J. Black Sea/Mediterranean Environment
Vol. 19, No. 2: 256-267 (2013)

REVIEW ARTICLE

Some remarks of Illegal, Unreported and Unregulated (IUU) fishing in Turkish part of the Black Sea

Bayram Öztürk[1,2*]

[1]Faculty of Fisheries, Istanbul University, Ordu St., No. 200, 34470, Laleli, Istanbul, TURKEY

[2]Turkish Marine Research Foundation (TUDAV), P. O. Box: 10, Beykoz, Istanbul, TURKEY

[*]**Corresponding author:** ozturkb@istanbul.edu.tr

Abstract

Illegal, Unreported and Unregulated (IUU) fishing is one of the serious threat for the sustainable fishing in the Black Sea. Due to IUU fishing, ghost fishing, by-catch, destruction of the benthic ecosystem has been reported. From 1992 to 2012, a total of 65 Illegal fishing cases have been reported in various Exclusive Economic Zones (EEZs) in the Black Sea. Among these cases, 5 fishermen lost their lives and 2 were wounded in the EEZ. This excessive use of force should be stopped for fishermen and peaceful pursuit should be followed in case of confrontation or in case of arrest.

Main illegal target fish is turbot and enforcement of the existing fisheries regulations and laws is necessary for Turkey to halt IUU fishing. Monitoring, Control and Surveillance (MCS) system should be developed to reduce illegal fishing practices all Turkish part of the Black Sea.

Illegal clam and *Rapana* dredging is also threat for benthic ecosystem. Anchovy is the largest stocks of small pelagic fish in the Black Sea and contribute the major part of fisheries production in the region, especially Turkey. Its unreported fishing, thus, should be taken into special consideration.

Even though IUU fishing in the Turkish part of the Black Sea shows decreasing trend in recent years, concerted actions and international cooperation are essential. Zero tolerance should be the main concept against IUU fishing in the Turkish part of the Black Sea.

Key words: Illegal, Unreported and Unregulated fishing, Black Sea, turbot.

Introduction

The scope of Illegal, Unreported and Unregulated (IUU) fishing problems refers to illegal activities conducted by national or foreign fishing vessels in waters under the jurisdiction of a state, without the permission of that state, in contravention of its laws and regulations; or conducted in violation of national laws or international obligations. Unreported fishing means fishing which has not been reported, or has been misreported, to the national authority, in contravention of national laws and regulations. Unregulated fishing means fishing in areas or for fish stocks for which there are no applicable conservation or management measures and where such fishing activities are conducted in a manner inconsistent with state responsibilities for the conservation of living marine resources under international laws (FAO 2008).

IUU fishing has several negative impacts, such as unfair competition, loss of biodiversity, loss of income, even loss of human lives. Moreover, there are social and juridical implications made by such consequences. It is obvious that fish stocks have been depleted in many areas in the world oceans and seas due to various reasons, namely, poaching, smuggling, overfishing and violation of the local, regional and international laws. It is also expected that IUU fishing is getting more and more attention in all fishing regions and sub-regions. Lower and upper estimates of the current total loss per year due to illegal and unreported fishing worldwide are USD 9 billion and USD 24 billion, respectively, representing between 11 and 26 million tonnes of fish (Agnew *et al.* 2009).

IUU fishing is one of the root causes for the decline of fish stocks and IUU fishing remains widespread in the Black Sea and the Mediterranean Sea. In addition, INTERPOL has launched a project as a global initiative to detect, suppress and combat fisheries crime which is estimated to cost the global economy up to USD 23 billion each year. Fisheries crime threatens food security and livelihoods, and can destabilize vulnerable coastal ecosystems (www.interpol.int).

The nature and extent of the IUU fishing in the Turkish part of the Black Sea is not clearly known at present. It is, however, known that this kind of illegal activities are becoming common practices in recent years and posing a serious threat for the fish stocks and fishing communities in the region. This issue has already been discussed in some papers, such as Zengin (2000), Samsun and Kalaycı (2004), Düzgüneş and Erdoğan (2008), Taner (2010), Öztürk (2011), Öztürk *et al.* (2011), Kara (2012), and Zengin *et al.* (2012).

It is already known that due to illegal fishing five fishermen were killed in 1997, 1998, 2000 and 2008. Besides, some of the Turkish fishermen were wounded, some of them were arrested, their boats were detained, some of them were obliged to pay fine. On the other hand, others were not caught and financially succeeded by selling precious fish in small or big markets unfairly. This

problem has several dimensions in Turkey including technical, legal, economic, social and political ones, which point was raised by General Fisheries Commission for the Mediterranean (GFCM, 2012) as well.

Fishing is one of the important métier since antiquity and over hundreds of people depend on fisheries in the Turkish part. In recent years, due to various anthropogenic reasons, the most important commercial fish such as turbot, bluefin tuna, whiting, mackerel, swordfish and sturgeons stocks were decreasing. Anchovy is the single largest marine resource in the Black Sea and it is believed that the stock of Black Sea anchovy is still being exploited above the level of sustainability (Barros 2011). Ye and Cochrone (2011) reported that the Mediterranean and Black Sea had 50% of the fish stocks overfished.

In the modern history, the fisheries in the Black Sea riparian States had three critical periods. These started firstly with the Soviet revolution including the Cold War period up to 1991, later with the appearance and implementation of the United Nations Convention on the Law of the Sea (UNCLOS) and the application of the Common Fishery Policy with quotas by EU members. During the Cold War Period, the fishing regulation was very limited due to small size of the fishing boats and less fishing effort, and as a consequence, there were more viable fish populations found in that period in the Black Sea. Except for Turkey, planned economy was applied in principle in the Soviet Union (which included Russia, Ukraine and Georgia), Romania and Bulgaria. There was not much pressure on the fish stocks in the Black Sea then. During that period, several Turkish fishermen worked in the high sea area of the Black Sea as their historical and traditional fishing grounds.

The second period was when the former Soviet Union proclamation of the 200 nmiles Exclusive Economic Zone (EEZ) was made, Turkish fishermen lost their traditional turbot fishing grounds in the Crimian Peninsula and Kerch Strait. EEZ enabled every nation to expand their jurisdictional waters up to 200 mile off their Black Sea coasts. This EEZ concept was new to all nations and these are needed to be expressly declared, unlike the continental shelf. Involving fisheries processes, the traditional fishing grounds have inevitably been under the exploitation of Russia, Ukraine, Romania and Bulgaria (Acara 1985). The increase of fishing power in the Turkish fleet in the late 1970's in terms of size of vessels and engine power gained momentum for catching turbot in the Northern Black Sea. This situation changed after the declaration of EEZ from USSR (Özdamar 1995). The process associated with EEZ delimitation has dramatically affected the livelihood of Turkish fishermen who were catching turbot. In 1985 the Turkish government and the Soviet fisheries authorities bilaterally discussed on the historical fishing ground issue in the Black Sea but did not reach consensus for turbot quota which the Turkish side requested. In 1987, the former Soviet Union and Turkey exchanged notes relating to an agreement for the delimitation of their EEZs in the Black Sea. This agreement reduced turbot fishing grounds in the entire Black Sea for Turkish fishermen (see Figure 1).

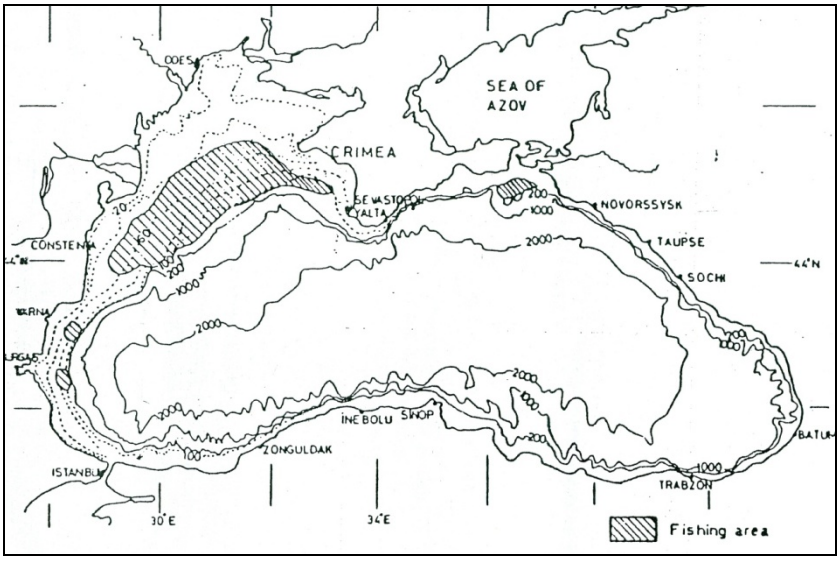

Figure 1. Turkish turbot fishing in the Black Sea areas between 1972 and 1983 (Acara 1985)

According to Kara (2012), great economic value and increasing demand for turbot has recently encouraged Turkish fishermen to poach across the foreign Black Sea fishing zones. Therefore unpleasant events have happened between such Turkish fishermen and the patrol boats of the relevant nations as a consequence of turbot poaching.

The third period was from 2008 up to present. European Union Common Fishery Policy (CFP) has extended into the Black Sea through Bulgaria and Romania. After this period, a quota system for sprat and turbot started for the first time. Total Allowable Catches (TAC) also started to be implemented for EU countries. The rest of the Black Sea riparian States do not regulate their fisheries with TAC.

Appearance of IUU fishing started mostly after the 1980's and this period was still under the influence of the collapse of mainly pelagic fisheries in the Black Sea due to *Mnemiopsis* sp. and other synergetic factors such as over-exploitation of the fish stocks, eutrophication, alien species and climatic fluctuations. Since this period, the illegal fishing started commonly in the Black Sea, mostly for turbot.

This paper has been prepared based on the published papers, prepared questionary form and reports since 1992 to 2012. Cases of reports by fisheries cooperatives, courts decisions and some of the riparian costguard information were obtained and evaluated.

Turkish fishing fleet and production is the strongest among all Black Sea countries. In recent years, from 2007 to 2011, however, significant reduction in the number of fishing vessels is reported.

IUU Fishing in the Turkish Part of the Black Sea

Generally, in the Black Sea, Turkish fishermen are involved in IUU fisheries both within the Turkish territorial waters and as deliberately sometimes beyond Turkish EEZ. In the territorial waters, most of IUU fishing activities are observed both in open and closed fishing seasons. Most common IUU fishing activities are violation of minimum catch size and usage of illegal fishing gear. Violation of closed season is a less common IUU fishing activity in Turkey. Illegal fishing gears and methods, fishing in coastal prohibited areas and fishing during fishing-closed seasons, mostly in summer, have been reported. On the oher hand, technical, infrastructural and operational framework is being developed for controlling IUU fisheries, such as establishing 36 offices at ports for collection of data on landing. Yakakent landing port in Samsun is designated as a controlling port of IUU fishing in the Black Sea (GFCM 2011). As for IUU fishing by Turkish fishermen beyond its EEZ for 20 years between 1992 and 2012, totally three fishing boats were sunk by coastal patrol boats: two of them in Ukraine in 1998 and 2000, the other one in Romania. Totally five fishermen died due to the conflict; one in Georgia in 1997, two in Ukraine in 1998 and one in 2000, and one in Bulgaria in 2008. A total of 64 fishermen were arrested. Over 1 million USD was paid to detaining states as fines during the last 20 years. Last illegal case was reported in the Russian Federation in 2001 and Bulgaria in 2008.

Unfortunaltely despite all precautions taken by coast guards and other relevant authorities some Turkish fishermen illegally entered foreign EEZs in the Black Sea. In Bulgaria, seven7 cases were reported between 1997 and 2008 for illegal fishing for turbot. Beside some Turkish fishermen were arrested by the Bulgarian authorities, later charged with some fines. One Turkish fisherman was killed on 17 April 2008 by the Bulgarian border forces who claimed for their illegal turbot fishing in the Bulgarian territorial waters.

In Georgia contrarily, anchovy is the main target fish. One of the major problems faced by Georgia is the control of territorial waters. Ukrainian, Russian and Turkish fishermen are allegedly reported to carry out fishing there. Düzgüneş and Erdoğan (2008) reported that Black Sea anchovy in the waters off Georgia is fairly exploited and this stock is accessible to Ukrainian fishermen in accordance with the Ukrainian Georgian Agreement on fishery. In 1997, a Turkish fisherman was killed as he was claimed practicing illegal fishing in the Georgian waters.

Öztürk *et al.* (2011) reported that the Turkish anchovy catch in the Georgian waters from 2003 to 2009 was estimated as 60,968 tons. Anchovy fishing started in Georgian waters in 1996 by Turkish fleet according to mutual

agreement made between some Turkish and Georgian companies. Turkish catch of anchovy was estimated as 50,000 tons in 2011 by 30 fishing boats. Precise catch figures for anchovy and other species are not known.

Regulations applied to the Turkish fishermen by the Georgian authorities during anchovy fishing have mainly five components. These are no fishing in marine protected areas in the Georgian waters, fishing over 300 m off the coast, minimum catch size of anchovy 7 cm, total allowable catch yearly 60 000 tons, and detaining 2/3 for the landing in the Georgian market. Besides, to control Turkish fishermen operating in the Georgian waters, VMS (AIS) are required. Interpreter/observer and reporting/control at the ports is also necessary.

However, due to illegal and unreported fisheries in Georgia, 32 Turkish purse seiners were arrested between 2000 and 2010 and detained for a short period (less than 7 days) in the Georgian harbors. Later they paid fines and their boats were also released. A total 16 cases have been reported in Georgia.

Zengin *et al.* (2012) reported that some Turkish fishermen were fined due to unreported landing in Trabzon of fish caught in Georgian waters.

In Romania, eight Turkish fishing boats were detected between 2007 and 2011. Since the 1990's, several Turkish fishermen were arrested, boats detained and fines charged by the Romanian authorities.

On 27 May 2011, a Turkish fishing boat was sunk by the Romaina authorties due to illegal turbot fishing practiced in the Romanian EEZ and one fisherman was wounded. The main target of the illegal fisheries is again turbot in the EEZ, at 45-80 m depths, is close to the border lines between the Ukrainian EEZ and the Turkish EEZ, in spring (March-April) and autumn (September-November).

In Russia, between 1990 and 2001, only eight fishing violation cases were reported for Turkish fishermen illegally fishing in the Russian territorial waters for turbot. Fine was paid by the owners of these fishing boats and they were later released. The Russian authorities declared that the Turkish fishing boats were detained according to the Article 56 to 58, Chapter 5 in UNCLOS.

Illegal turbot catch was reported also in the Ukrainian water by Turkish fishermen. At least 30 Turkish fishermen were arrested and later detained between 1992 and 2012. The most tragic event happened on 22 May 2000. The captain of a Turkish fishing boat was killed by the Ukrainian navy claiming their illegal fishing practice in the Ukrainian EEZ. Another boat was sunk by firing. Kurumahmut (2001) reported that the Ukrainian navy practiced excessive use of force to the fishermen. Besides this incident, it has been reported that several fishing boats were detained, fines were charged, and some fishermen were arrested at least for a week.

Main Species Affected by IUU Fishing

Several target fish species are affected by IUU fishing in the Turkish part. Main target fish species of IUU fisheries in Turkish part of the Black Sea are; turbot, anchovy, bluefish, sprat, horse mackerel, bonito, sardine, scad, chub mackerel, whiting, red mullet, sea snail and sturgeon. Turbot is is high commercial value and there is high demand, in the Turkish market. Sea snail is the only alien species for exploitation in the Black Sea. Sturgeons are at the endangered level in the Black Sea, even though they are fully protected by Turkish fisheries law.

Fishing Gear and Fleets for Target Fishes

For turbot, the main fishing gear is bottom gillnet, but bottom trawling is also permitted. For anchovy, purse seining is the most common fishing gear.

Turbot fishing area is within 100m isobath in the Turkish part of the western Black Sea. In general, turbot fishery is operated within 15 miles from the coast.

IUU fishing is undoubtedly one of the reasons for the over-exploitation of the fishing resources in the Turkish part of the Black Sea and the unfair competition for fishermen who practice fishing legally.

Estimation of the exact economic damage is not possible due to data uncertainty and paucity. However, in general, IUU fishing causes; deterioration of fish stocks and habitats, loss of sales tax, loss of income due to loss of fish, loss of biodiversity and legal, social and political problems, such as loss of human lives, injuries.

Furthermore, due to IUU fishing, some fishermen lose or have their boats and gears detained, and pay fines in the countries where they are arrested, thus lose time and revenue on a short term. IUU fisheries cause ghost fisheries (abandoned nets) and bycatch in the Turkish part of the Black Sea.

IUU fishing also damages vulnerable habitats by the use of prohibited fishing gears, mainly for sea snail *Rapana* and clam harvesting. Illegal sea snail and clam dredging make destructive effects on the soft bottom communities and siltation on macro and meio benthos. As a whole, they are a threat for the marine biodiversity.

Bycatch

Bycatch of the non-target species is one of the serious problems due to IUU fishing. Öztürk (1998) reported that due to sturgeon and turbot fishing about 2000-3000 dolphins, majority being harbour porpoises, are entangled to the nets in the Turkish part of the Black Sea every year. Besides cetaceans, fish such as sharks and sturgeons are also caught accidentally by IUU fishing in the Black Sea. Pasyakin (1991) reported that 194 dead dolphins were found in the driftnet on 14 Turkish boats arrested in 1992 in Crimea.

Tonay and Öztürk (2003) reported a total bycatch of 40 harbour porpoises, one bottlenose dolphin and one common dolphin by one turbot fishing boat in the Turkish Western Black Sea coast during two turbot fishing season. Birkun (2002) reported several bycatch records in the Black Sea.

Radu *et al.* (2004) reported that incidental catches were found in April 2002, due to the fraudulent fishing carried out by Turkish trawlers in the Romanian EEZ. However, a good cooperation example was also reported between the Romanian and Turkish authorities about IUU, bycatch and ghost fishing. In 2001, some Turkish fishermen took all turbot nets from Romanian EEZ with the permisson of Romanian government, accompainied by the coastguards of both governments. After net hauling, all fishes found in the nets were delivered to Romanaian fisheries experts.

Shark bycatch was reported by Kabasakal (1998) due to turbot fishing in the Turkish part of the Black Sea. In recent years, bycatch records can be collected via logbook of fishing vessels by Turkish experts.

Ghost Fishing

IUU fisheries sometimes cause ghost fisheries when fishermen abandon their nets to seas and try to escape at the sight of patrolling coast guards or other relevant authorities. Released nets cause ghost fisheries, that is, many organisms such as dogfish, stingrays and dolphins, are entangled to the nets and die, later either strand to the shore or sink to the bottom. Ghost fisheries are not only threat for marine life itself. After a certain period, nets start sinking or floating on the sea surface, which is a threat for marine transportation, mostly when they entangle the propellers of vessels at night. Fast speed boats suffer extensively, from sinking ghost nets in the Black Sea. Besides, these nets come to a shore and cause another pollution on the beaches. Topçu and Öztürk (2010) reported that fishing gears are generally the most attributable debris sources of the sea bed pollution. Sixteen fishing gears were found among 244 total solid waste materials, which clearly showed that fishing activities could be the main sources of litter on the southwestern Black Sea sea bed.

According to the questionnaire survey conducted with the fishermen in Rumeli Feneri, a small fishing village at the exit of the Istanbul Strait, a total of 1279 turbot nets were lost, and 1200 of these nets were lost in the EEZ only in 2008 (Taner 2010). Driftnet and mono-multifilament fishing nets referred as ghost fishing gear have been banned since 2011 in the Turkish waters.

Conclusion

IUU fishing practices clearly shows that there are some gaps in the fisheries management in Turkey. Identification of these gaps will solve the problem in a short term is needed. It is clear that zero tolerance is an ultimate goal to halt IUU problems.

Enforcement of the punishment for the violation of the fisheries laws are; sanctions applied for fisheries violations, fines, confiscation of products caught, temporary seizure of fishing license and cancellation of fishing license.

However, even all these measures are taken by fisheries authorities, illegal fishing have been reported mainly for *Rapana* dredging. Sometimes demersal fisheries is practiced in the 3 miles zone where trawling is not permitted and in the areas completely closed to trawling. Monitoring and control activities are insufficient on daily quota allocated by the fisheries authorities on baby clam. All the main and local markets and/or restaurants sell undersized fish (anchovy, whiting, horse mackerel, and bluefish). There are special regulations for anchovy fisheries, such as no fishing activity for anchovy shall be permitted from 15 April to 31 August, the minimum landing size shall be 9 cm total length, fishing is permitted only between 16:00 and 8:00 during fishing season. These are important principles, although implemented poorly at the moment.

There are some legislation and regulations in force in Turkey, in the article 36 of 1380 numbered Fisheries Law, specified infringements, violations and fines to be applied are described. The fishing licenses of 134 vessels were detained because of the violation of the regulations in force in 2012.

IUU fishing activities are decreasing due to more stringent measures for control and cooperation with other riparian states beyond EEZ and more effective implementation of the fisheries law 1380 in the territoral waters in Turkey

For the enclosed sea like the Black Sea, all efforts should be harmonized and coordinatated by littoral states due to peculiarities of the demersal and pelagic stocks. An important element in successful implementation can be close and effective coordination, consultation and the sharing of information among the states and regional organizations to mitigate IUU fishing practices. In that framework, the Black Sea Littoral States Border/Coast Guard Cooperation Agreement (BSCA) is an important instrument against IUU fishing. Another instrument is the recently signed memorandum of understanding between the GFCM and the Black Sea Commission which aims at strengthening cooperation between these two organizations in their respective areas of competence. In fact, more stringent measures are needed against IUU fisheries in the Black Sea with regional cooperation and competent organizations such as GFCM, and the Black Sea Commission. Besides, the Black Sea States should, as appropriate, develop and implement national plans into actions to prevent, deter and eliminate IUU fishing practices and related activities in the entire Black Sea, according to the FAO International Plan of Action against IUU fishing. For fishermen or owners of boats violating the national rules or practice any IUU activity, the license of fishing should be annuled and this annulment should be life-long. The responsible fishing boats should also be detained.

Fisheries information system is also one of the main components of the Turkish fisheries in the Black Sea. This system contains information on registry of

commercial fishing vessels, registry of recreational fishers, issue of special fishing permits to fishers.Vessel Monitoring system is also put into force. Vessels over 15 m are obliged to record and keep logbook, to be equipped with Automated Identification System (AIS).

Fishing license have not been issued for the marine vessels since 2002 in order to reduce catch stress on stocks and to maintain sustainable fisheries in Turkey.

For mitigating IUU fishing, clear and transparent information system should be established all part of Turkish side of the Black Sea coast. Fleet movement is important for surveillance. Monitoring, Control and Surveillance (MCS) system should be developed to reduce illegal fishing practices. MCS training is essential and fishery observer programs can be applied where/when necessary. Besides, a detailed monitoring scheme is needed from the fishing net to the fish at the market, ready to be sold to consumers.

National fleet management plan has recently been started in Turkey, A recommendation on VMS has been adopted by GFCM in 2009 and work is currently ongoing within the GFCM to elaborate solutions alternative to VMS through tecnical assistance programmes through GFCM members.

Twenty three Fisheries Administration Office (FAO)'s are active in total in the Black Sea for IUU fishing, fishing controls, fishing gears controls, logbook data entry into FIS, issuing of certificate of origin and certificate of transportation and monitoring of catch composition. Estimation of IUU products out of revenues gathered from fishing activities is less than 2% of total revenues in Turkey according to the questionnaire survey.

All fisheries associations and cooperatives should take an initiative for mitigation or zero tolerance against IUU fisheries in Turkey. Public awareness campaigns against IUU fisheries in the Black Sea with the help of fisheries authorities, with the active participation of fishery cooperatives, should be started. Overall an effective program should be developed to halt IUU fishing in the region, which includes also vocational trainings and involves relevant academic institutions and research centers existing at local level.

Acknowledgement

I sincerely thank Prof. Ertuğ Düzgüneş, Assoc. Prof. Ali Cemal Gücü, and Dr. Ayaka Amaha Öztürk, for their kind help during the preparation of this paper.

References

Acara, A. (1985) The Black Sea Turbot. State Planning Organization, Ankara, Turkey. 21 p. (in Turkish).

Agnew, D. J., Pearce, J., Pramod, G., Peatman, T., Watson, R., Beddington, R. J., Pitcher, T. J. (2009) Estimating the worldwide extent of illegal fishing. *PloS ONE* 4 (2): e 4570.

Barros, P. (2011) Mediterranean and Black Sea. Review of the state of world marine fishery resources. FAO, Fisheries and Aquaculture Technical Paper, 569: 77-92.

Birkun, A. Jr. (2002) Interactions between cetaceans and fisheries in the Black Sea. In: Cetaceans of the Mediterranean and Black Seas: State of Knowledge and Conservation Strategies. (ed., G. Notarbartolo di Sciara), A report to the ACCOBAMS Secretariat, Monaco. Section 10.

Düzgüneş, E., Erdoğan, N. (2008) Fisheries management in the Black Sea countries. *Turkish Journal of Fisheries and Aquatic Sciences* 8: 181-192.

FAO (2008) Management of fishing capacity and the international plan of action to prevent, deter and eliminate illegal, unreported and unregulated fishing. Available at http://www.fao.org (accessed 10 Oct. 2008)

GFCM (2011) Status of the GFCM Actions in the Black Sea. GFCM: SAC13/ inf. 24.

GFCM (2012) Background document on the Black Sea fisheries for the First meeting of the GFCM Working Group on the Black Sea. Constanta, 16-18 January, 2012. Preliminary version.

INTERPOL Available at: www.interpol.int/crime-areas/environmental-crime (accessed 10 Dec. 2012)

Kabasakal, H. (1998) Shark and ray fisheries in Turkey. *Shark News* 11: 8.

Kara, A. (2012) Turbot fishery. In: The State of Turkish Fisheries (eds., A. Tokaç, A. C. Gücü, B. Öztürk), Turkish Marine Research Foundation Publication, Istanbul, Publicstion number: 35, 400-418 pp.

Kurumahmut, A. (2001) Legal Status of the Black Sea. Seminar of the Aquaculture. Chamber of Shipping, Istanbul, 86-87 pp.

Özdamar, E. (1995) A comparative study on constructional characteristics and engine power of Turkish fishing vessel in the Black Sea. *Turkish Journal of Marine Sciences* 1 (2): 109-120.

Öztürk, B. (1998) Black Sea Biological Diversity, Turkey. Black Sea Environmental Series Vol. 9, UN Publication, New York.

Öztürk, B. (2011) Sea Essays. İlke Kitap, Istanbul. 378 p. (in Turkish).

Öztürk, B., Keskin, Ç., Engin, S. (2011) Some remarks on the catch of anchovy, *Engraulis encrasiculus* (Linneus, 1758), in Georgian waters by Turkish fleet between 2003 and 2009. J. *Black Sea/Mediterranean Environment* 17 (2): 145-158.

Pasyakin, V. (1991) The operation “Kalkan” is completed. *Kareltny Krym*. 78: 4 (in Russian).

Radu, G., Nicolaev, S., Papadopol, N.C., Anton, E., Maximov, V., Staicu, I., Radu, E. (2004) Results of the dolphin monitoring carried out between 2001-2002. *Cercetari Marine* 35: 191-204.

Samsun, N. and Kalaycı, F. (2004) The determination of turbot tangle nets and trammel nets features, catch per unit effort (CPUE) and turbot fishing in Middle Black Sea (Sinop). *Journal of SDU, Eğirdir Fisheries,* 2: 100-109 (In Turkish).

Taner, L. (2010) Determination of amount of lost fishing gear which cause to ghost fishing in Istanbul artisanal fisheries. MSc Thesis. Istanbul University, Istanbul (in Turkish).

Tonay, A. M., Öztürk, B. (2003) Cetacean bycatches in turbot fishery on the western coast of the Turkish Black Sea. In: International Symposium of Fisheries and Zoology (In memory of Ord. Prof. Dr. Curt Kosswig in his 100th birth anniversary), (eds., I. K. Oray, M. S. Çelikkale, G. Özdemir), Istanbul, 131-138 pp.

Topçu, N. E., Öztürk, B. (2010) Abundance and composition of solid waste materials on the wastern part of the Turkish Black Sea Seabed. *Aquatic Ecosystem Health and Management* 13 (3): 301-306.

Ye, Y. Cochrane, K. (2011) Review of the State of World Marine Fishery Resources. FAO, Fisheries and Aquaculture Technical Paper, Roma, No: 569, 32 pp.

Zengin, M. (2000). The Bio-ecology, Population Parameters and Stocks Assessment of the Turbot (*Scopthalmus maeoticus* Pallas, 1811) in the Turkish coast of the Eastern Black Sea. Ph. D. Thesis. Fen Bilimleri Ensitütüsü, Karadeniz Teknik Üniversitesi, Trabzon. 221 pp. (In Turkish).

Zengin, M., Genç, Y., Ak, O. (2012) A preliminary investigation on the state of Turkish fishing fleet on anchovy along north eastern Black Sea (Georgia, Abkhazia) coast. *Yunus Araştırma Bülteni* 4: 27-43 (In Turkish).

Received: 01.01.2013
Accepted: 01.04.2013