**GENERAL FISHERIES COMMISSION FOR THE MEDITERRANEAN**

**COMMISSION GÉNÉRALE DES PÊCHES POUR LA MÉDITERRANÉE**

in collaboration with

**The Commission on the Protection of the Black Sea Against Pollution**

**Joint GFCM BSC Workshop on IUU Fishing in the Black Sea**

**Istanbul, Turkey, 25-27 February 2013**

# ATURE AND EXTENT OF THE ILLEGAL, UNREPORTED AND UNREGULATED (IUU) FISHING IN THE BLACK SEA

Prepared by

Bayram ÖZTÜRK

Faculty of Fisheries, Istanbul University/TUDAV



## EXECUTIVE SUMMARY:

Illegal, Unreported and Unregulated (IUU) fishing is one of the serious threat for the sustainable fishing in the entire Black Sea. Due to IUU fishing, ghost fishing, by-catch, destruction of the benthic ecosystem has been reported. This issue has several social, economic and legal dimensions. Most of the states have reluctancy to report IUU fisheries and

to analyze it due to various reasons. From 1992 to 2012, a total of 60 IUU fishing cases have been reported in various Exclusive Economic Zones (EEZs). Among these cases, 3 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 target fish is turbot and stocks of turbot are decreasing and regional stock assessment is requested. Enforcement of the existing fisheries regulations and laws is necessary for all riparian countries to halt IUU fishing. Monitoring**,** Control and Surveillance (MCS) system should be developed to reduce illegal fishing practices.

Asipenceriform species (sturgeons) are endangered species in the Black Sea and illegal fishing and overfishing is most likely the cause of collapse of the stocks. Illegal clam and *Rapana* dredging is also threat for benthic ecosystem. Most of the countries do not have records of bycatch and ghost fishing in the Black Sea.

Even though IUU fishing in 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 Black Sea.

The FAO General Fisheries Commission for the Mediterranean is the regional fisheries management organization competent to manage fisheries in the Mediterranean, the Black Sea and connecting waters since its establishment (1949). Within its umbrella, it has a fully operational working group on the Black Sea. Among possible solutions to improve the fight against IUU fishing, there is that of a establishing GFCM permanent working group for IUU fishing. In addition, both the GFCM Agreement and the Bucharest Convention should be promoted, in terms of participation and compliance in order to enable optimum utilization of the living resources. The possibility of creating a technical cooperation project for the Black Sea to be executed under the GFCM Framework Programme, together with partners such as the Black Sea Commission and ACCOBAMS, should be considered.

## 1. 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 responsabilities for the conservation of living marine rssources under international laws (FAO, 2001).

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 has been depleted and 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. FAO and GFCM have made several studies and initiatives for combatting IUU fishing in all fishing areas.

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).

The nature and extent of the IUU fishing in 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 getting serious threat for the fish stocks and fishing communities in the region. This issue has already been discussed in several papers, such as Shlyakhov and Daskalov (2008), Düzgüneş and Erdoğan (2008), Raykov et al. (2011), GFCM (2012). It is already known that due to illegal fishing three fishermen were killed in 1997, 2000 and 2008 Öztürk, (2011). Besides, some fishermen were wounded, some of them were arrested, their boats were detained, some of them were obliged to pay fine. On the other hand, some of them were not caught and financially succeeded by selling precious fish in small or big markets unfairly. This problem has several dimensions in the Black Sea including technical, legal, economic, social and political ones.

Besides that, the Black Sea is one of the fertile seas in terms of bioresource due to high primary production and fishing is one of the important métier since antiquity and about half million people depend on fisheries in the entire basin. In recent years, due to various types of pollution, invasion of alien species, mostly *Mnemiopsis leidyi*, eutrophication and overfishing, the most important commercial fish such as turbot, bluefin tuna, mackerel, swordfish and sturgeons stocks were decreasing.

Fisheries management of the Black Sea suffers some harmonization problems due to the nature of the political and institutional context of the region. Nevertheless, due to the nature of this kind of fishing, there is no accurate data available for the yearly estimation of the IUU in the Black Sea at the level of both market and catch. But it is a common perception that turbot and sturgeon in the western part of the Black Sea and anchovy in the eastern part of the Black Sea are mostly subjected to IUU fishing activities. Other commercial species have less market value and are not much caught or targeted by IUU fisheries.

In the modern history, the fisheries in the Black Sea riparian States had three critical periods. These started firstly with the Soviet revolution in 1917 and the foundation of the Turkish Republic in 1923, 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. Even an agreement was signed in 1959 in Varna, which was not acceded by Turkey, to cooperate and regulate fishing activities between the so-called socialist States. 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 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 Fig. 1).

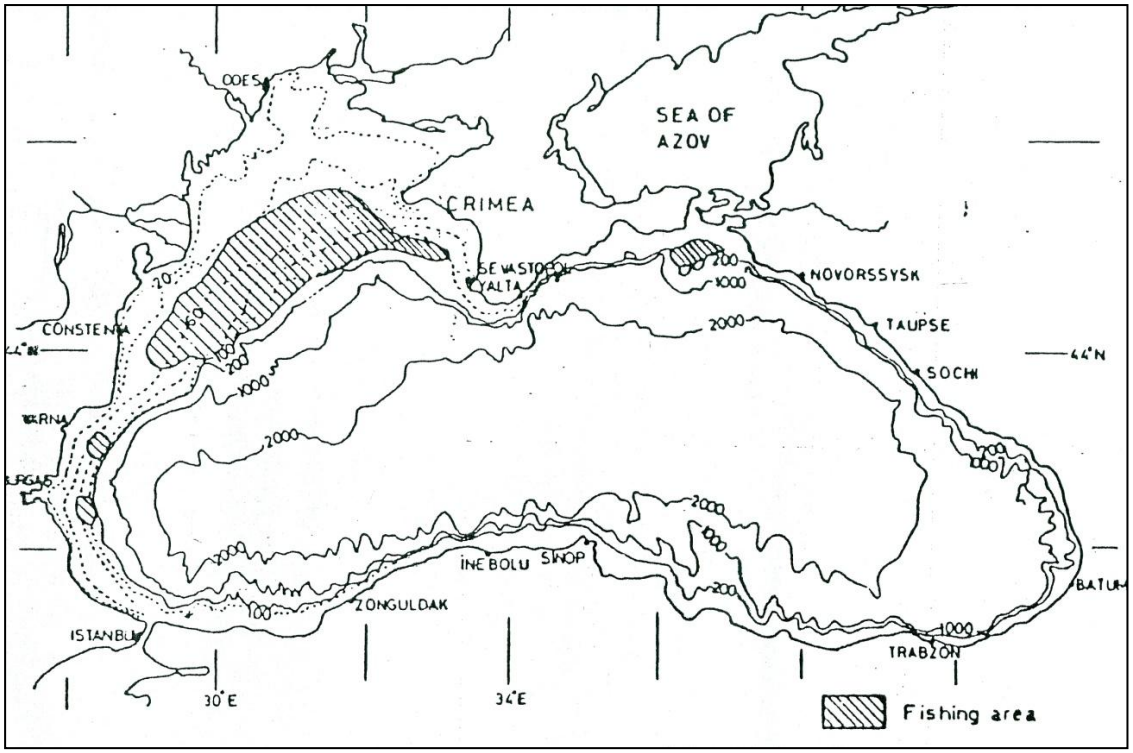


**Fig. 1**. Turkish turbot fishing areas between 1972 and 1983 (Acara, 1985)

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 and therefore unpleasent events have happened between such Turkish fishermen and the patrol boats of the relevant nations as a consequence of turbot poaching. In these years, mainly due to *Mnemopsis leidyi*, the Black Sea ecosystem collapsed and has only recently begun to recover. Fishing was, however, in crisis due to overfishing and other factors.

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 1990's and this period was still under the influence of the collapse of fisheries in the Black Sea due to *Mnemiopsis* and other synergetic factors. Since this period, the illegal fishing started commonly in the Black Sea, mostly for turbot and sturgeon. Later in the beginning of the 2000's, Georgia demanded fishermen and fishing boats from Turkey and other countries who requested to make bilateral agreement.

Some companies were established throughout the region and some illegal and unreported fishing practices started. At last, the Black Sea riparian States started to fight against IUU fishing since 2007 seriously with a regional mechanism of cooperation especially with coastguards under the Black Sea Littoral States Border/Coast Guard Cooperation Forum – BSCF.

This background paper has been prepared based on the published papers, reports and records of Istanbul Fisheries cooperatives as well as the results of the survey with the questionnaires filled by the relevant authorities and researchers of the Black Sea riparian countries.

**Table 1.** Black Sea riparian countries and their fishing capacity (Düzgüneş and Erdoğan, 2008)

| Data | Bulgaria | Georgia | Romania | Russian Federation | Turkey | Ukraine |
|---|---|---|---|---|---|---|
| Population[1] (x1000) | 7.965 | 5.177 | 22.387 | 144.082 | 70.318 | 48.902 |
| Coastal Population (x1000) | 714 | 650 | 746 | 1.159 | 6.700 | 6.800 |
| Coastal Length (km) | 354 | 310 | 225 | 800[2] | 1.329 | 2.782[2] |
| Total Fish Production (t) | 11.000 | 3.000 | 13.000 | 3.051.000[3] | 644.000 | 229.000[3] |
| Black Sea Production (t) | 2.843 | 2.837 | 1.824 | 24.922 | 342.455 | 63.161 |
| Number of Fishing Vessels | 1.261 | 360 | 436 | 2912 | 7.308 | 2.300 |

As it can be noticed clearly in Table 1, as of 2008 Turkey is dominant in terms of the number of fishing vessels and fishery production in the Black Sea. Another remark is two member countries of EU, Bulgaria and Romania, can constitute less than 10 % of all fishing vessels.

Fig. 2 shows the trend of total catch by country in the Black Sea for the past decade. Turkish catch was larger than the others throughout that period with major and minor fluctuations, but showing decreasing trend after the peak in 2007. On the contrary, Ukraine has an increasing trend after 2007. Georgian catch has been increasing steadily.

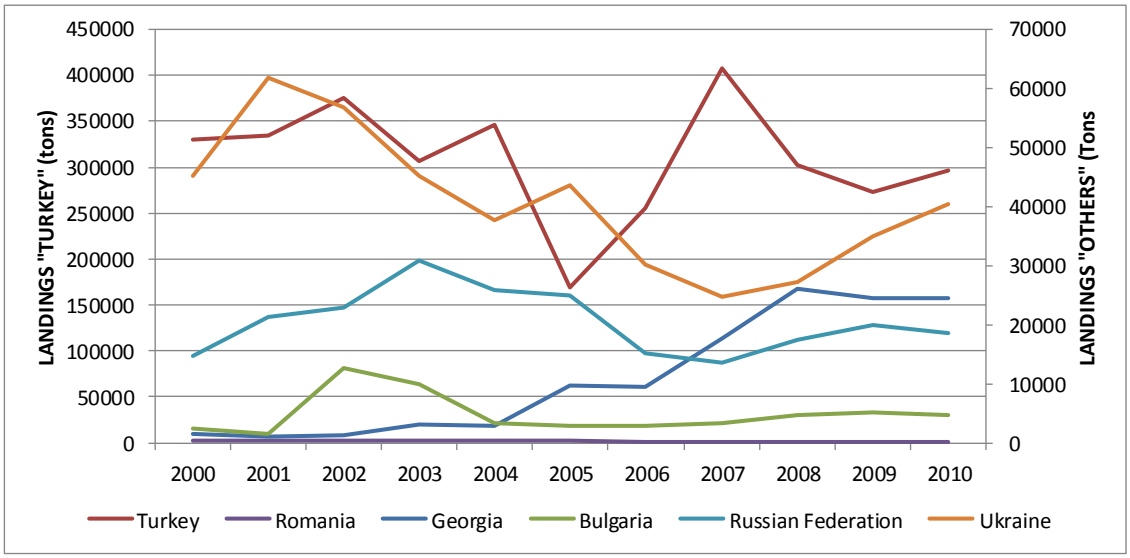


**Fig. 2.** Landings of the total catch of the riparian countries in the Black Sea in 2000-2010

## 2. EVALUATION OF THE IUU IN RIPARIAN STATES

In this chapter, IUU fishing is examined country by county. At first, illegal practicing of fishing in the EEZ is considered. Later, IUU fishing within teritorial water is also examined.

### 2.1. Bulgaria:

In Bulgaria, only 7 cases were reported between 1997 and 2008 for illegal fishing for turbot. Beside some Turkish fishermen 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. This juridical case is continuing at present.

In Bulgaria IUU fishing practices seems to continue all year round in the Bulgarian waters. Main fishing gears are gill nets and bottom trawl. Average size of fishing boats is 12m. Main target species are turbot, spiny dogfish, anchovy and mackerel. In 2012, totally 3300 kg of turbot and 20684 kg of other species were illegally caught. Estimated revenues of the IUU products - 287 808 levs, 147 154 euro. in Bulgaria were reported.

IUU fishing in Bulgaria for 2012 is summarized in Table 2.

**Table 2.** IUU fishing for 2012 in Bulgaria

| № | Fisheries Control Sector | Number of infringements | Quantities confiscated (kg) | Estimated revenues of the IUU products (levs) |
|---|---|---|---|---|
| 1 | Burgas | 99 | 20318 | 243816 |
| 2 | Dobrich | 35 | 451 | 5412 |
| 3 | Varna | 120 | 3215 | 38580 |
| | **TOTAL** | **254** | **23984** | **287808** |

### 2.2. Georgia:

Contrarily to the above states, anchovy is the main target fish in Georgia. 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. It has been reported that even some foreign investors established fish oil and meal factories, trying to sell these products to fish farms. The problem could be therefore considered to be mostly political, and to a certain extent beyond fisheries management issues. Nevertheless, Azov anchovy *Engraulis engrasicolus maeoticus* is caught in this area, but there is no accurate information on its stock. 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 – Georgia Agreement on fishery.

Khavtasi et al. (2010) reported that illegal fishing by foreign vessels also happens in the Georgian territorial waters. Although a vessel monitoring system (VMS) is in use, it does not seem to be efficient enough. In 1997, a 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 agreements 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 is not known. Nevertheless, this fishing practices should be regulated by the national authorities with the help of regional cooperation.

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 harbours and later they paid fines and their boat were also released. A total 16 cases have been reported in Georgia.

Komakhidze (2004) reported that there is no effective environmental protection practice in Georgia against poachers. Enforcement of the Georgian fisheries regulation is needed. Zengin et al. (2012) reported that some Turkish fishermen were fined due to illegal landing of fish caught in Georgian waters in Trabzon.

### 2.3. Romania:

Table 3 comprises in chronological order the illegal vessels arrested in the act (effectively fishing) in the EEZ (above 12 Nm); during certain actions, it was necessary to make use of the weapon and technical equipment outfitting of the Border Police vedettes, in order to seize and escort to port the vessels failing to comply with the control. Eight Turkish and one Bulgarian fishing boats were determined between 2007 and 2011.

**Table 3.** List of fishing vessels caught by the Romanian authorities

| Name of fishing vessel | Flag | Date |
|---|---|---|
| Senyuzler | Turkish | 12.06. 2007 |
| Uygunghior | Turkish | 10.01.2009 |
| Ames Sakir Reis | Turkish | 12.03.2009 |
| Karaca 2 | Turkish | 3-4.04.2010 |
| Kaptan Seyfullah Ogullary | Turkish | 3 - 4.04.2010 |
| Canakcilar | Turkish | 3 - 4.04.2010 |
| Efeler 1 | Turkish | 04.11.2010 |
| BCi - 5159 | Bulgarian | 13.04.2011 |
| Ahmet Ckomoglu | Turkish | 28.05.2011 |

Data on illegal fisheries have been recorded since 2006. Regionally operational structures were established. At the beginning of this activity, the vessels practicing illegal fishing were probably more numerous, however, the more extensive verifications in the area of oil drilling platforms performed by the Border Police resulted in identifying and subsequently arresting illegal vessels operating in the entire EEZ for turbot fishing. 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).

Since the 1990's, several Turkish fishermen were arrested, boats detained and fines charged by the Romanian authorities.

However, in recent years, not much illegal fishing has been reported due to better frontier control and implementation of security measures since Romania has joined the European Union. It seems that in the near future their marine frontiers will have more effective control implemented for illegal fisheries.

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. Later, the boat crew were brought back to Turkey with the help of Turkish coastguard.

In addition, IUU fishing was reported for sturgeon near the Danube and the Romanian government is trying to stop it.

### 2.4. Russia:

Between 1990 and 2001, only 8 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. Russian authorities declared that Turkish fishing boats were detained according to the Article 56 to 58, Chapter 5 in UNCLOS.

Not much information about IUU practices in the Russian waters in the Black Sea is available. Volovik (2004) reported uncontrolled large-scale poaching in the Russian part of the Black and Azov Sea has reached the unprecedented level. Kumantsov (2011) reported that poaching and absence of fish farming facilitate aggravate decline of the fishing sector in the Russian part of the Black Sea.

The Russian fishing fleet and catch records in the Black Sea is very small (see Table 2). Nevertheless, Russian Federation has a long tradition for fisheries and expects its fishing fleet to increase.

### 2.5. Turkey:

Turkish fishing fleet and production is the strongest among all Black Sea countries see (Table 1)

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. This kind of fisheries and its impacts are already reported by several studies, such as Zengin (2000), Samsun and Kalaycı (2004), Taner (2010), Öztürk (2011), Öztürk et al.(2011), Kara (2012), and Zengin et al. (2012).

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; 59 IUU cases were detected and reported in the Black Sea. Totally 3 fishing boats were sunk by coastal patrol boats: two of them in Ukraine in 1998 and 2000, the other one in Romania. Three fishermen died due to the conflict in Georgia in 1997, Ukraine in 2000 and 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. However, IUU fishing activities are decreasing due to more stringent measures for control and cooperation with others riparian states beyond EEZ and more effective implementation of the fisheries law 1380 in the territoral waters.

A satellite-based vessel monitoring system for vessels over 15 m in length and Automatic Identification System (AIS) for vessels over 12 m in length are used for monitoring and controlling purposes in Turkey to mitigate IUU fishing. Although some useful measures were adopted by GFCM, more effective measures would be needed in the future to stop IUU fishing practices. 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 . Additionally a new support scheme was taken into effect in Turkey for the reduction of the number of fishing vessels over 12 m. Fishing license of 407 vessels over 12 m will be annulled and removed from fleet within 2013. It is known that the average size of fishing boats taking part in IUU fisheries are generally below 12 m.

High performance and successful operations of the Turkish coast guard against illegal fisheries in the territorial and international waters is another reason for the decrease of the IUU fishing activities compared to last few years.

Landing places are important in terms of fishery statistics, for monitoring the catch and enforcement of regulations.

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.

### 2.6. Ukraine:

The earliest records of IUU fishing dated back to 1990. The violation of fishing rules relates both to citizens and non-citizens of Ukraine. Fines for violation of fishing rules, compensation of losses, damage to fisheries as a result of illegal fishing, extraction of vessels and fishing gears related with the violation, are ordered by the court.

Illegal turbot catch was also reported in the Ukrainian water. At least 30 Turkish fishermen have been arrested and later detained between 1992 and 2012. A total of 20 IUU cases were reported in that period. 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 Ukraininan EEZ. Another boat was sunk by firing. Some legal experts reported that the Ukrainian navy practiced excessive use of force to the fishermen.[1] 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.

[1] For instance, Kurumahmut (2001) refers to Article 73, 300 and 301, Chapter 5 in UNCLOS for these tragic events and excessive use of force. He proposed peaceful pursuit rather than firearms.

IUU fishing is practiced mostly in the Ukrainian EEZ (northwestern part of the Black Sea), about 34 nautical miles or more from the coast. In addition, IUU fishing is common around the Kerch Strait. Fishing violations in using of bottom gill nets have also been reported. The timing depends on the target species, usually from March to May for turbot fishing. There had been, however, the violation of fishing rules recorded during autumn-winter season (October-April).

Shlyakhov (2003) reported that sturgeon poaching in the northwestern Black Sea was equal to 25 tons in 1970-1979 and 27 tons in 1980-1989 and the excessive catch is threat to the sturgeon population. Shlyakhov and Charova (2003) reported turbot poaching by Ukrainian and Turkish fishermen in the Ukrainian waters. Shlyakhov and Daskalov (2008) reported that illegal sturgeon fisheries probably caused the collapse of their stocks in Ukraine.

Table 4 summarizes the information of IUU fisheries in Ukraine, provided by the Ukrainian authorities for the survey. Estimated revenues of the IUU products in Ukraine are quite informative (Table 5).

**Table 4.** IUU fisheries in Ukraine

| **Species** | **Season** | **Main fishing ground** | **Main fishing gear** |
|---|---|---|---|
| Sturgeon | All seasons | North-western Black Sea | Gillnets. hooks, trawls |
| | | Azov Sea coasts | Gillnets, trawls |
| Turbot | Spring, summer and autumn | North-western, North-eastern Black Sea | Gillnets, hooks, trawls |
| So-iuy mullet | All Seasons | Ukrainian coast of Azov Sea | Gillnets, purse seines |
| Azov-Don shad | October-April | Kerch Strait | Gillnets |

**Table 5.** Estimated revenues of the IUU fisheries in Ukraine.

| **Species** | **Fishing ground** | **Year** | **Estimated catch (tons)** | **Remarks** |
|---|---|---|---|---|
| Sturgeon | Black Sea (Danube and Dnieper population) | 1995 | 600 | More than 12 times higher than the official landings all of the Black Sea |
| | Sea of Azov | 1988-1990 | 4810 | 3-50 times higher than the official catch of Ukraine and the Russian Federation |
| | | 1992-1994 | 3210 | |
| | | 1995-1997 | 2040 | |
| | | 1998-2000 | 980 | |
| | | 2001-2003 | 110 | |
| | | 2004-2005 | 50 | |
| Azov-Don shad | | 2011 | 15 | 1.7 times higher than the official landing of Ukraine |
| So-iuy mullet | Sea of Azov | 2007-2010 | > 10000 | 3 times higher than the official landings of Ukraine |
| Turbot | Black Sea | 1992-2002 | 200-800 | 6-20 times higher than the official landings of Ukraine |
| | | 2005 | 800 | 7 times higher than the official landing of Ukraine |

## 3. MAIN SPECIES AFFECTED BY IUU FISHING

Several target fish species area affected by IUU fishing (see Table 2), the main target fish are, however, turbot and sturgeon in the western part of the Black Sea and anchovy in the eastern part of the Black Sea.

The Black Sea turbot *Psetta maxima* and *Scopthalmus maeticus* are highly commercial species. *P. maxima* is a benthic species living on soft bottom and gravel substrate to the depth of 80 m. Its length is 40-80 cm, max.100 cm. It feeds on other benthic fish such as gobies, as well as crustaceans and mollusks. Spawning season is spring and summer. Sexual maturity is reached at 3-5 years old. The eggs, as many as 10 to 15 million from a single fish, drift in the middle depths for a week, later rising in the form of larvae into the surface water where they are carried by currents. During this stage, larvae drift away from the spawning site. This movement resulting in larval loss when the developing fish try to settle beyond the continental shelf and find a habitat in a suitable depth of water (Acara, 1985).

The length of *S. maeticus* is 40-60 cm, max. 75 cm. This is also a benthic species on soft and hard substrates to the depth of 80 m. Young specimens are found in shallower waters than adults. It feeds mainly on benthic fish such as gobies. Spawning season is late winter and spring.

In addition, turbot is the only demersal fish which is caught by quota by two EU member countries in the Black Sea, namely Bulgaria and Romania, since 2008. This species is of high commercial value and there is high demand, mostly in the Turkish market. One kg of turbot was 20 Euro in 2012 in the Turkish market. This is the reason for the fact that illegal fishing is mainly focused on turbot, except for Georgia.

As it is seen in Fig. 3, the stocks of the turbot in all the countries show decreasing trends from 2000 to 2010. The most significant decrease was observed on the Turkish side. It is not easy, however, to identify the proportion or contribution of the IUU fishing to the decrease of the turbot stocks.

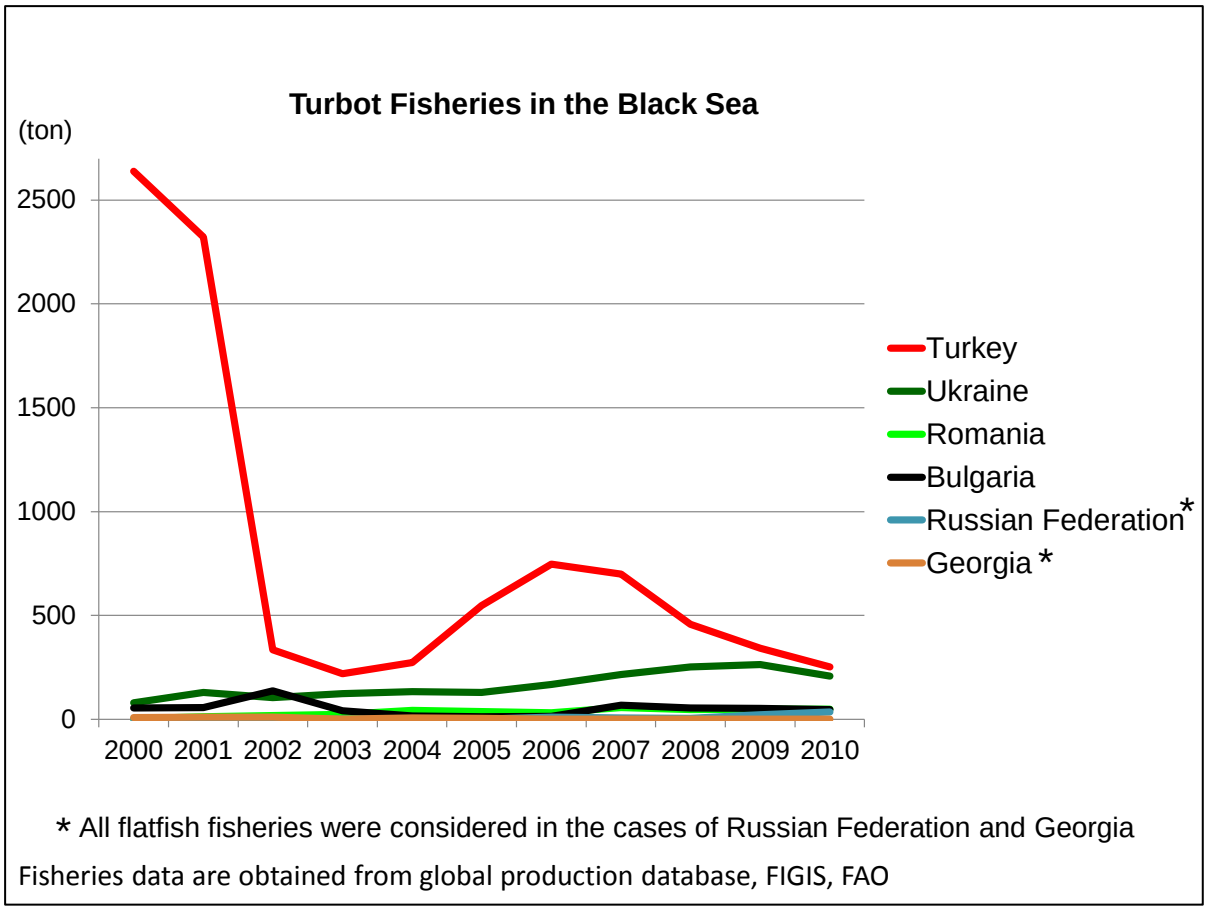


**Fig. 3.**Turbot catch of the Black Sea countries (2000-2010)

**Table 6**. Main target fish species of IUU fisheries in the Black Sea

| | Bulgaria | Georgia | Romania | Russia | Turkey | Ukraine |
|---|---|---|---|---|---|---|
| Anchovy | x | | | | x | |
| Bluefish | | | | | x | |
| Sprat | | | | | x | |
| Horse mackerel | | | | | x | |
| Bonito | | | | | x | |
| Sardine | | | | | x | |
| Scad | | | | | x | |
| Chub mackerel | x | | | | x | |
| Whiting | | | | | x | |
| Red mullet | | | | | x | |
| Turbot | x | | x | | x | x |
| Russian sturgeon | | | | | | x |
| Starry sturgeon | | | | | | x |
| Beluga | | | | | | x |
| Black Sea shad | | | | | | x |
| So-iuy mullet | | | | | | x |
| Spiny dogfish | x | | x | | | |
| Sea snail | | | | | x | |
| Baby clams | | | | | x | |

As seen in Table 6, turbot is the only common target species for all riparian countries around the Black Sea. It is also interesting that target fishes in Turkey are more diverse (13 species) than the other states.

So-iuy mullet and sea snail are two alien species. Sturgeons are at the endangered level in the Black Sea, even though they are fully protected in all states. CITES also concerns the status of sturgeons in the Black Sea.

### 3.1. FISHING GEAR AND FLEETS FOR TARGET FISHES

For turbot, the main fishing gear in all coastal states is bottom gillnet, except in Turkey where the bottom trawling is permitted (Daskalov et al., 2012). For anchovy, purse seining is the most common fishing gear.

Details of turbot fisheries in Turkey are summarized in Tables 7 and 8.

Turbot fishing area is within 100m isobat in the Turkish western Black Sea. In general, turbot fishery is operated within 15 miles from coast. Fishing season begins in April and ends in the last week of June. For the turbot fishery, nets are set end to end. One net is 60 fathom length(=108m). One set of nets has 5-15 anchors and there are 12-30 nets between two anchors. For example, one set of 50 nets is approximately 5 km long. The boats used for turbot fishery are between 7 to 30m in length. Table 6 shows number of boats, number of bottom gill nets and distance of fishing area from coast in the western part of Turkey.

**Table 7.** The features of turbot fishery and bottom gill nets in Turkey

| | |
|---|---|
| **Season** | April, May, June |
| **Fishing depth** | 20-60 fathom (36-108m) or 50-60 m |
| **Soak time** | 10-30 days |
| **Mesh size** | 160-200mm |
| **Net twine** | 210d/9-18 no |
| **Prohibitions** | Min. fish body length 45cm; banned during 15 April-15June |

Only in 5 fishing ports (İğneada, Kıyıköy, Karaburun, Şile, Ağva) on the Turkish western Black Sea coast, 14,000 pieces of bottom gillnets in total were reported. Thus, the fishing effort is high considering the length of the coastline which is 350 km (Tonay, 2010).

**Table 8.** Number of boats, bottom gill nets and distance of fishing area from coast in Turkey

| Fishing Port | Number of bottom gill nets | Number of boats | Distance of fishing area from coast (miles) |
|---|---|---|---|
| İğneada | 4,000 | 80 | 15 |
| Kıyıköy | 5,000 | 27 | 15 |
| Karaburun | 2,000 | 8 | 3-5 |
| Şile | 1,000 | 10 | 1 |
| Ağva | 2,000 | 10 | 10 |
| Total | 14,000 | 135 | - |

In Romania, Bulgaria and Ukraine, turbot is fished in the western part of the shelf of the Danube, Crimea and Bulgarian continental shelf.

## 4. SOCIAL, ECONOMIC AND ENVIRONMENTAL IMPACTS OF IUU FISHING IN THE BLACK SEA

IUU fishing is undoubtedly one of the reasons for the over-exploitation of the fishing resources in the Black Sea and 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 income and employment in other industries and activities in the supply chain and the fishing operation itself
- Loss of biodiversity
- Legal, social and political problems, such as loss of human lives, injury

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 Black Sea. Moreover, their statistics can never be considered to elaborate solid management plans for both target species and bycatch species.

Best example for the loss of biodiversity is seen in sturgeons. Due to sturgeon poaching for caviar and meat, which are of highly commercial value, these species are now endangered in the Black Sea and Black Sea countries have banned sturgeon fishing in their rivers and seas. Even some countries like Turkey, stock enhancement practices have been started in recent years. IUU fishing also damages vulnerable habitats by the use of prohibited fishing gears, mainly for *Rapana* and clam harvesting. Illegal *Rapana* and clam dredging make destructive effects on the soft bottom communities and siltation in macro and meio benthos.As a whole, thus they are a threat for the marine biodiversity.

### 4.1. 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.

Tonay and Öztürk (2003) reported a total bycatch of 40 harbour porpoises, one bottlenose dolphin and one common dolphin by one turbot fisherman in the Turkish Western Black Sea coast during one turbot fishing season. Birkun (2002, 2008) reported that cetaceans are under the threat due to bycatch in the Black Sea.

Radu et al. (2003) reported that due to illegal fishing performed by foreign vessels in the Romanian EEZ in April 2002, 26 cetacean specimens were entangled in the fishing nets and all of them were harbour porpoise. He also noted that turbot gill net with the mesh size smaller than 20 mm is forbidden by the Romanian law. Incidental catches were found in April 2002, due to the fraudulent fishing carried out by Turkish trawlers in the Romanian EEZ (Radu et al., 2004). In the gill nets launched, found and recovered by the vessels of the Border Police and NIMRD, 20 harbour porpoise were recorded. The total number of dead animals was about 100; being in advanced decomposition stage, they detached from the nets during the recovery operations (Radu et al., 2003). The accidental by-catches, due to gear selectivity, consisted mainly in bottom fish species, frequent components of benthic biocoenoses, typical for the Black Sea (common sting ray and thornback ray), however sometimes specimens of the three cetacean species of the Black Sea have been reported in Romania.

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 permission of Romanian government, accompanied by the coastguards of both governments. After net hauling, all fishes found in the nets were delivered to Romanian 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. Since bycatch species has no economic value, those species are released into the sea. In 2006, in Bulgaria the police authorities found some dead dolphins on the beaches of Shabla and Krapets, near the Romanian border, and they suspected poaching. In Bulgaria bycatch records – 3300 kg of turbot and 20 684 kg other species were reported in the questionnaire survey.

### 4.2. 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 is 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 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. 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). The interviews conducted with fishermen during the study revealed that there were 10,000-15,000 turbot nets lost in the same region (Tonay, unpublished data). In Bulgaria, ghost fishing with 31 210 m of abandoned nets was reported.

In Romania, due to abandoned gillnets, many times in great numbers, when lifted on board of the control vessels, by-caught dolphin individuals are often found, usually decayed. These "ghost" tools are gillnets, built in series, with no markings, mechanically armed, especially designed for bottom stationary fishing, mesh size 280-360 mm; never 2a>= 400 mm. According to existing data, the total length of the "ghost" nets found from 2006 to date is approx. 90 km.

Driftnet and mono-multifilament fishing nets referred as ghost fishing gear have been banned since 2011 in the Turkish waters. Inspection on the usage of above mentioned fishing nets are conducted by National Coast Guard Command at sea and by fisheries inspectors of Provincial Directorates under the coordination of the General Directorate of Fisheries and Aquaculture.

## 5. LEGISLATION ISSUE

There are some legislation and regulations in force in the Black Sea riparian states to fight against IUU fishing. 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.

Since Bulgaria and Romania are now members of the European Union and all fishing rules and regulations should be consistent with those of EU. New regulations of the EU since 2010 oblige them to ensure that fishery imports into the EU are from legal sources. Council Regulation (EC) No. 1005/2008 of 29 September 2008 requires to establish a community system to prevent, deter and eliminate illegal, unreported and unregulated fishing, as well as amending Regulations (EEC) No. 2847/93, (EC) No. 1936/2001 and (EC) No. 601/2004 and repealing Regulations (EC) No. 1093/94 and (EC) No. 1447/1999. This Regulation has started to be in force since 1 January 2010.

Ukraine has several legal measures such as managerial responsibility (penalties of 2 to 50 tax-free minimum incomes, with the confiscation of boats, fishing gear and catch, with or without confiscation), criminal liability with the confiscation of water-craft (boats), fishing gear and catch, with or without confiscation, imprisonment for up to 3 years), civil liability (compensation for losses incurred as a result of illegal fishing, or destruction of aquatic biological resources in accordance with the established rates).

Bulgaria, Romania, Georgia, and Ukraine are parties of ACCOBAMS (Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and contiguous Atlantic Area) and very shortly Turkey will become a party as well. Much attention will, then be given to cetacean bycatch and interaction with turbot fisheries.

All countries around the Black Sea are parties to the Convention of Biological Diversity. All Black Sea riparian countries are parties of the Commission on the Protection of the Black Sea Against Pollution (known as the Bucharest Convention) and Advisory Group on the Environmental Aspects of the Management of Fisheries and Other Marine Living Resources (FOMLR) and The Advisory Group on Conservation of Biological Diversity of the Bucharest Convention which are the most important tools to protect living resources of the Black Sea. All Black countries are also members of the Black Sea Economic Cooperation.

Turkey, Romania and Bulgaria are members of General Fisheries Commission for the Mediterranean (GFCM) which is the only Regional Fisheries Management Organization for fisheries resources of the Black Sea. To harmonize all efforts and elaborate concerted action plans, non-GFCM Members should either join the GFCM umbrella or at least apply for a cooperating non contracting party status. This would be even more important now that the GFCM Working Group on the Black Sea is fully operational (first meeting was held last year in Costanta; the second meeting will be convened in April).

At international level, except for Turkey, all coastal states are parties of Law of the Sea Convention (UNCLOS). With regard to the UN Fish Stock Agreement, the following are Members: Bulgaria, Romania, Russian Federation and Ukraine. According to article 8 of the UN Fish Stock Agreement, States fishing in an area under the mandate of a Regional Fisheries Management Organization would be expected to join this organization or to cooperate to the maximum extent with it in the application of conservation and management measures in place.

Black Sea Littoral States Border/Coast Guard Cooperation Agreement (BSCA) was signed in 2007. One of the tasks in Article 3 of this agreement is the cooperation among states for the violation of fisheries rules and protection of marine living resources. This agreement has been put into force and it will be the most important tool against IUU fishing in the Black Sea region if implemented properly. The number of illegal fishing activities has already started to decrease due to the joint establishment of the Black Sea coast guards commanding.

Establishment of a joint Black Sea Memorandum of Understanding on port state control in 1999 with all riparian states for better controlling all kinds of vessels in the Black Sea is another legal instrument for controlling and surveillance of fishing boats. All detained fishing vessels need to be clearly recorded to better understanding real figure of the IUU violation in the Black Sea.

## 6. A PROPOSED ROAD MAP TO FIGHT AGAINST IUU FISHING IN THE BLACK SEA

IUU fishing in the Black Sea clearly shows that there are some gaps in the fisheries management in the Black Sea. Identification of these gaps will solve the problem in a short term with the cooperation of all riparian states. At present, there is a will and a wish to abandon, mitigate or reduce IUU fishing in the Black Sea. It is clear that zero tolerance is an ultimate goal to halt IUU problems.

There is particularly no study on IUU fishing in the riparian countries. This gap should be filled by starting IUU studies with the standardized and harmonized methods urgently. Some countries do have records of bycatch and ghost fishing while others do not have any data. These problems should also be tackled with standardized methods.

In fact, different legislations and enforcement exist in the Black Sea, i.e. the European Union, with two member countries - Bulgaria and Romania - and a candidate member country Turkey; GFCM, with three member countries - Bulgaria, Romania and Turkey; the Black Sea Economic Cooperation (BSEC) with members of all Black Sea countries; Black Sea Commission (BSC) has been acting on the mandate of all Black Sea countries with an aim to achieve sustainable management of marine living resources. However, the Black Sea region requires the application and implementation of those relevant international agreements that concerns its ecosystems and living resources because no effective control on fishing practices seem to exist in general.

Surveillance and enforcement of the fisheries regulations in the Black Sea countries are particularly crucial to successful fishery management. However, in some countries, there is lack of real commitment by the authorities to undertake surveillance and enforcement of the regulations. It is also important to introduce regulations which are realistic in the current circumstances and which are enforceable. It is better to give overall control for surveillance and enforcement as a single entity rather than as diverse authorities such as police, coastguard, civil persons, custom administration, etc. For the enclosed sea like the Black Sea, all efforts should be harmonized and coordinated 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 fishing boats violating the national rules or practice any IUU activity, the license of fishing should be annulled and this annulment should be life-long.

For mitigating IUU fishing, clear and transparent information system should be established and shared by the authorities of the riparian states in case of crises. Vessel monitoring system is needed for the Black Sea riparian countries. Fleet movement is important for surveillance. Monitoring**,** Control and Surveillance (MCS) system should be developed to reduce illegal fishing practices. National fleet management plan has recently been started in some of the riparian countries, i.e. Turkey, Romania and Bulgaria. 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 technical assistance programmes through GFCM Members.

Besides, a scientific monitoring program is needed for creating a database of the IUU fishing in the region. Similarly, GFCM Rec. GFCM/33/2009/8 “On the establishment of a list of vessels presumed to have carried out IUU fishing in the GFCM Area, amending

Recommendation GFCM/2006/4" should be implemented in a way that special attention is given to the Black Sea. A permanent working group for IUU fishing to be created within the GFCM would significantly help to address all these issues and more. This working group could work under the remit of the GFCM Working Group on the Black Sea. Among other things, it body could oversee the implementation of a roadmap to be developed by all riparian States and together with the Black Sea Commission. In alternative, or in parallel, a technical cooperation project for the Black Sea could be established building upon the FAO practice of Regional Projects and it could be executed under the 1st GFCM Framework Programme. The project could oversee all matters pertaining to the Black Sea, including the roadmap to fight IUU fishing.

In any case, this roadmap should have a fully encompassing vision and also include means to protect the turbot stocks and mitigate IUU fishing in the Black Sea, such as turbot farming as an alternative method and replace the catch of wild fish. In fact, the turbot farming was started in the 1980's in the United kingdom, followed by Spain and France. Spain is the main producer and Galicia Region is known as the main turbot producer to the EU market. Some Black Sea states already produce turbot frys from the hatchery and some of them started stock enhancement in their waters as well.

To promote and finance turbot farming in the Black Sea by governments may be one of the solutions to balance the market demand mostly in Turkey. Similarly, the GFCM could provide enormous help through its Committee on Aquaculture. If turbot farming becomes successful and the market price is reduced, IUU fishing can decrease. In addition, wild stocks can remain sustainable and the protection of the stocks can be more easily guaranteed. This case resembles that of sea bream and sea bass aquaculture in the Mediterranean Sea. After successful farming of these two sparid fish was achieved, their prices decreased and the natural stocks were not depleted totally. Nevertheless, turbot disputes have not taken place only in the Black Sea. Cox (1996) reported that due to turbot fishing, a kind of turbot war occurred between Canada and Spain and had caused diplomatic problems between two countries.

All fisheries associations and cooperatives should take an initiative for mitigation or zero tolerance against IUU fisheries among members. 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.

## 7. REFERENCES


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

Agnew, D., Pearce, J., Pramod,G., Peatman, T., Watson, R., Beddington, R.J., Pitcher, T.J. 2009. Estimating the worldwide extent of illegal fishing. Plus one 4(2) e 4570.doi.10.1371.

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

Birkun, A. Jr. 2008. Pilot project involvement of Black Sea artisanal fisheries in anti-bycatch and anti-marine litter activities. Final report of the Ukrainian Team. Joint Programme of UNEP, BSC PS and ACCOBAMS PS on Marine Litter and Marine Mammals Conservation in the Black Sea.

Council Regulation (EC) No 1005/2008. "Establishing a community system to prevent deter and eliminate illegal, unreported and unregulated fishing."

FAO. 2008. Management of fishing capacity and the international plan of action to prevent, deter and eliminate illegal, unreported and unregulated fishing. http://www.fao.org

Cox, K. 1996. Who won the great turbot war? National News, The Globe and Mail, March 16, 1996.

Daskalov, G., Osio, C., Charef, A. 2012. Scientific, Technical and Economical Committee for Fisheries (STECF). Assessment of Black Sea Stocks. Joint Research Center. European Commision, 236 p.

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

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.

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

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

Khavtasi, M., Makarova, M., Lomoshvili, I., Phartsvania, A., Moth-Poulsen, T., Woynarovich, A. 2010. Review of fisheries and aquaculture development potentials in Georgia. FAO Fisheries and Aquaculture Circular, No.1055/1. FAO, Rome, 82 p.

Komakhidze, A. 2004. Responsible Fisheries Booklet for the Black and Azov Seas. Turkish Marine Research Foundation Publication, Number 7, pp. 17-21.

Kumantsov, M.I. 2011. The Birth and Evaluation of Fishery in the Northern Black Sea, Part 1, from Antiquity to the Early 20th Century. Vniro Publising, Moscow, 236 p.

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

Radu, G., Nicolaev, S., Anton, E., Maximov, V., Radu, E. 2003. Preliminary data about the impacts of fishing gears on the dolphins from the Black Sea. In: B. Öztürk and S. Karakulak (Eds.) Workshop on Demersal Resources in the BlackSea and Azov Sea. Turkish Marine Research Foundation Number 14, pp. 115-129.

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.

Raykov, V., Velikova, V., Lisichkov, K., Kuvendziev, S. 2011. Review of main fisheries indicators in the Black Sea by using diagnostic analysis. Natura Montenegriana Podgorica 10(3): 309-312.

Shlyakhov, V., Charova, I. 2003. The status of demersal fish populations along the Black Sea coast of Ukraine. In: B. Öztürk and S. Karakulak (Eds.) Workshop on Demersal Resources in the BlackSea and Azov Sea. Turkish Marine Research Foundation Number 14, pp. 65-74.

Shlyakhov, V. 2003. On the current state of Aciepnseridae stocks in the Ukrainian sector of the nortwestern Black Sea. In: B. Öztürk and S. Karakulak (Eds.) Workshop on Demersal Resources in the BlackSea and Azov Sea. Turkish Marine Research Foundation Number 14, pp. 75- 77.

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

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.

Öztürk, B. 2011. Sea Essays. İlke Kitap, İstanbul. 378 p. (In Turkish)

Skalkov, V.A., Daskalov, G.M. 2006. The state of marine living resources. In: T. Oğuz (Ed.), State of the Environment of the Black Sea (2001-2006/7). Publication of the Commission on the Protection of the Black Sea Against Pollution (BSC), Istanbul, pp. 321-364.

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. 2002. Cetacean bycatches in turbot fishery on the western coast of the Turkish Black Sea. In: I.K. Oray, M.S. Çelikkale, G. Özdemir (Eds.), International Symposium of Fisheries and Zoology (In memory of Ord. Prof. Dr. Curt KOSSWIG in His 100th Birth Anniversary), İstanbul, pp. 131-138.

Volovik, S. 2004. State and prospects of the development of Russian Fisheries in the Azov and Black Sea basin. Responsible Fisheries Booklet for the Black and Azov Seas. Turkish Marine Research Foundation Number 7, pp. 37-47.

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. 221p. (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)

**Newspaper articles**

Basler Zeitung, 7 July 2000.

Inter-TASS, 11 May 1996.

Milliyet, 30 May 2000.

Romania Libera, 20-21 April 2002, p. 16.

Sabah, 25 April 2000.

Sabah, 19 August 2002.

Segondya, 4 March 2000.

The Kievskie Vedomosti, 6 March 2000, p. 5.

**ANNEX:1**

# QUESTIONNAIRE FOR JOINT GFCM-BSC WORKSHOP ON ILLEGAL, UNREPORTED AND UNREGULATED FISHING IN THE BLACK SEA

**(25-27February 2013, Istanbul, Turkey)**

**COUNTRY :**

1. Do you have any data or record for IUU fishing in your territorial waters or Exclusive Economic Zone (EEZ)? If so, since when?

2. Please provide the below information on IUU fisheries in your water as much as possible.
   A) Season/months
   B) Areas
   C) Main fishing gear
   D) Average size of fishing boats
   E) Main target species
   F) By catch records
   G) Ghost fishing (abandoned nets)
   H) Estimated revenues of the IUU products
3. Have there been or are there any on-going particular studies on IUU fishing in your country?
4. Do you have any legal measures to reduce IUU fishing in your waters, such as fines, detention of boats or fishing gears?
5. Are coastguards or fisheries authorities well-informed of IUU fisheries?
6. Do you have any monitoring or controlling system for your fishing fleet, such as landing control or assigning on-board observers?
7. What are the social/economical impacts of IUU fishing to your society?
8. How can this problem be solved in your country and also among the Black Sea countries ?
9. If there is an international agreement on IUU fishing in the Black Sea, what is your opinion about it?
10. Which is the structure of your national fishing fleet operating in the Black Sea? Please provide the below information:
    A) Total number of vessels (active and not active):
    B) Number of vessels by
       – length classes
       – main categories of vessel type[2]
       – main categories of fishing gear[3]
    C) Vessels equipped with VMS system or other technologies to track down their fishing activities
11. Is there any national fleet management plans currently in place? If yes, kindly specify the main characteristics of the plan.
12. Any other suggestions and comments?

Thanks for your kind cooperation and contribution!

[2] According to the "International Standard Statistical Classification of Fishery Vessels by Vessel Types (ISSCFV) - ftp://ftp.fao.org/FI/DOCUMENT/cwp/handbook/annex/annexLII.pdf

[3] According to the "International Standard Statistical Classification of Fishing Gear (ISSCFG) - ftp://ftp.fao.org/fi/document/cwp/handbook/annex/AnnexM1fishinggear.pdf