

## REVIEW ARTICLE

# Nature and extent of the illegal, unreported and unregulated (IUU) fishing in the Mediterranean Sea

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### Abstract

Illegal, Unreported and Unregulated (IUU) fishing is one of the serious threats for the sustainable fishing in the entire Mediterranean Sea. Due to IUU fishing, ghost fishing, by-catch, depletion of the fishing stocks, destruction of the benthic ecosystem has been reported. This issue has several social, economic and legal dimensions. Most of the coastal states have IUU fishing practices in the Mediterranean. However, most of them do not necessary record by-catch, ghost fishing and data related fisheries crimes. Purse-seine, trawl and driftnets were most common fishing gears for IUU fishing. Bluefin tuna, swordfish, among benthic species shrimps are the most common target species in the coastal states of the Mediterranean Sea. Most of the by-catch species were cetaceans, sea turtles, seabirds and sharks. Concerted actions and international cooperation are essential to halt IUU fishing. Zero tolerance should be the main concept against IUU fishing. A common black list of IUU fishermen and fishing vessels should be prepared and shared by the riparian states. National fleet management plans and Monitoring, Control and Surveillance (MCS) System should be encouraged by riparian states and GFCM in the entire basin.

**Keywords:** IUU fishing, Mediterranean Sea, monitoring system, fisheries regulations

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### Introduction

The Mediterranean Sea is a semiclosed basin whose connections with other masses of water are through narrow isthmuses such as the Strait of Gibraltar, the Çanakkale (Dardanelles) Strait and the Suez Canal. Overall, the Mediterranean Sea (0.82% of the global oceanic surface) holds 4-18% of all known marine species (~17,000), with a high proportion of endemism. It is also known to be a hot spot of biodiversity with its great variety of marine and coastal habitats wetlands, lagoons, dunes, reefs, seamounts, canyons, sandy and rocky coasts,

which are all important fisheries grounds. There are 21 riparian states along the shores of the Mediterranean Sea. Populations and economic activities are often concentrated therein. In the specific case of fisheries, they are in the Mediterranean Sea, historically and traditionally, of vital importance and provide significant source of food and income. However, several stocks are currently depleted due to overfishing and the rise of IUU fishing in recent years is no stranger to the decline. As a matter of fact, IUU fishing can be currently recognized as a serious threat for the conservation of the marine ecosystems in the Mediterranean Sea and for the sustainable use of living marine resources found therein.

As it is known, the scope of IUU fishing encompasses: (i) 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; (ii) fishing which has not been reported, or has been misreported, to the national authority, in contravention of national laws and regulations and (iii) 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).

The GFCM has addressed issues relating to IUU fishing in a number of occasions over the past decade, always in conformity with the FAO International Plan of Action to Prevent Deter and Eliminate IUU fishing (IPOA-IUU), the very instrument where the above definition was put forth. Accordingly, the GFCM has adopted a step-by-step approach whereby the various dimensions of the issue have been taken into account in a holistic manner. In 2004, when the first workshop on IUU fishing for the Mediterranean was convened by the GFCM, together with the FAO (Swan 2004), it was suggested that the establishment of positive and negative lists of vessels could have represented a first step in the fight against IUU fishing. Also, the creation of a special working group on IUU fishing was advocated. This working group would have ensured follow up on relevant paragraphs in the 2003 Ministerial Declaration of Venice but it never came into existence. Regardless, the GFCM has continued to tackle IUU fishing and several recommendations have been adopted by the Commission to that end (e.g. on port State measures, on VMS, on compliance with GFCM recommendations, *etc.*). Besides, the GFCM has participated in the consultations that led to the adoption of the “2009 FAO Agreement on Port State Measures” and the “2013 FAO Voluntary Guidelines for Flag State Performance” and worked in close collaboration with the FAO in matters linked to IUU fishing.

Irrespective of the existence of these measures, there is presently a need to evaluate more precisely the negative impacts of IUU fishing in the

Mediterranean Sea, such as unfair competition, loss of biodiversity, loss of income and threats it could pose to human lives. At global level INTERPOL has recently launched a project - ProjectScale - to detect, suppress and combat fisheries crimes which threaten food security and livelihoods and can destabilize vulnerable coastal ecosystems. It is expected that, thanks to this and other initiatives, IUU fishing will increasingly draw the attention of the international community bearing in mind that rough estimates of the total loss per year due to IUU fishing worldwide have been reported to vary between \$10 bn and \$23.5 bn annually, representing between 11 and 26 million tons of fish globally (Agnew *et al.* 2009). Decreasing amount of fish caught in global fisheries, oversized fishing fleets and rising demand for fish are accelerating the negative impacts of IUU fishing and making the problem increasingly widespread and profitable for those involved (Flothmann *et al.* 2013).

At regional level, it is particular the socio-economic ramifications of IUU fishing in the Mediterranean Sea that have to be addressed when dealing with this problem. It seems safe to affirm that the nature and extent of the IUU fishing in the Mediterranean Sea is not entirely known at present. It is, however, known that this kind of illegal activities are becoming common practices in recent years and that they are causing a serious stress to the fish stocks in the region, 50% of which are reported to be already overfished (Ye and Cochrane 2011). As far as overexploitation is concerned, it has been reported that across the Mediterranean Sea more than 65% of commercial stocks are fished beyond sustainable limits. Determining who is accountable of what share of this percentage is not exactly fair-weather sailing.

Indeed, Mediterranean coastal states are quite different from each other: some have short coastlines and are engaged generally in small scale fisheries, thus the fishing pressure is relatively weak and IUU fishing remains at low levels. IUU fishing activities is usually carried out in the coastal areas up to 50 meters in this case. It is worth pointing out that these coastal areas are generally covered by the Mediterranean endemic *Posidonia* meadows. Some other countries mainly practice industrial fisheries, thus causing more detrimental effects when IUU fishing occurs. Some species such as bluefin tuna (*Thunnus thynnus*) and dusky grouper (*Epinephelus marginatus*), have been fished to such an extent that they are listed as endangered on the IUCN Red List. Both croaker (*Sciaena umbra*) and shi drum (*Umbrina cirrosa*) have been listed as vulnerable, while European plaice (*Pleuronectes platessa*), Baltic flounder (*Platichthys flesus*), European sea bass (*Dicentrarchus labrax*), white grouper (*Ephinephelus aeneus*), swordfish (*Xiphias gladius*) and Atlantic chub mackerel (*Scomber colias*) are listed as near threatened (Abdul Malak *et al.* 2011). Of 86 shark, ray and chimera species that can be found in the Mediterranean Sea, 15 are critically endangered, nine are endangered, and eight are vulnerable (Abdul Malak *et al.* 2011). Among invertebrates red coral (*Corallum rubrum*) and red shrimp (*Aristeus antennatus* and *Aristomorpha foliacea*) are also known to be illegally

caught. Due to illegal fishing activities, the degradation of large areas of coralligenous species has also been reported by RAC/SPA (2003). Besides, Baulch *et al.* (2013), Ulman *et al.* (2013), Öztürk (2013), Forrest *et al.* (2014) and Vasilakopoulos *et al.* (2014) reported that illegal fishing cause overfishing and threat entire stocks.

In light of the above, it appears evident that fisheries management in the Mediterranean Sea suffers some harmonization problems, which are at times exacerbated by the different nature of political and institutional contexts found in the region. Eight countries, namely Croatia, Cyprus, France, Greece, Italy, Malta, Slovenia, and Spain, are members of the EU and are hence compelled by relevant EU regulations. The rest of the countries have their own fisheries regulations and enforcement procedures although some of them are committing to either apply a number of EU regulations or approximate their bodies of law to them. The common trait of all these countries is that they are Contracting Parties to the GFCM. This represents a great advantage as it gives them the possibility to apply and promote a unique and common fisheries management scheme throughout the Mediterranean Sea. It goes without saying that there is and there will be a constant need of exchange of information and cooperation among all countries in general terms and, in particular, in order to combat IUU activities under the stewardship of the GFCM.

The following information was compiled based on the information contained in several published papers and reports as well as on the basis of the replies provided by participants in the “GFCM Workshops on IUU fishing in the Mediterranean Sea” (Tunis, 3-4 October 2013) to a questionnaire prepared and circulated by the GFCM Secretariat (Appendix C). However, the level and amount of information provided by the counties in the questionnaires submitted varied. This is reflected in the summaries presented in the next section of the report which contain a short evaluation of IUU fishing in each country using pertinent information in the questionnaires. No information is reported on those countries that did not respond to the questionnaire.

## **Evaluation of IUU in riparian countries**

### *1. Albania*

Officially a record on IUU fishing exists which includes the total number of infringements reported in inland waters, aquaculture and marine areas. These water spaces are not treated separately in Albania. As a management structure, the Fishery Directorate communicates with the IMOC Centre (Inter Operational Marine Centre, under the Ministry of Defense) which is endowed of a fishing activity control operation in marine areas in the frame of the national VMS-MCS system. The IMOC Center started to operate in 2010 whereas the VMS-MCS system has been built in a frame of an EU founder project. IUU data is reported to Fishery Directorate. In 2012, several infringements were detected by

the IMOC Centre, such as fishing in forbidden depths in January, February, March, April, July and August. Furthermore, illegal activities in Albanian territorial waters by Greek and Italian fishing boats have been recorded (6 cases in 2012). Fishery authorities involved in controls and inspections are well informed on IUU fishing. Several training courses have been organized to improve their knowledge on the subject. However, no study has been carried out or published in Albania on IUU fishing thus far.

The social and economic impacts of IUU fishing in Albania are complex to assess due to various reasons. Among others, there is a lack of a specific and systematic strategy to combat IUU fishing, including a fleet management plan, solid, professional, well-equipped inspection/control structures, clear legal provisions which are easy to apply, strong communication and collaboration with similar structures in other GFCM Members. Although a central body exists within the Fishery Authority which examines and analyzes all reports regularly, as well as fines and penalties charged after inspections, the authority to be exercised is too fragmented and scattered among national agencies at present.

## *2. Algeria*

The National Frontier Service controls all types of fishing activities within the territorial sea and protected areas as of 2008. Different sets of information are also collected by the Ministry of Fisheries and Fishing Resources at the national level and a number of fishery regulations are currently under consideration. With regard to regulations already in place, most of IUU fishing activities take place during the reproductive period of various species, usually between 1 May and 31 August and at the time of the closing season for swordfish, namely between 1 October and 30 November. These activities are mostly carried out both within and beyond Algerian territorial waters. In the latter case, vessels over 26 m are more likely to commit infringements. There is however no systematic study on IUU fishing in Algeria although sanctions have been laid down in several legal instruments. Algeria coastguard is responsible for overseeing the implementation of these instruments and to take the necessary steps and actions against persons engaged in IUU fishing. They avail themselves, among others, of VMS, which is supposed to be used by trawlers over 12 m in the near future, as well as observers on board for bluefin tuna and control at landing ports. Fishermen are requested to keep records in their logbooks.

A large-scale public awareness campaign is needed to make the fight against IUU fishing more effective and for fishermen to understand why new regulations are enacted by Algeria (e.g. there is a new fisheries management programme which interdicts the construction of new fishing boats as trawlers and purse seiners). Fisheries research should also be conducted for gathering additional data in support of sustainable fisheries while technical enforcement

and legal measures should be regarded as means to achieve better fisheries management.

### 3. *Croatia*

Only Croatian fleet is known to operate in Croatian territorial waters while in the Adriatic Sea small pelagics are mainly exploited by Croatia, Italy and Slovenia and demersal stocks by Italy and Croatia. There has been no fishing vessel flagged to other countries recorded or observed by Croatia in these areas thus far. Because the fishing grounds are exploited by national fleets and are considered to be fully regulated, there have been no studies on IUU fishing in Croatia to date. Legal measures concerning IUU fishing have been harmonized with those under the EU regulations in view of the Croatian accession to the EU. These include fishing fleet register, catch certification scheme, their verification, management plans for specific fishing fleet segments, the control of incoming fisheries consignments and import of fish products (customs, vets, port authorities, fisheries inspectors *etc.*).

The fishing fleet activities, as well as catch, landing and marketing of fishery products in Croatia, is monitored by national authorities under Directorate of Fisheries by the medium of a number of mechanisms, including electronic communications as well as standard logbooks and catch certificates. The introduction of electronic system and links between the databases on licenses, fleet, catches and landings, first buyers, first sales and VMS system, has enabled efficient data cross check. Considering the geographical characteristics of Croatia there are many landing places. This complicates the physical control of catches/landings/sales. To facilitate the on-the-spot control and increase coverage of the inspection activities Croatia has hence adopted an electronic system for detection of the discrepancies between data and potential irregularities. On-the-spot inspections are planned and implemented based on risk analysis and potential number of infringements in relation to landed quantities and/or number of vessels operations in a certain port. To regionally fight against IUU fishing in the Mediterranean Sea, stronger MCS and inspections at sea are needed.

### 4. *Egypt*

In Egypt IUU fishing cases have been consistently reported for the last 5 years. IUU fishing occurs usually from June to October in the territorial sea as well as in waters adjacent to it. Main fishing gears involved in IUU fishing are trawlers and purse seiners, usually boats over 20 m in length. The main target species is shrimp and there is no record for discarded fish. Ghost fishing is not monitored. Revenues of the IUU products are not estimated and there is no on-going study for IUU fishing.

There are legal measures in place against IUU fishing cases, such as suspending licenses for a period of six months (the first time) and revoking the license (the

second time). Records about fines and detained boats are available. Coastguards or fisheries authorities are well-informed on IUU fishing activities and there are observers in the fishing ports and on-board for bluefin tuna fisheries. Exacerbating sanctions, increasing awareness among fishing associations, better surveillance at sea and using VMS, could be promising solutions to mitigate IUU fishing in the Mediterranean Sea.

#### *5. France*

Of the total French catch, 4% came from the Mediterranean Sea in 2010, with 3169 fishermen engaged in this business. All fishing activities are regulated and implemented according to the EU regulations which constitute the applicable legal framework. In the French legal system several issues are further clarified, such as landings, names of the ports, list of the ports national control programmes. No IUU fishing activities in French waters in the Mediterranean Sea have been reported to date.

French fishing boats have several obligations to report, such as catch amount and species, catch date and area, engines of the boats. Besides, fishing boats are monitored by VMS if over 12 m in length, short of some exceptions. AIS system is also obligatory for all fishing boats over 15 m. Controls at sea are essential for ensuring sustainability in fishing. For the bluefin tuna, 100% of landings are subject to controls. Besides, a scientific observer system is also obligatory under relevant ICCAT regulations.

#### *6. Greece*

Data are available for IUU fishing in relation to the activities of Greek fishing vessels in territorial waters. These data have been recorded in a national electronic database since the year 2000 and seem to point to an increasing trend in IUU fisheries during spring, summer and early autumn. IUU fishing activities are scattered throughout Greece and sanctions are charged by the local port authorities. There have been a large number of penalties imposed on fishing vessels berthed in major fishing ports all over the Aegean Sea. Amateur fishers are particularly renowned for incurring in infringements, but also fishing vessels with various gears (except dynamic tools) and bottom trawlers account for a significant share. VMS has proven to be helpful in identifying and demonstrating infringements. Also, there are data available for by-catch in bluefin tuna fisheries, which are included in the bluefin tuna recovery plan. Conversely, there is no data available for other species, for ghost fishing and for estimated revenues of IUU products.

Legal measures to reduce IUU fishing encompass both administrative and criminal sanctions for fisheries offences. The former include fines, temporary or permanent withdrawal of the fishing license, seizure of illegal fishing gear and species. A point system for serious infringements is expected to be enacted before long, in accordance with EU legislation. The entire personnel of Hellenic

Coast Guard is involved in controls. There is also specialized personnel dealing with fisheries inspections. These people know the entire fisheries legislation and are continuously kept apprised on developments through orders and circulars issued by the Administration of the competent Ministries, and furthermore, through organized seminars. There is control in landings at fishing ports as well as mandatory inspection for bluefin tuna. For monitoring purposes of landings, and within the scope of RFMOs recommendations and EU legislation, there are certain designated fishing ports, including for landings by third country vessels, bottom trawlers, longliners, purse seiners and dredges. An observer scheme is applicable for live tuna fishery. There is a national fleet management plan ongoing and a multiannual management plan for purse seiners for small pelagic species (i.e. anchovy and sardine). A multiannual plan for bottom trawlers is in the process of being established. To ensure the effectiveness of these and other measures, fighting IUU activities will require the strengthening of regional cooperation, control mechanisms and technical means, such as patrol vessels.

#### *7. Italy*

Many cases of IUU fishing are yearly reported, including in connection with the use of small nets placed in protected areas in front of estuaries all year around. Also, the illegal selling of IUU catches with longliners is common, including by non-commercial fishermen. No estimate has been made, however, for revenues generated by this and other kind of IUU fishing. Although minimal for a single operation, the total amount of revenues could be considered to be very high. Main fishing gears used in IUU fishing operations are trammel nets and longlines. Lack of control is a recurrent problem linked to IUU fishing in Italy and it is believed that most coastal fish stocks are seriously depleted in most areas. A serious control policy effort, including the involvement of citizens to spot infringements, is needed.

#### *8. Lebanon*

The Lebanese fishing fleet is characterized by being totally artisanal and predominantly made of wood and, to a lesser extent, fiberglass. No data is available for IUU fishing, but this occurrence is known to take place all year around in Lebanon. The current regulations envisage penalties for law infringements that include fines and confiscation of illegal gears. Although the Lebanese Navy and Police are well aware of the national fishery regulations, they also have other tasks to perform which are considered to represent higher priorities than IUU fishing at national level. As far as fisheries authorities are concerned, they are understaffed, not well-trained and ill-equipped. Furthermore, their duties encompass the forestry sector. To solve problems in Lebanon, proper staffing, training and equipping are hence necessary. Appropriately amended regulations, installing local and regional VMS, monitoring of landings and raising awareness of fishermen on the negative impacts of IUU fishing for the sustainability of the resources are also needed.



## 9. *Libya*

There are IUU fishing activities in waters under national jurisdiction, mostly by Libyan flagged vessels, since the 1990's. Trawlers target demersal species while tuna longliners (40-60 m) catch pelagic species. There are legal measures to reduce IUU fishing in Libya and these measures, as stipulated in applicable laws and executive regulations. Controls are enforced by coastguard and usually they ensure surveillance over the coasts. In addition, information on IUU fishing is provided by fishermen and commercial ships to the common central operation center of the marine ports. MCS for tuna fishing fleet is available for Libyan vessels equipped with VMS system.

In spite of the legislation which regulates fishing activities, IUU fishing has been increasing in Libya due to weakness of facilities of coastguard, insufficient awareness of the regulations by fishermen and shortage in personnel training. Issues to be further addressed in Libya include implementation of laws and other regulations, installation of monitoring and controlling systems for the fishing fleet, support to the coastguard with more patrol vessels, completion of infrastructure (ports and harbors) and identification of areas where IUU fishing is operated. Cooperation with all GFCM Members to prevent IUU fishing is urgently needed.

## 10. *Malta*

Maltese authorities have been controlling and managing the Fisheries Management Zone (FMZ) around Malta since its establishment. This was further consolidated as of 2009 with the introduction of VMS for all fishing vessels of 12 m and over. The FMZ covers a 25 mile nautical zone and monitors all the Maltese flagged fishing vessels and third country fishing vessels operating in these waters. Illegal fishing over seasons and months do not show any regular pattern. Penalties were charged in 2012 mostly due to false registration, unreported fishing, fishing in illegal areas, fishing in closed season and illegal retaining of fishery products. Main fishing boats involved were trawlers, tug vessels and sport fishing boats. Maltese authorities control designated and non-designated ports on a 24-hour basis and all landings of bluefin tuna, swordfish, dolphin fish and trawled fish must be notified to the Department of Fisheries and Aquaculture prior to landing. When by-catches are found not to be compliant with current legislation or over the allocated percentages of what is allowable, these are seized by the authorities. There are no records in 2012 related to IUU activities in connection with by-catch. Moreover, there are no records of any ghost fisheries and thus no data can be provided.

All EU legislation related to IUU fishing was transposed into Maltese Law and Maltese authorities have taken all necessary measures to introduce all the relevant actions to prevent, deter and eliminate IUU fishing activities. There are no on-going studies strictly related to IUU activities and no scientific paper has

been published on IUU fishing in the Maltese waters. However, Malta has regular statistics for IUU fishing. The Department of Fisheries and Aquaculture are the designated bodies entrusted with control and management measures related to all fishing activities. The fisheries authorities act in continuous liaison with the armed forces of Malta that hold the same powers of fishery protection officers in order to communicate all related updates required to perform controls over the FMZ. Malta has also a monitoring and controlling system for fishing fleet. Maltese authorities manage the designated ports and landing facilities and also conduct random inspection in non-designated ports. Maltese authorities also assign onboard observers on bluefin tuna longliners as stipulated by EU regulations. Moreover, they have recognized that although the fishing fleet is considered as mainly artisanal in nature and family based, the fines regarding IUU activities may leave irreparable impacts on the well-being of the fishing. Malta is currently in the process of enhancing data validation systems to cross-check VMS, catch, effort and market data, crew data and data related to the community fishing fleet register as well as the verification of licenses and fishing authorizations.

#### 11. *Montenegro*

The national Law on Marine Fisheries and Mariculture recognizes IUU fishing as fishing without a permit, fishing with tools and gear not allowed, fishing in sites not allowed for fishing, as well as fishing juvenile fish. Appropriate misdemeanor or criminal penalty is foreseen for all activities that are not allowed or are prohibited. Catching fish and other aquatic organisms with explosives, electricity, poison or stunning devices is a crime sanctioned by imprisonment. Harmonization of national laws with EU regulations is planned for the upcoming future. Most IUU fishing activities are reported between May and October in the territorial sea. Main fishing gears used in this period are trawlers and purse seines. Main target species are demersal and pelagic fishes. No records exist on by-catch and one of the biggest problems in Montenegro remains fishing with dynamite. No data about estimated revenues of the IUU products are available.

Under the implementation of a 2009 project Montenegro has developed the system of satellite monitoring of fishing vessels bigger than 10 m. The Fishing Monitoring Centre, situated in the premises of the Ministry of Agriculture and Rural Development, receives data on the position of fishing vessels via satellite every two hours. Furthermore, in order to leave the territorial waters, a fishing vessel has to notify the Maritime Safety Administration, the port, customs and police services as well as the Port Master's Office. Administration for Inspection Affairs, together with the Ministry of Agriculture and Rural Development and legitimate fishermen, encourage as many fishermen as possible to be legal and to apply for a fishing license. The Ministry of Agriculture and Rural Development recently issued fishing licenses based on the opinion of the relevant scientific institution (Institute of Marine Biology) on

the amount of fish that can be caught which in turn is decisive to determine the number of vessels for each fishing gear. There is a need for IUU fishing to be more aware. In this regard, it should be stressed that in Montenegro the control of the entire coast is done by four inspectors, who do not own a boat, with the help of the Border Police. Assistance with this kind of equipment would certainly contribute to higher quality and more efficient control.

#### *12. Morocco*

Morocco has been collecting national data for IUU fishing since 1994. These data are easily accessible. Most of the infringements detected concern shrimps and cuttlefish during their reproduction period in a 3 nautical miles zone. Main fishing gear used is trawling. A national control plan and studies have been carried out to estimate revenue of IUU fishing. No data on by-catch and ghost fishing are available. There is an ongoing project to address IUU fishing under a national plan. There are also several legal measures and, accordingly, statistics for detained boats and fines. Coastguards or fisheries authorities are knowledgeable in connection with IUU fishing and are trained in workshops regularly. There is also a monitoring or controlling system for fishing fleet and a central observation system for fishermen. During bluefin tuna fishing, an observer is always on board. Landing controls are also effectively done for each fishing port in all regions of Morocco.

The social and economic impacts of IUU fishing in Morocco are under study. IUU problems can be solved only by educating fishermen and decision makers, developing new methods (such as new information systems), data collection centers and bilateral and regional cooperation. National fleet information is recorded by the Fisheries Department, with all the characteristics and in all harbors along the Atlantic and Mediterranean coasts of Morocco. The Fisheries Department also follows the development of newly constructed fishing boats as of 1992, operations for the reduction of the fishing nets and the management of fishing effort.

#### *13. Slovenia*

The Slovenian Fisheries Inspection Unit performs inspections at sea in accordance with EU regulations. During these inspections no IUU fishing by Slovenian fishermen or fishermen of other nationalities has been detected in any season or time for the time being. No on-going IUU study in Slovenia is currently planned. To mitigate IUU fishing through legal measures fines have been applied. Enforcement measures, accompanying sanctions and the confiscation of illegally acquired goods have been prescribed as well. Also, the EU legislation in this field is applied directly in Slovenia. Fines, enforcement measures and sanctions for fisheries in general are also prescribed in the National Marine Fisheries Act, including the possibility of detention of boats and fishing gears.

Coastguards or fisheries authorities are well-informed on IUU fishing and they are also informed by other competent or cooperating authorities, such as the Ministry of Agriculture and the Environment and the Customs Administration of the Republic of Slovenia. Furthermore, they have been informed through participation in discussions during the preparation of the relevant legislation at the EU level and Slovenian national legislation and they have participated in a number of workshops organized by the European Fisheries Control Agency (EFCA). Controls of landings are performed regularly. Landing control proceeds in accordance with the sampling plan which has been prepared pursuant to relevant EU regulations.

#### 14. *Spain*

There are no IUU cases reported in the Spanish territorial waters or the EEZ. In any case, Spain supports any mechanism that identifies those involved in IUU fishing, including vessels listed in the EU IUU list or any RFMO IUU list. No scientific paper on IUU fishing has been published thus far. However, several documents and studies were carried out internally to ensure the implementation of EC Regulation 1005/2008. In addition, Spain has begun to enact laws against IUU fishing since 2002, thus it has great experience in the domain and remains open to any concrete proposal that could be made in the future. The actions undertaken by the Spanish Secretary General on Fisheries to control IUU fishing activities have proven adequate, such as documentation control, mandatory and on the spot (at ports). All fishing vessels are subject to very strict control measures. The control is double: 1) vessels must have an e-logbook or logbook (depending on their size), 2) inspections are duly performed. Also, VMS is installed on vessels over 12 m. There is an ongoing national fleet management plan. It is foreseen that fishing effort will be diminished thanks to this measure for at least 10% of units, with an additional reduction of fishing effort of 20% for bottom trawlers. This can help sustainable management of fishing activities in order to ensure the preservation of small pelagics and demersal species. Ad hoc measures exist at national level for bluefin tuna, swordfish and by-catch.

IUU fishing is considered as one of the worst threats to the sustainable exploitation of marine living resources. According to Spain, the socio-economic cost of IUU fishing is very high and IUU fishing must be fought with commitment. To this end, EU regulations must be applied and multilaterally additional measures have to be agreed upon. One option that could be considered is that of trying to take into account provisions in relevant EU regulations, so that they can inform the adoption of measures in other fora. The Mediterranean Sea could be a pilot area to do this, bearing in mind that there is no one size fits all formula to solve the problem of IUU fishing. Cooperation and mutual understanding are needed for: addressing lack of data, low reliability of focal points providing data, no prompt responses from third countries in matters pertaining to the trade of fishery products, ignorance on regulations in place, lack of enforcement at national level to punish infringements, lack of

uniform standards among countries, forging of documents and import of products without the required documentation.

#### 15. *Tunisia*

Tunisian and foreign vessels have been reported in recent years to have engaged in IUU fishing in the Gulf of Gabes, mainly in summer with small boats for benthic species. There are some studies on IUU fishing in Tunisia that can be retrieved online ([www.faocopemed.org](http://www.faocopemed.org), [www.webmanagercenter.com](http://www.webmanagercenter.com), [www.apal.nat.tn](http://www.apal.nat.tn)). There is a 1994 law in Tunisia concerning IUU fishing which has been consistently applied ever since. Coastguards receive training on IUU. There is also a boat observation system for bluefin tuna and landing control at fishing ports.

The impact of IUU fishing is detrimental in many ways, such as depleting the resources, diminishing income of fishermen and reducing biodiversity. This is a global problem and needs international plans of action against IUU fishing, management of the resources, promoting artificial reefs and new fishing management methods, among others. Technical support to the Tunisian government with capacity building for fishermen and stakeholders is also needed.

#### 16. *Turkey*

In Turkey, under the authority of the Ministry of Food, Agriculture and Livestock, data recording has been carried out by the Fisheries Information System (FIS) which comprises a combination of resources organized to collect, process, transmit, and disseminate the fisheries relevant data. The different components of the FIS are catch information, sales notes, VMS, Fishery Port Offices and Fisheries Coastal Structures. Also based on these data IUU fishing is observed both in open and closed fishing seasons. The most common IUU fishing activities are violation of minimum catch size and illegal fishing gear usage. Main illegal fishing gear observed in inspection and control practices is mono and multifilament fishing net which has been banned since 2011. Average size of fishing boats engaged in IUU fisheries is usually below 12 m. The Ministry of Food, Agriculture and Rural Affairs has carried out scientific research activities on IUU fishing in cooperation with universities and research institutions. The national laws specify infringements, violations and fines to be applied. The fishing licenses of 134 vessels were revoked because of violation of regulations in force in 2012.

Coastguards and fisheries authorities are well-informed on IUU fishing. MCS practices are conducted by the Coast Guard Command at sea and by fisheries inspectors of Provincial Directorates under the coordination of the General Directorate of Fisheries and Aquaculture on landing sites. MCS is possible via satellite based VMS for vessels over 15 m AIS for vessels over 12 m. Nevertheless, weak implementation of the fisheries law is one of the

impediments to combat IUU fishing in the Turkish part of the Aegean and Mediterranean Sea. There is a fishing management plan currently ongoing in Turkey. Among others, fishing licenses have not been issued for marine vessels since 2002 in order to reduce catch stress on stocks and to maintain sustainable fisheries. Additionally, a new support scheme was taken into effect in Turkey for the reduction of the number of fishing vessels over 12 m. The fishing license of 407 vessels over 12 m are to be annulled and removed from fleet in 2013.

### **Impacts of IUU fishing**

#### *Main species affected by IUU fishing*

Several fish and invertebrate species are affected by IUU fishing in the Mediterranean Sea. In Turkey, albacore, red mullet, sea bream, frigate mackerel, bluefin tuna, little tunny, Atlantic bonito and cuttlefish have been reported. In Morocco, sparid fish, shrimps, octopus and cuttlefish have been reported. In Italy, swordfish, mullet, striped bream, sea bass, gilthead bream have been reported. It could be presumed that similar information is available in other countries although it should not be ruled out that other species could be negatively affected by IUU fishing, also in light of problems linked to by-catch and ghost fishing.

#### *Fishing gear and fleets for target fishes*

For bluefin tuna, the main fishing gear used in all coastal States is purse seine. For demersal fish and invertebrate species, it is bottom trawler. For clam fishing, dredge is the main gear. For swordfish and some scombrids, the main gear is driftnet but also monofilament nets. As far as nets are concerned, the problem of the use of illegal driftnets in several GFCM Members has been reported several times.

Fishing with illegal fishing gears in the Mediterranean Sea remains one of the most serious problems considering the impacts they can have. Increasingly modern and efficient fishing methods have significant effect on several species. In addition, increase in vessel engine power, size of the gear and vessels, development in fishing gear and fishing net technology, development in electronic devices and easy application to the fishing practices, all have contributed to the decline of aquatic stocks. Purse seining, trawling, longlines, driftnets and set nets are main gears illegally used in most areas of the Mediterranean Sea when fishing seasons are closed. Trawling is generally recognized as a particularly destructive practice for the benthic communities. It severely alters deepwater coral ecosystems, sea grass meadows and their associated fauna, reducing both the number of species and available habitats (UNEP/MAP 2012).

### *Social, economic and environmental impacts of IUU fishing in the Mediterranean Sea*

IUU fishing is undoubtedly one of the reasons for the over-exploitation of the fishing resources in the Mediterranean Sea and for the unfair competition among fishermen. Estimations of the exact economic damage caused by IUU fishing, both in terms of loss of revenues and impacts on the marine living resources and the marine ecosystems, cannot be easily made. However, in general, IUU fishing in the Mediterranean Sea brings the following to the fore:

- 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 and injuries in general.

Furthermore, IUU fishing causes ghost fisheries (abandoned nets) and by-catch in the Mediterranean Sea. Existing statistics cannot be considered to elaborate solid management plans for both target species and by-catch species.

Effects and impacts of illegal fishing practices to marine life in the Mediterranean Sea are various depending on the fishing gear, season, and area. For example, deep trawling has impacts on sea grass beds and gives physical damages, destroy benthic community and habitat loss for many species, such as endemic sponges *Axinella cannabina* and other species. Elasmobranch species are known to have characteristics such as slow growing and late maturation, low fecundity. It is known that many populations of elasmobranch species are declining in the Mediterranean Sea due to illegal fishing, overfishing and by-catch, mostly white sharks and sting rays. IUU fishing also damages vulnerable habitats by the use of prohibited fishing gears, mainly for clam harvesting. Illegal clam dredging creates destructive effects on the soft bottom communities and siltation which is harmful for macro and meio benthos. Besides, illegal and unreported bivalve fishing, due to their marketing, may cause fatal consequences for human being when toxic plankton bloom occurs.

### *By-catch*

By-catch of the non-target species in the Mediterranean Sea concerns the following: seabirds, mainly Mediterranean shag and the Audouin's gull, which have high mortality rates mostly because of driftnets and long lines; the loggerhead turtle *Caretta caretta* and green turtle *Chelonia mydas*, which suffer from the use of bottom trawling and set nets and, to a lesser extent, of surface longlines employed for swordfish; cetaceans, most commonly the striped dolphin *Stenella coeruleoalba*, common dolphin *Delphinus delphis*, sperm whale *Physeter catodon* and fin whale *Balaenoptera physalus*. The main root

cause of by-catch are illegal driftnets (Di Natale *et al.* 1993; Öztürk *et al.* 2001; Tudela *et al.* 2005; Notarbartolo di Sciara and Birkun 2010; Akjol *et al.* 2012).

To reduce by-catch of non-target species, including those above, some recommendations have been adopted by international bodies and legal measures have been implemented. According to resolutions 44/ 225 and 46/ 215 adopted in 1989 and 1991 by the General Assembly of the United Nations, a moratorium on all large-scale pelagic driftnet fishing was agreed at global level. In 1992, the EU prohibited driftnet fishing in the Mediterranean Sea with nets longer than 2,5 km in length, as did the GFCM in 1997 under a binding resolution. The same decision was adopted by ICCAT. All fishing activities outside this legal framework are tantamount to IUU fishing. IUU fishing and the use of illegal driftnets in the Mediterranean Sea are hence closely interrelated.

In the past few years, an increasing number of cetacean by-catch has been reported. At first it was noted as an increasing number of cetacean strandings especially in the Ligurian Sea. It was also noted that an increasing proportion of stranded cetaceans showed the evidence of entanglement in netting (net fragments or scars, or missing tails; Notarbartolo di Sciara and Birkun 2010). Sperm whales, perhaps due to their size or feeding habits (they are deep divers) are rarely reported in driftnets. It should not be discarded that illegal, large scale driftnets are still used in several Mediterranean areas at present.

#### *Ghost fisheries*

IUU fishing sometimes cause ghost fisheries when fishermen abandon their nets in the sea and try to escape at the sight of patrolling coast guards or other relevant authorities. Released nets can 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 threat not only for marine life itself. As a matter of fact, after a certain period, nets start sinking or floating on the sea surface, then became a threat for marine transportation, mostly when they are engulfed in ship propellers at night. Fast speed boats suffer extensively by such floating nets in the Mediterranean Sea. Besides, these nets are washed up to the shores and cause pollution on the beach.

#### **Legislation issues of IUU fishing**

There are some legislations and regulations in force for EU Members Mediterranean riparian States relating to the fight against IUU fishing. New regulations of the EU since 2010 oblige them to ensure that fishery imports into the EU are from legal sources (i.e. Council Regulation (EC) No. 1005/2008 of 29 September 2008 establishing a Community system to prevent, deter and eliminate illegal, unreported and unregulated fishing, 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). Some other countries on the other hand are still to develop very detailed rules against IUU fishing. However, there is a positive trend overall as GFCM Members are either striving to enact legislation of their own or are, in a number of instances, approximating their laws to relevant EU regulations.

At present there is no uniform legal framework for all riparian States, short of GFCM recommendations. GFCM hence remains the only organization that can manage and regulate IUU fishing the entire Mediterranean Sea. Other organizations, such as ICCAT, might have a mandate only on given species, and global agencies, including the FAO, are focusing their attention on developing instruments which subsequently call for a transposition at regional level. The opportunity of having the GFCM as a point of reference in the region is unique for all countries in the east, west, north or south of the basin. However, GFCM Members should commit not only to agree on additional measures to fight IUU fishing in the future, but also to submit those data which could be already used in the fight against IUU in accordance with relevant GFCM recommendations (e.g. 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”). Their reactivity would significantly contribute to underpin concerted actions at regional level.

### **A proposed roadmap to fight against IUU fishing in the Mediterranean Sea**

According to the information submitted by GFCM Members in their questionnaires, there are few studies carried out on IUU fishing. This lacuna should be filled by launching studies, possibly with a standardized and harmonized method. Some countries do have records of by-catch and ghost fisheries while others do not have any data. The problem of IUU data should also be tackled in a standardized and harmonized manner.

Nonetheless, the very incidence of IUU fishing in the Mediterranean Sea reveals that there are some gaps in fisheries management at regional level. An accurate identification of these gaps, including on the basis of studies and data, could enormously help in addressing IUU fishing in the short term with the cooperation of all riparian States which, at present, demonstrate to possess a strong willingness to stamp out IUU fishing. It is important that this willingness triggers a zero tolerance policy towards IUU fishing activities in the long term. A number of actions should be proposed and advocated through the GFCM to make sure that a strategy is devised to steer the transition from the short to the long term. A participatory and down-to-earth option could be that of developing a roadmap to fight IUU fishing in the Mediterranean Sea comprised of the following aspects:

- (i) Institutional aspects,
- (ii) Legal aspects,

- (iii) Scientific research aspects,
- (iv) Technical aspects,
- (v) Socio-economic and education aspects, and
- (vi) MCS related aspects.

The proposed roadmap should be considered as a basis for future undertakings to be launched within the remit of the GFCM which would require strong political commitment from its Members. Among others, a regional plan of action to fight IUU fishing could be developed and adopted on the basis of the roadmap, consistent with the FAO practice. This would allow GFCM Members to tailor responses adequate for a problem, that of IUU fishing, which in the Mediterranean Sea has very peculiar traits due to the specificities of the region. For that purpose, all the aspects identified above would have to be considered as IUU in the Mediterranean Sea also has, if not predominantly, a human dimension.

Insufficient information on fishing fleet and weak implementation of port states controls are among major impediments that contribute to IUU fishing in some Mediterranean coastal states. Bluefin tuna stocks, by far the most commercially valuable species in the region, are depleted and there is need to reduce fishing effort and to elaborate and implement robust and efficient recovery plans. Creating incentives for fishermen could help.

Besides, sustainable aquaculture from eggs of the bluefin tuna should be promoted in riparian states of the Mediterranean Sea which are engaged in bluefin tuna industry. This aquaculture can be one of the solutions for stock recovery while at the same time it can mitigate IUU fishing in the Mediterranean Sea, if done properly. They have succeeded over the last ten years in breeding bluefin tuna in Japan. It is also known that some European companies already have started experiments and thrived in breeding bluefin tuna. The GFCM, through its Committee of Aquaculture, should evaluate this progress in near future as a new viable option to be pursued by the aquaculture sector in the Mediterranean Sea.

Small pelagic species, like anchovy and sardines, are shared stocks and cannot be managed properly without regional cooperation. A distinction of the small scale fisheries and industrial fisheries will have to be made though, bearing in mind that the latter, particularly in the case of purseiners and deep trawlers, often times cloak IUU fishing activities. Accordingly, traditional and historical fishing methods, such as dalianis, harpooning, traditional sponge and coral diving, which are known to be practiced in small scale fisheries, should be more promoted.

Although IUU fishing mainly impacts on marine living resources, the damage that it does to the marine ecosystems should not be overlooked altogether. Area based management tools, such as the designation of Marine Protected Areas

(MPAs), need to be supported by countries because most of them provide stringent protection measures and their implementation could be straightforwardly assessed. The GFCM, based also on recent memoranda of understanding it had adopted, could avail itself of the cooperation of UNEP-MAP, ACCOBAMS and MedPAN to tackle this issue.

Establishing a special working group on IUU fishing under the GFCM umbrella was already discussed in 2004. This initiative should be re-activated and updated so that GFCM Members could launch concerted action against IUU fishing on the basis of the roadmap. Moreover, this group should prepare a yearly report to the GFCM Compliance Committee, not only for the Mediterranean Sea but also for the Black Sea, including achievements, progress, difficulties, impediments *etc.* In order for the group to perform, it should be open to a vast array of actors, including NGOs and fishermen associations, not to mention representatives of regional and international organizations. Improving market control and traceability mechanisms and stop the trade of IUU products could be, among other subjects, considered in this forum. Consequently, the working group could contribute to ensure that controls are performed from the net to the plate.

Awareness campaigns, such as a special day for IUU fishing in the Mediterranean Sea, should be promoted. Inspiration could be drawn from the “Clean up the Med” campaign. This could help to investigate the reasons or excuses used by fishermen when concealing IUU activities. Similarly, socioeconomic studies should be commissioned. In this respect, GFCM Members should avail themselves of the established Sub-Committee on Scientific and Economic Sciences (SCESS) of the Scientific Advisory Committee. This is yet another instance of the fact that institutional settings and fora already exist and the time has come for countries to making best use of them. With a view of promoting positive messages, slow food and marine stewardship initiatives should be encouraged so that consumers become more cautious and selective when they purchase seafood and the role of traceability is boosted. Such an effort will require the strong participation of civil society organizations and fishermen associations at the same time.

Capacity building and training will remain a top priority in the years to come, with particular reference to MCS. Combating IUU fishing activities in a number of GFCM Members is made exceedingly difficult by capacity gaps at present. Recently, the EU, in order to make as effective as possible its recent regulations relating to IUU fishing, has landed significant assistance to third countries, including through regional seminars and multilateral and bilateral meetings. DG MARE has been collaborating with DG DEVCO actions to assist developing countries and has launched several capacity building programs. Regardless, if one of the main goals of the EU is to give widespread legitimacy to its groundbreaking legal instruments, and have third countries cooperating in the fight

against IUU fishing, a major effort should be done to make that possible in the Mediterranean Sea. There is possibly no better playground than the Mediterranean Sea to test the feasibility of modern anti-IUU policies for many reasons. And arguably, there is no better organization than an FAO commission to steer countries with different backgrounds and levels of capacity toward reaching a common end.

As the EU, including through its relevant agencies (i.e. EFCA and EMSA), is not the only institution keen to enhance capacity building and promote sustainable development, others would be also welcome to step up to the plate. In recent times participatory approaches, which call upon all components of the society, have proven to be more efficient than traditional top-down approaches. There is significant scope for agencies, civil society organizations and various entities to provide technical assistance in the Mediterranean basin. Among others, and looking back at fruitful initiatives already undertaken in the past, the Japan International Cooperation Agency (JICA), the PEW Charitable Trust, the Marine Stewardship Council, WWF, Oceana and the GEF are worth mentioning. Also, organizations such as the IMO, CITES, UNDP and UNODC could be GFCM partners in launching training seminars on various issues of mutual interest. A recent initiative which is worth mentioning, namely the INTERPOL Environmental Crime Programme based “ProjectScale”, could be of great help in shedding light on a concept, that of fisheries crimes, which is still partly unknown. After all, when looking at the bigger picture the ramifications of IUU fishing in the Mediterranean Sea could be staggering. It suffices to mention the issue of migration which at times is made possible from one shore of the Mediterranean to the other because fishing boats are used for purposes other than fishing. It will be important that any measures taken at regional level to mitigate IUU fishing in the Mediterranean Sea will be conceived as preventive in nature. At least some countries such as Croatia, Turkey, Algeria, and Spain have reported that they are going to reduce their fishing fleets and not allow to build new fishing boats in order to protect fishing resources and grounds. This policy should be followed by other States with the support of scientific advice and data by GFCM to reduce the overall fishing effort in the Mediterranean Sea. Attention should be paid in turn to the number of fishing vessels operating in the region. Based on the replies to the questionnaires, the number of fishing vessels reported, both active and not active, is given in Table 1. Fishing vessels include trawlers, midwater trawlers, purse seiners and small scale longliners, polyvalent small scale vessels without engine and hooks. Interestingly, there are some discrepancies between what was reported through the questionnaires and the info submitted officially to the GFCM Secretariat in connection with the regional fleet register.

As there could well be other fishing vessels, operating under flags different than those of GFCM Members, preventive would have to be also any initiative aimed at improving cooperation with non GFCM Members. If known to fish in the

Mediterranean Sea their flagged vessels would be by definition engaging in IUU fishing. In this connection, it is important to recall the clear wording used in Article 8 (paragraphs 3 and 4 in particular) of the 1995 United Nations Fish Stocks Agreement, which has 81 Contracting Parties at the moment of writing, including major fishing nations. Either membership of cooperating non Contracting Party status are mandatory for those countries whose vessels are known to fishing in an area under the mandate of an RFMO.

**Table 1.** Number of fishing boats in 2013 reported by each country in the Mediterranean Sea

<b>Country</b>	<b>Number of fishing boats</b>
Albania	501
Algeria	4,167
Croatia	7,770
Egypt	3,082
France	1,483
Greece	15,920
Italy	12,691
Lebanon	2,762
Libya	4,621
Malta	1,076
Montenegro	19
Morocco	3,463
Slovenia	175
Spain	2,861
Tunisia	11,990
Turkey	9,307

### **Fishing by non-GFCM members in the Mediterranean Sea**

The presence of non-GFCM Members in the Mediterranean Sea has not been discussed much thus far. There might be several reasons behind that, including the possible lack of knowledge on GFCM activities outside the area of competence of the Commission, as well as the lack of data. However, the situation could be bound to change in the near future. The GFCM, at its 37<sup>th</sup> Session (Croatia, May 2013), has adopted forms of letters of identification for both its Members and non-Members which would be sent by the Compliance Committee in cases of non-compliance. Therefore, the Compliance Committee is expected to take action in the future, based on any possible information that will be brought to its attention concerning the presence of non-GFCM Members fishing in the Mediterranean Sea.

It is worth underlying that the lack of data does not automatically imply absence of non-GFCM Members fishing in the Mediterranean Sea altogether. For instance, some ICCAT Members were attributed a quota for bluefin tuna in the Eastern Atlantic and Mediterranean in 2013 (Table 2). Obviously, their bluefin tuna catch could come entirely from the Eastern Atlantic and not from the Mediterranean Sea. Still, ICCAT databases show that in the past some small amounts of quota from non-GFCM Members were actually caught in the Mediterranean Sea. As small as these amounts could be, compared to that of Mediterranean states which are both ICCAT and GFCM Members, the negative consequences of fishing in the area of competence under the mandate of an RFMO to which the fishing state is not a party to should not be disregarded.

**Table 2.** BFT 2013 allocation scheme for non-GFCM Members in the Eastern Atlantic and Mediterranean

<b>CPC</b>	<b>Quota (t)</b>	<b>%</b>
China	38.19	0.2850
Chinese Taipei	41.29	0.3082
Iceland	30.97	0.2311
Korea	80.53	0.6010
Norway	30.97	0.2311
Total	221.95	1.6564

Aranda *et al.* (2010) made specific reference to the presence of non-GFCM Members in the Mediterranean Sea engaged in tuna fishing in the past. Among others, they reported the presence of a Korean purse seiner vessel which was operating in the Maltese EEZ in 2008. Jolly (2012) reported that two non-Mediterranean fleets (one Chinese and the other of unknown origin) were recently spotted in some of the main Mediterranean bluefin tuna fishing grounds. Leaving aside any value judgment on the matter, as the GFCM through its Compliance Committee will have to collect information and decide whether or not it is enough to approach a given non-GFCM Member, the current legal reality and structure imposes on fishing States to either become Members or cooperating Parties to those RMFOs with a mandate over a marine area where they fish. It is a matter of fairness in addition to legal certainty. In the future science could be perhaps used to underpin legal certainty thanks, for instance, to the progress that has been made in genetics for analysing gene sequences of certain species. Analysing DNA of tuna and verifying where tuna species, whales or sturgeons were caught could be an important and effective method against false trade reporting. DNA testing techniques could be hence used for the better understanding of the sources of the fish illegally caught in the Mediterranean Sea and further reinforce the prevention of trade in IUU fishing products.

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## Akdeniz'de yasadışı, kayıtdışı ve kural­sız (YKK) balıkçılığın incelenmesi

### Özet

Yasadışı, kayıt dışı ve kural­sız balıkçılık (YKK) bütün Akdeniz için önemli bir tehdit haline gelmiştir. Bu avcılık sırasında hayalet avcılık, hedef dışı avcılık, balık stoklarında düşüş ve bentik ekosisteme zarar verme gibi olgular ortaya çıkmaktadır. Ayrıca konunun sosyal, hukuki ve ekonomik boyutları da vardır. Gırgır, Trol ve Dip Sürütme ağları en çok (YKK) yapan balıkçı takımları olup orkinos, kılıç ve bentik türlerden karides en fazla hedef türlerdir. Ayrıca, yunus ve balinalar, deniz kaplumbağaları, deniz kuşları ve köpek balıkları en fazla hedef dışı türlerdir. YKK'yi azaltmak için uluslararası işbirliği, ortak eylem ve sıfır tolerans ana tema olmalıdır. Bu tür avcılığa ve gemilere karşı ortak bir siyah liste hazırlanarak kıyıdaş ülkelerce paylaşılmalıdır. Kıyasal devletler ve GFCM tarafından ulusal filo yönetim planı, izleme, denetleme ve gözleme sisteminin teşvik edilmesi de gerekmektedir.

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