Pegusa lascaris	Sand sole	Dil balığı	*	*	*	*	Benthic
Solea senegalensis	Senegalese sole	Dil balığı		*	*	*	Benthic
Solea solea	Common sole	Dil balığı	*	*	*	*	Benthic
Synapturichthys kleini	Klein's sole	Dil balığı		*	*	*	Benthic
Cynoglossus sinusarabici	Red Sea tonguesole	Sivrikuyruklu dil balığı				*	Benthic
Symphurus nigrescens	Tonguesole	Sivrikuyruklu dil balığı			*	*	Benthic
Balistes capriscus	Grey triggerfish	Çütre, Domuz balığı	*	*	*	*	Benthic
Stephanolepis diaspros	Reticulated leatherjacket	Dikenli çütre			*	*	Benthic
Lagocephalus lagocephalus	Oceanic puffer	Mavi balon balığı			*	*	Benthopelagic

Lagocephalus spadiceus	Half-smooth golden pufferfish	Balon balığı		*	*	*	Benthic
Lagocephalus suezensis	Suez puffer	Balon balığı			*	*	Benthic
Lagocephalus sceleratus	Silver-cheeked toadfish	Balon balığı			*	*	Benthic
Sphoeroides pachygaster	Blunthead puffer	Balon balığı			*	*	Benthopelagic
Torquigener flavimaculosus	Yellow spotted puffer	Cüce balon balığı				*	Benthic
Tylerius spinosissimus	Spiny blaasop	İğneli balon balığı				*	Bathydemersal
Mola mola	Ocean sunfish	Aybalığı		*	*	*	Epipelagic
Ranzania laevis	Slender sunfish	Pervane balığı		*	*	*	Epipelagic