



# TRANSITION TO RESPONSIBLE RECREATIONAL FISHING

**Editors**

Vahdet Ünal   Cem Orkun Kırac

June 2013  
Underwater Research Society



# **TRANSITION TO RESPONSIBLE RECREATIONAL FISHING**

Conscious recreational fishing is the future of our seas

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# DEVELOPING OF RESPONSIBLE RECREATIONAL FISHING IN TURKEY KAŞ PILOT PROJECT





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## PREFACE

I am very pleased to observe that some operational principles declared by Food and Agriculture Organization of the United Nations' Committee on Fisheries and Aquaculture in terms of sustaining and operating the fishing resources take place in this study. Moreover, "Responsible Fishing Principles" adopted by many developed countries have also been included into this study as well. I am very content that all related stakeholders about recreational fishing will benefit from it. I extend my sincere gratitude to the ones who put effort in completing this book.

I believe that this study will contribute to the conservation and sustainable operation of fishing resources; create a very positive effect upon the related groups of people and a substantial awareness in the society about the issue.

I hope that this study will be acknowledged as a true guide for "recreational fishermen" whose importance and numbers are increasing day by day in our country.

**Dr.Durali Koçak**

*General Director of Fisheries and Aquaculture*

## A PREFACE FROM A RESPONSIBLE RECREATIONAL FISHERMAN

I read the draft of this book several times during the preparation stage of it. It was written with the help of valuable academics and with the views, suggestions and critics of the stakeholders who took part at the three workshop activities of the project. Some chapters (marine and coastal biodiversity, marine and coastal habitats, fishing methods and their impacts on the ecosystem) in the book may seem irrelevant to recreational fishermen at first sight. Some may find it unnecessary and even boring. But I myself as a responsible recreational fisherman who devoted many years of my life to this hobby find this information given in this book straight to the point. In this way, people who has intentions to read this book will learn the issues they didn't know before about the seas and fishing.

As it is mentioned in the book, better texts can be written in time and they are always welcome. However, at this moment, I believe that this study contains and delivers the message properly. I hope that Responsible Recreational Fishermen will like this book. As a Responsible Recreational Fisherman, I have done my fair share of the work in terms of sharing the content of this book with my friends and I do it again. This project certainly targets the illegal spearfishing more than anything, but its scope covers all branches, specifically the recreational fishing.

First of all, I want to emphasize that recreational fishing as a sector contributes billions of dollars to their national economies all around the world and US is one of the first countries in line. As it comes to Turkey, our potential is no more no less than other countries. I think the authorities should take this sector which is able to create billion dollar economies in many countries in the world very seriously in our country as well, specially in the regions that include the seas, lakes, dams and rivers.

In order to conserve the marine ecosystem and fulfil the requirements of sustainable fishing in the long run, some changes are expected from the recreational fishermen and these changes are defined within the scope of "Responsible Recreational Fishermen Project". I strongly believe that the same kind of responsibility should be carried by central and local administrative authorities too. Their full contribution will no doubt accelerate the process.

Being concious and licenced, responsible recreational fishermen should report their catch to the local authorities and have their say about the decisions made for our freshwaters and our seas. They should also be rewarded with plaquets or cups presented by related authorities as they prove worthy for some categories. In this way, responsible recreational fishermen should be encouraged to remain as they are and conscious.

In order to prevent the piling Responsible Recreational Fishermen into certain places at large fishing areas, some derelict areas that have been occupied without a licence, surrounded by barbed wired or left aside unattended in our fresh water and coastal areas should be repaired and presented to the use of recreational fishermen without damaging nature with concrete constructions.

As the responsible recreational fishermen are expected to change their behaviour in favour of nature and be responsible for it, local officials are also expected to build infrastructure for the needs of recreational fishermen and to check illegal fishing much more and effectively. Some of the expectations can be cited in here as the following: piers that can help many fishermen going fishing simultaneously, clean and handy toilets and fountains, large trash boxes that wild animals cannot knock down, containers for recycling materials, controlled incineration houses, picnic and park areas for the ones who wishes to visit the area with their families and to camp using tents, some officers who serve for the guests and protect the consturctions and infrastructure and the like.

This developing community that contributes to the national economy in terms of promotion of the area; buying and selling of fishing and camping equipments, food and fuel consumption definitely deserve to be taken into consideration by local administrations.

NGOs and civil businesses should be supported for gaining rights to operate such fishing areas including the areas in the national parks.

The surroundings of detached fishing areas should be open to recreational activities with moderate eco-friendly stopovers. These recreation areas should provide information on the local fish population and remind the visitors the rules of recreational fishing.

Responsible Recreational Fishermen can contribute to the data collection by reporting the fishes they caught during their camping period. The reports can include the fishing periods, the number of caught fishes, their weighs and species. Such information could be submitted to the related web page of the ministry via a link in which required details are explained. In this way, recreational fishermen have a chance to be a part of finding out about the fish diversity of Turkish waters, which will eventually help sustaining the fish stocks.

Rather than "prohibiting" the areas, a different kind of approach should be adopted. Fishing areas are currently being managed by prohibitions as they read "PROHIBITED AREA, NO TRESSPASSING, NO FISHING, NO FISHING IN THE NATIONAL PARK etc." We need to change this approach as soon as possible. Instead of "PROHIBITED" we need to write "NO TRESSPASSING WITHOUT ALLOWANCE OR WITHOUT LICENCE" or "HERE IS NOT A FISHING AREA". I believe that such expressions are much more constructive and appealing. This is how hunters and fishermen feel about those signs and I think a positive approach is a better way to earn their attention.

Some areas are "prohibited" to the citizens of the Turkish Republic without any scientific base and some official institutions conserve such areas and preserve their status, but their members do fishing this kind of places themselves. Such attitudes are considered selfish and arbitrary. Prohibitions should apply to all members of society and to all institutions.

Consequently, as a person who does recreational fishing passionately for 40 years, I strongly believe that recreational fishing in Turkey should be practiced consciously and responsibly. This project "Developing Responsible Recreational Fishing", which is administered by Underwater Research Society, is the first of its kind in our country and I consider it as a solid opportunity to handle our problems not only by recreational fishermen but by all stakeholders.

We, the Responsible Recreational Fishermen, believe that a change basing itself on science is a must in our sector. We will be together in this struggle tomorrow as we are today; we will work shoulder to shoulder to gain back what we have lost.

A friend of Environment, a writer of fishing on an internet forum

**M.Talip GİRGİN**

*June 2013, İğneada*



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As it is very well known, having good ideas for projects and showing perseverance to implement them are not always enough to get tangible results and become successful. But for the financial support of Global Environmental Facility-Small Grants Programme and MedPAN Foundation, this project would not have been carried into effect. In this respect, we would like to extend our deepest gratitude to both of the organizations and especially to Mr. Gökmen ARGUN of GEF-SGP coordinator, and to Marianne ROMANI and Marianne LANG of MedPAN, the executives. We also extend our sincere appreciations to DEV Advertising Agency and Rahim YURDAKUL for their time and patience in the course of the design and publication of this book.

Our thanks to the Ministry of Food, Agriculture and Livestock – General Directorate of Fisheries and Aquatics and its director Dr. Durali KOÇAK and the president of Fishery and Control Department, Turgay TÜRKYILMAZ, and the staff members Mahmut AKYÜREK, Hamdi ARPA and all others; and our thanks to Kaş Port Authority, Municipality of Kaş, and the Coast Guard. This book, an important output of the project, was reduced by Prof Dr. Zafer TOSUNOĞLU and Dr. Ejbel ÇIRA DURUER; we received invaluable contributions of Gülay ÖZDEMİR and Ecem Tuğçe GÖKER; we owe you a debt of gratitude.

With this very first study in this area of expertise, we hope to serve for the improvement of recreational fishing. Our best wishes are always with our country, nature and seas.

**Nesimi Ozan Veryeri**

*Project Director*

*SAD-EKOG*

*May 2013, Karaburun, İzmir*

## 01 INTRODUCTION



Amateur fishing is a passion. © Barış Göker

Fishing has two main categories all over the world: one is commercial and the other is recreational. Commercial fishing is responsible for the much larger part of the total catch yield. There is a common view that fishermen who fish with trawling, purse seiner, dragging nets and long liners have shares both in overfishing and eco-system deterioration. On the other hand, in recent years recreational fishing has been making an immense impact on some species in some areas. That is pretty much evident through the disputes emerged among the groups who profit from the sea.

Today, recreational fishing is performed by a lot of people who either fish from the shore, or do near-shore fishing with boat, or do speargunfishing or fish with traps of a variety of angle types. And yet, it is not possible to suggest that recreational fishing is anywhere near to the attention of the current administration or of scientific research. In Turkey, little is done on amateur fishing in comparison to the studies still continuing for the rest fishing activities. Administrators spend more time on commercial fishing and its problems. Ministry of Food, Agriculture and Livestock (MoFAL), Coast Guard Command (CGC), and Gendarmerie Command are responsible of every fishing activity to be performed in compliance with the set rules and regulations and their work mainly concentrate on commercial fishing. As for Recreational fishing, controlling, checking and monitoring activities of these official bodies are much less efficient in comparison to the ones they do for commercial fishing. There is no data collection, therefore, there is no analysis of any data available on any matter. This being the case, it can easily be said that recreational fishing is left aside and remained unattended.

Recreational fishing is accepted as a recreational activity with which many people enjoy their time, get away from their stressful daily routines, do sports, integrate with nature by learning living creatures. They may even learn the basics of seamanship. Besides, those hobby groups who do recreational fishing spend a considerable amount of money for it.

Studies carried on in Europe, the USA, Canada and Australia show that recreational fishing is performed by millions of people in those countries creating a huge economy. In the first decade of the 21st century, studies prove that recreational fishing makes an economy of 25 billion Euros in Europe, 6.7 billion Euros in Canada, and 2 billion Euros in Australia. In accordance with American Recreational Fishing Union's 2002 statistics, there are 14 million people who do fishing expeditions 93 million times a year in the sea. In accordance with 2010 data, recreational fishing created an economy of 50 billion dollars in the United States of America (NMFS,2011). Unfortunately, there are no similar statistics available for Turkey. Because the compulsory licencing for recreational fishing is not applied in Turkey, it is not known how many people do recreational fishing, therefore, no assumptions can be made as to how recreational fishing contributes to the economy, likewise the data or studies on recreational fishing are rarely available especially in terms of its impact on fish stocks and the ecosystem. Anyone can take a fishing line or a speargun and do recreational fishing on the shore, on a boat or underwater. Recreational fishermen did not need to report to any authority either about the species they fish, or the numbers of fish they caught, or their fishing time and place. As well as there is an official bulletin prepared in detail about the procedures and principles of recreational fishing, which in itself can be considered as an important development, the bulletin alone is not enough to manage recreational fishing. Ethics and regulations of recreational fishing is still unknown. Eventhough recreational fishermen's selling their catch is clearly stated "illegal" in the bulletin, there are still many recreational fishermen who see no problem with it and they ironically behave this way by saying they only do recreational fishing. Another wrong attitude is that the fish caught by the recreational fishermen find buyers and consumers.

In fact, recreational fishermen have responsibilities as to the fish they catch, to the environment in which they do fishing, to other traditional fishermen and to the present rules and regulations. By ignoring their responsibilities, recreational fishermen harm both themselves and the ecosystem on which the community is dependent. Given the reasons above, a totally new approach to recreational fishing should be adopted. Such an approach should consider the ecosystem holistically and help make recreational fishing activities managable. Most important of all, it should focus on changing the behaviour of the recreational fishermen. The main target is a sustainable ecosystem and sustainable recreational fishing. Within the limits of this main target, it might be necessary to revise or perhaps redefine the current recreational fishing and recreational fisherman definitions. In this project, the concepts of "responsible recreational fishing" and "responsible recreational fisherman" have been developed to address this need of redefinition and the issue itself is the the subject matter of this book.

It is hoped that this book is acknowledged by recreational fishermen first and then by decision makers, by NGOs, by business owners that provide material and equipment for recreational fishing, by associations, by clubs, by administrators who are responsible for management and practices of fisheries, and by scientists as an aid and a complementary resource to the "bulletin that regulates fisheries for recreational purposes". The adoption and longevity of the book is both depended on the periodical updating and developing of its content and on wide-spreading the concept and the practices of responsible fishing. The mission belongs to all of the stakeholders and especially to the related ministries, recreational fishing associations, NGOs and Universities.

The scope of "The Project for Developing Responsible Fishing in Turkey" includes sea fishing only, therefore, in this book, inland waters are not the subject of this study. In accordance with the scope of the project, study subjects were picked up as sea creatures and sea fishing. This book is a guide and a subsidiary tool in terms of understanding the impacts of recreational fishing, reducing such impacts to minimum and presenting best practices. On the other hand, General Directorate of Fisheries should definitely develop new politics for recreational fishing and have recreational fishermen abide by the rules and regulations with similar tools and methods cited in the bulletin as to fisheries by recreational fishers.

## 02 DEFINITION OF RECREATIONAL FISHERMEN



**RESPONSIBLE**  
AMATEUR FISHING

In order to achieve the concept of an ideal recreational fisherman, establishing a *consciousness to become a responsible recreational fisherman* is very important. In order to do that, the term *responsible recreational fishing* needs to be well defined. Therefore, in this chapter, the concepts of "*Recreational Fishing*", and "*Responsible Recreational Fisherman*" are defined as the followings

**Recreational Fishing:** Recreational fishing is an activity which is done only for recreational or sportive purposes. It is deprived of any pursuit of profit or commercial gain as the fish caught is never sold. (General Directorate of Fisheries and Aquaculture, the definition in the Bulletin)

**Recreational Fishing:** Recreational fishing is an activity that utilizes live fisheries in the sea. The sale and trade of this fish is prohibited. Recreational fishing is comprised of two groups: leisure and sportive. Traditional fishing tourism (*pescaturismo*) that is practiced in countries like Italy and France in the Mediterranean is outside the definition of recreational fishing due to its commercial nature (GFCM definition).

**Recreational Fisherman:** Recreational fishing is a kind of fisheries in which fish caught are not consumed as primary food by the fisher, and the fish is not caught for commercial purposes like export, local trade or blackmarket. It is usually difficult to clarify the fine line between the recreational fishing and commercial fishing. On the other hand, creating a source of income by doing recreational fishing definitely crosses that fine line. The most wide-spread recreational fishing technique in the world is line fishing, therefore, recreational fishing usually becomes the synonym of recreational line fishing (EIFAC and FAO definitions)

**Responsible Recreational Fisherman:** A Responsible Recreational Fisherman not only follows the legislations and regulations but also knows about the fishing ethics and acts in favour of reducing the impact of recreational fishing, which is being done by masses all around the world. In other words, a responsible recreational fisherman becomes a pioneering fisherman by setting a good example and goes beyond the written rules for the good of nature.

An recreational fisherman is certainly obliged to follow the rules and regulations, but what is really expected from an eco-friendly recreational fisherman is to become much more knowledgeable and aware than an recreational fisherman who simply follows the rules word by word. Going beyond just following the rules, a responsible recreational fisherman should be able to develop sensitivity for the sea and coastal ecosystem and keep his impact to the minimum. This being the case, we have a new type of recreational fisherman in the world, and it coins the term responsible recreational fisherman.

A Responsible Recreational Fisherman (RAF) is a hunter who does fishing as pasttime and relaxation activity such as a hobby; he is a person who never sells, exchange or make profit from the fisheries he caught, in other words, he acts in compliance with the "bulletin that regulates fisheries for recreational purposes". Moreover, a RAF is a fisherman who knows well about the marine living creatures, the basics of a marine ecosystem, the impact of his fishing upon the ecosystem even if he follows the recreational fishing rules; he is able to interpret his nature observations to better understand the very ecosystem he fishes in. And a RAF is a hunter who does not push his regulated and allowed limits so as to reduce the possible harm he causes to the ecosystem and when necessary, he prefers to fish below his regulated limits. A RAF is a hunter who feels responsible for marine conservation and informs others about the ethics and principles of knowledgeable, aware (in other words, conscious) and responsible recreational fishing.



### 03 WHY IS IT IMPORTANT TO JOIN RESPONSIBLE RECREATIONAL FISHERY?



Common seabreams. Fishing limits are defined as to what species are fished in what amounts in kilograms, the limits are also defined as to the numbers of fishes, their dimensions and the place where the fishing takes place. © N.Ozan Veryeri / SAD-EKOG

It is stated that the catches of recreational fishing covers more than 10% of the overall fish hunt in the Mediterranean. The number of recreational fishermen has reached up to a significant level both in the world and in our country. The total negative impact of recreational fishing activities, regardless of being large or small, can no longer be considered little. So today all scientists and stakeholders unanimously agree upon the perceivable impact of recreational fishing both on fish stocks and marine/coastal ecosystems. On the other hand, recreational fishing is a very preferable activity in that people do sports in a natural, clean and healthy environment; they learn and love about the sea and have a nice pastime. Given the attributions, it is no surprise that recreational fishing creates a sizable economy.

It is obvious that we need to find solutions and implement those solutions in order to reduce the accumulative and negative impacts of recreational fishing over marine ecosystems and fish stocks. This being the case, one of the cures that pops in the mind is to make every individual who do recreational fishing get closer to the higher level of an ideal fisherman. And to do this, it is first and foremost necessary that principles of ideal recreational fishing are clearly set. In other words, recreational fishing should be done within the framework of some principles and ethics based upon stakeholders' views and scientific studies. For a fisherman who embraces these principles of an ideal fisherman, we designate him as a "responsible recreational fisherman", and for aiming to get closer to this ideal, we coin the term "responsible recreational fishing", which is a very new approach in our country. Spreading out the concept of recreational fishing into every related component in the community should be our final goal. In this way, the total negative impact of millions of recreational fishermen upon marine ecosystem will be reduced to minimum. The most important step to reach this goal is to have, if possible, all recreational fishermen comprehend, adopt and implement the principles of "responsible recreational fishing".

Our approach in this book is not to explain to our recreational fishermen about the rules and regulations of fishing. Our objectives are to focus on the rudiments of responsible recreational fishing, to explain the basics of marine ecosystems and the sea, to translate the correlation between over/ illegal fishing and fish stocks, and to suggest some "behavioural changes for some fishermen" in the path of "being a responsible recreational fisherman" who are able to think of the overall picture beyond the limits of regulations.

Only when this approach is well understood and adopted among the recreational fishermen, then we will achieve some standards for sustainable recreational fishing, this is, in fact, what we are totally aware of. With our project "Developing Responsible Recreational Fishing in Turkey", we have sown the seeds of our efforts in changing the behaviour of fishermen to make them responsible recreational fishermen. Our suggestions to changing fishermen's behaviours have been put forward with this book, and we believe, it will serve as a resource for generations to come. In chapter 16, the principles of "Responsible Recreational Fishing" have been written down in detail and in collaboration with veteran recreational fishermen who are very competent and experienced in their field, with academics from our universities, with some experts and with NGO representatives specialized in fishing.

Every fisherman should comprehend and develop an understanding about the present deteriorations in the ecosystem. He should take one step further from the regulations to be able to decide on when and how to reduce his own individual fishing impact upon the environment with the given conditions of the marine life. He should be sensitive enough to act this way and he must knowingly show the maximum care for the endangered marine species of whose fishing is banned. If we can make all of it happen, a massive and tangible change in recreational fishing will occur in our country as well. Therefore, participating to the implementation of responsible recreational fishing is very much important. It is crucial that all of the stakeholders and especially recreational fishermen comprehend the importance of this participation and give their support accordingly.

In the meantime, we have recognised a fact in the course of the project that every stakeholder (first and foremost General Directorate of Fisheries and Aquaculture, authorized official institutions, NGOs for recreational fishermen, fishing equipment sellers, NGOs for nature conservation, academics and fishing experts) shows a lot of interest and fully support this new concept. We think that it is the sign of a new and a good beginning. Knowing that there will be better versions of this book in the future and there will be updated prints of it. We know that starting is the most important stage in completing a mission. With this edition, we believe that we have shed a light to the matter for the first time and helped start the stakeholders' participation in completing the mission of achieving "responsible recreational fishing" in our country.

## 04 MANAGEMENT OF RECREATIONAL FISHING

### 4.1. Traditional approach

From the traditional point of view, the essentials of traditional management of recreational fishing comprise conservation and sustainability. For the target species and their environment, there are some tools to be used for the protection of their environment and their survival (FAO,2002; Hindson et.al, 2005). Area prohibitions, seasonal prohibitions, species and size prohibitions and daily fishing limits are defined in accordance with scientific studies and past experiences. So the species that needs protection can be efficiently conserved.

**Area Prohibitions** are implemented in ecologically critical areas that serve for the survival of all species, especially where fish reproduce and juvenile fish grow. There could be temporary prohibitions in the areas where the stocks decline due to overfishing.

**Seasonal Prohibitions** are implemented through fishing bans during spawning periods.

**Species Prohibitions** are of the banning the catch of the endangered fish species, the ecologically valuable species and the species that are artificially released into a fish source for a special purpose. These bans could either be permanent or temporary.

**Size Prohibitions** aim to give the fish a chance to reproduce at least once, minimum fish size is the definition of a size that a fish reaches to after it has reproduced at least once. In some cases, it is possible that only broodfish or some certain sexes are prohibited.



Marine activities and site plan of Kaş-Kekova Specially Protected Area in terms of amateur fishing and underwater hunting. © 2013 SAD-EKOG



**Limitations for Fishing Quantities** are either seasonal or daily. The amount is determined so as not to endanger the continuity of the fish population. The number of hunters is also needed to be limited on the grounds that daily limits per person should be calculated by dividing the capacity into the number of hunters (FAO,2012).

An recreational fishing document that is given after a training or an examination help us achieve mainly two very important gains: firstly, the rules are clearly presented to the attention of every fisherman, and secondly, records are kept to help monitor the number of fishermen and the amount of the fish caught. You can name this document as a licence or a certificate, in fact, they are the most important tools of fisheries management. These documents may differ from one country to another as countries have different water sources. For example, In Germany, every recreational fisherman has to obtain an recreational fisherman licence. There is a special kind of licencing for inland waters. The licence is designed according to the needs of that specific water source. In the USA, recreational fishing licences are composed of several groups in many States. There are lifetime licences as well as temporary licenses. Simpler licenses and pioneering fisherman licences are defined in a different category (Anonymous,2013).

## 4.2. Current Approach (Ecosystem-based Approach)

Today, both in the management of commercial and recreational fishing, the management strategies are built upon an ecosystem-based approach. In fact, the demands of fishermen can only be met by protecting the balance in the ecosystem and all kinds of fishing methods can be continued only when the users are in harmony with it.

The main goal of fisheries management is sustainability and there are biological, ecological, socio-cultural, economic and even institutional dimensions of it. Regulations and precautions in pursuit of sustainability should base themselves upon the most current and globally acclaimed scientific studies. On the other hand, one cannot show the lack of scientific studies or their not being sufficient to suggest solutions for the current problems as an excuse so as not to implement action plans or take precautions.

The most widespread management strategy is to limit the amount and effort of fishing (input and output control). Implementations for habitat and stock enhancement in recreational fishing are widespread in many countries. Those practices are especially seen in inland waters.

In Turkey, there is no licencing, therefore, no limitation for recreational hunters. Anyone can do surface fishing, shore fishing or underwater fishing with spearguns. Moreover, fishermen can use any type of traps and angles. However, daily catch limits are restricted to 5 kg per recreational fisherman. For some species, the number of fishes to be caught are restricted. But the number of recreational fishermen is not restricted. Everyday, thousands, hundred thousands or even millions of recreational fishermen could catch 5 kg fish at a time. In other words, the impacts upon fish stocks will vary with regard to the number of recreational fishermen who fish that day. Recreational fisheries management cannot be performed without knowing how many people do recreational fishing, how and with what tools they fish and what species they target.

Recreational fishing activities are regulated with rules through a bulletin issued by General Directorate of Fisheries and Aquaculture which works under the administration of Ministry of Food, Agriculture and Livestock. The bulletin that regulates the recreational fishing contains the items of regulations that every recreational fisherman should know and comply with.

However, this bulletin by itself cannot provide grounds for the full management of recreational fishing. In fact, management is not only about rules and regulations. In order to manage recreational fishing, some important tasks need to be performed by the Ministry of Food, Agriculture and Livestock and the General Directorate of Fisheries and Aquaculture. They are the official authorities responsible in managing fisheries pursuant to Fisheries Law numbered 1380, in other words, guaranteeing a sustainable usage of live aquatic sources are solely under the responsibility and authority of this ministry and its directorate.

In order to achieve an efficient recreational fishing management, there should be data collection, data analysis, planning and implementation steps done with appropriate methods. Moreover, it is necessary to administrate some enforcements to control the behaviours of recreational fisherman and other stakeholders today and in the future. While such tasks are performed as administrative issues, there are also important tasks awaiting the universities and recreational fishing associations. But the largest responsibility of all belongs to the "responsible recreational fisherman" himself, in other words, to you!



A sound marine ecosystem is a guarantee for sustainable fishing. © N.Ozan Veryeri / SAD-EKOG



Turkey is long a member of General Fisheries Commission for the Mediterranean, a commission established in 1949. In 2010, the organization hosted a workshop in Spain. The resolutions of the workshop indicated some important points as to the problems of recreational fishing, its management and its future in the Mediterranean. It was outstanding that one of the biggest problems in terms of management was the lack of data and the other one was the weakness of controls and sanctions. A Turkish delegation did join the sessions and an official report was issued unanimously citing a list of immediate actions to be taken in the management of recreational fishing. Here is the list:

- Licencing procedure will begin in order to determine the number of active recreational fishermen
- For the fishing gears used in recreational fishing (passive fishing gears such as baskets and pinters will be banned), limitations will come into force
- For the suitable and prepared areas, closed season and closed area practices will be implemented.
- Appropriate penalties will be enforced in accordance with the degree of violations.
- The amount of fish caught will be limited (apart from the limitations in the amount of total catch, there will also be limitations for the daily catch of some vulnerable species).
- Fishing of some species will totally be banned
- A monitoring system will be established for recreational fishing
- There will be limitations in the fishing workforce (in the fishing efforts)
- Studies will be carried on building the "Ethics and Principles for Recreational Fishermen" by every nation
- Research and Development activities will be enhanced
- Importance will be attached to interactions with other sectors (like tourism)
- Awareness, training and promotion activities will be carried out in regard to recreational fishermen
- A proactive management approach will be adopted and potential impacts of new fishing gears upon the environment and fishing will be detected.
- Indirect impacts of recreational fishing will be detected



A school of Leerfish (*Lichia amia*) © N. O. Veryeri / SAD-EKOG

## Ecosystem-based Fisheries Management

An ecosystem is defined as a unified whole in which living organisms are in constant relationship with one and other, and they live in one specific area surrounded by a non-living environment. Every component of an ecosystem is inter-related, therefore, deteriorating any one of those components can result in cases that may never recover. Once the balance of the ecosystem is broken, it may not be possible to make it back on track. We need to acknowledge that ecosystems are much more complex than we comprehend now and tomorrow. This very point of view is embraced by many ecologists.

Many sectors, but first and foremost, the fishing sector, are benefitting from the marine ecosystems, and this is the reason why the ecosystem is damaged in many ways. Parallel to the technologic advancements, fishing sector too has developed too and living marine organisms have begun to be exploited more rapidly. In time, structural and functional organization of the marine ecosystem was deteriorated. Conflicts between the benefiting sectors (commercial fishermen, aquaculture businesses, recreational fishermen, transportation, military, and users in tourism etc.) were increased and fishing became no longer profitable. On these grounds, there emerged more rational and more extensive new fisheries management approaches. Current management approaches could not cope with overfishing and remained unsuccessful in facilitating "sustainability" due to the fact that they focused only on traditional management tools (mesh width, fish size, regulating the fishing seasons etc.) and on the protection of a single or several species.



A content and responsible amateur fisher. © M.Tahir Gürkan

Ecosystem based fisheries management (EBFM) is a management strategy that tries to guarantee a sustainable usage of sources despite of possible changes and uncertainties in an ecosystem. This strategy suggests immense contributions to the current approaches of fisheries managements. EBFM targets to regulate human activities in an attempt to conserve biological diversity, habitats and key species, which consequently provides a sustainable ecosystem in the long run.

With this management type, the borders of different ecosystems need to be detected and defined, and these differences have to be taken into consideration when managing the area. There are several tools that are used in achieving the goals of EBFM. Along with traditional management tools, EBFM tools are : establishing Marine Conservation Areas and Reserved Areas, an active usage of qualitative and traditional information, and sharp limits to entering into the fishing sector.

EBFM cannot sort out all of the problems derived of fisheries management. Should there be no marine conservation areas, research, checking, deterring penalties, monitoring programs and most importantly no political consistency, EBFM could never be effective in putting a halt to this negative ongoing and problems with fishing. In order to achieve sustainable fishing, we need to protect the biological diversity and keep the ecosystem healthy in terms of its functionality and structures. The path to reach a healthy ecosystem and sustainable fishing is paved with preparing management plans that adopt an ecosystem-based approach, and with establishing marine conservation areas and making a real time conservation of them. The issue is not simply drawing up conservation areas on a map. When we fish as responsible recreational fishermen, we can definitely contribute to the sustainability of recreational fishing and marine ecosystems in the long run by being considerate enough to care for the objectives of EBFM.

A responsible fisherman's better understanding of an ecosystem and his constant revision of his own behaviours to cause the minimum harm is vitally important as to the sustainability of fishing. To achieve this goal, a responsible fisherman should learn about the ecosystem and its components in the first place. So you will find a brief information about these subjects in the chapters to come.



## 05 MARINE AND COASTAL BIOLOGICAL DIVERSITY

### 5.1 Algae and Phytoplanktons

Algae, the first link of food chain in the sea, use sunlight to produce their own food. These organisms are primary producers and placed at the lowest layer of the food pyramid. They generate the essential nutrients to the consuming organisms of the upper layers. Algae, without roots, stems or leaves as body parts, are not real plants, therefore, they reproduce with spores, not with seeds. Body forms of algae can be very different; they comprise both monocellular and multi-cellular species longer than 50 meters. Their spread reaches beneath 300 meters in the oceans. Many of the multi-cellular algae types have developed body parts to hold onto grounds. These species can live on the surface of the water down to the underwater areas where light penetrates to the maximum. Monocellular algae do not need to hold onto grounds, they are not dependent on coasts, therefore, monocellular algae can live in the open seas and oceans. Monocellular algae, in other words, phytoplanktons, are much more in numbers in the world as compared to the number of multicellular algae. When their oxygen and food production via photosynthesis is considered, the importance attached to monocellular algae in the food chain is very obvious.

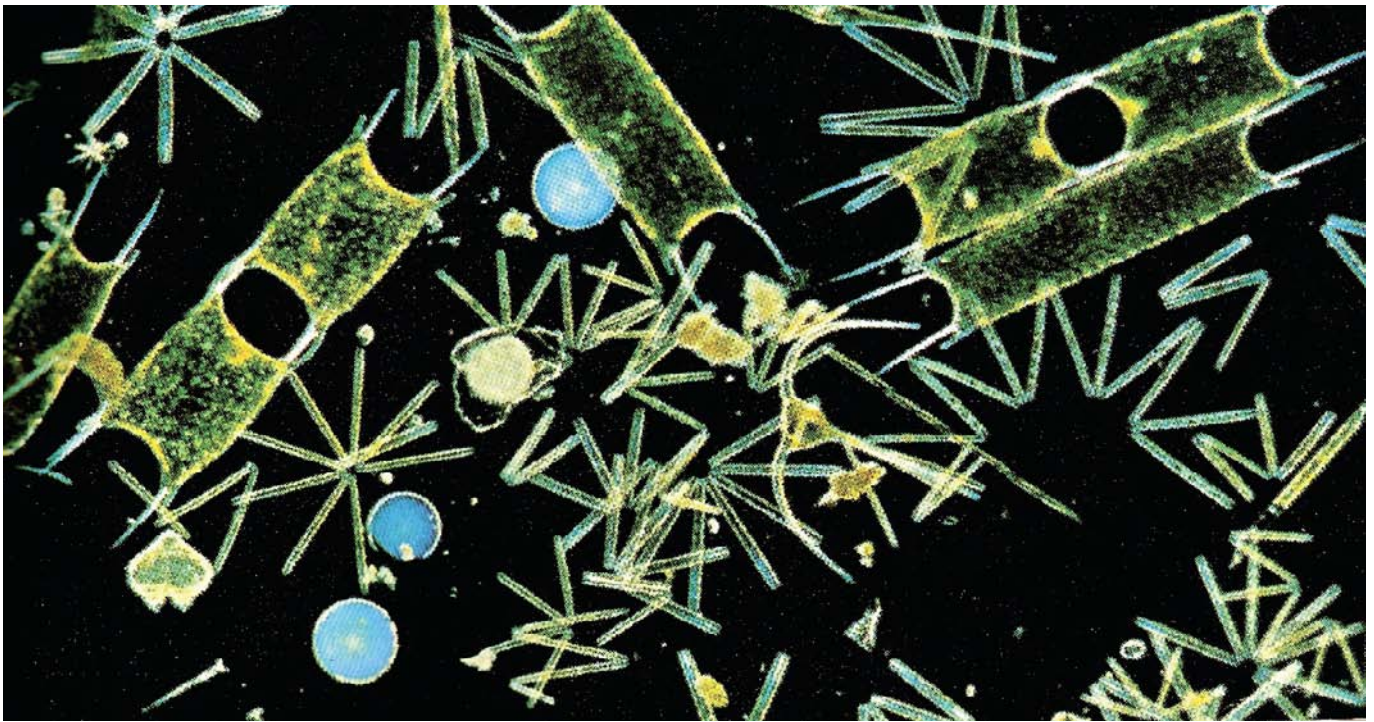


Figure 1: Phytoplanktons are very important marine organisms that make up the first link of the marine food web.

Algae are incredibly sensitive to the food salts like nitrate and phosphate available in the sea waters in limited amounts. The increases in the the concentration of food salts result in over-reproduction of some species in the upper layers of the sea, which can divide themselves very fast . This occasion is called algae bloom and it causes a colorization of the sea water, decreasing the amount of penetrating light. This leads to a massive death of algae holding onto grounds because they cannot get enough light. Such environmental disasters caused by algae blooms are seen very often in the areas polluted by domestic and industrial wastes. The intense algae masses occuring because of plankton blooms and sticking on the nets are called "saliva" by our fishermen.



## 5.2 Seagrass (sea meadows): True Plants

Plant species are generally called seagrasses. They are the true flowering plants that have evolved to turn back to the seas from the land. Unlike algae, they have specialized body parts like roots, stems and leaves. They flower and generate seeds by pollinating, like land plants. On the coastline of our country, there are local species: *Posidonia oceanica*, *Cymodocea nodosa*, *Zostera marina* and *Zostera noltii*, as well as migrating species like Redsea-based *Halophila stipulacea*.

Due to their access ability into rotten organic matter underneath the sand by means of their roots, they have more advantages in finding food salt (nutrients) in comparison to algae whose only source is seawater. However, since they need sandy grounds to hold on, they have disadvantages in comparison to algae that can live upon any kind of solid ground. This is the reason why algae populations emerge seasonally related to the water temprature and food salt amounts whereas the seagrasses make up masses of them on sand with their fixed roots.

Seagrasses, primary producers in the food chain like algae, make very important protection areas over marine organisms with their long-leaved, wide spread, intensive masses along with making good by generating food and oxygen for them. Seagrass masses that locate in the protective coastal areas are very crucial for the larvae and juvenile fishes of many fish species.



Figure 2: A general view of a seagrass bed (*Posidonia oceanica*). It is a flowering plant, a well-known one among other sea meadows. © Banş Akçalı / DEU-DBTE

The growth and reproduction of seagrasses take place totally underwater. Their leaves and roots are made of water columns. With these columns, they take in food salts and inorganic carbon necessary for their growth from the ground like land plants do. The dispersion of polens occur by the help of currents. The visible parts of seagrasses upon the sediment are made of sprouts or of 3-10 vertical leave bunches. Sprouts are tied to rhizoms (vertically and/or horizontally) that crawls inside or above the sediment.

### Seagrass:

*Posidonia oceanica*, in other words seagrass, is a species that lives only in the Mediterranean. Seagrasses spread widely upon large areas on the coasts of bays and the surroundings of islands, but they are negatively affected by the over usage of coasts and housing as it is the case in recent years. Marine flowering plants have fewer species than sea weeds, but they are in the front line in the Mediterranean ecosystem as they constitute large masses. Seagrasses have a special place among the other sea plants due to their organs like their roots, stems, leaves and flowers, all of which are very different than seaweeds'.

Seagrass, *Posidonia oceanica*, spreads from shallow waters down to 40 meters below the surface in our country. Economically and ecologically, it is a very important species for the following reasons: its roots prevent erosion on the shore and underwater; through the photosynthesis it makes, it produces oxygen for the marine life; it builds up an environment in which fish and other marine organisms live, breed and find food; it makes the first link of the food chain. In recent studies, economic benefits that seagrasses provide to the ecosystem are calculated as 15.837 Euros per hectar and this figure, all in all, is larger than agricultural areas. With these ecological and biological features cited above and their functions equal to forests on lands, seagrasses are a life source for marine ecosystems. Conservation of this organism and cultivating efforts in the areas where the species damaged are some of the precautions that have been taken to increase the areas the species spread. Sea plants have very important functions in marine life, therefore, they must be conserved precisely.

Today, in many European countries like France, Italy and Spain, the species is on the list of endangered species in marine conservation areas.



Figure 3: Leaves of a seagrass (*Posidonia oceanica*), a very important component of marine ecosystem with regard to its generating oxygen and its making both a shelter and food for juvenile fishes. © Barış Akçalı / DEÜ-DBTE



### Ecological importance of Seagrass

*Posidonia oceanica*, in other words seagrasses, are the oxygen sources for the sea as they generate oxygen through the photosynthesis they make in the depths, the essential need of marine organisms. It was confirmed that a seagrass bed that covers an area of 1 meter square produces 10 liters of oxygen. They also trap carbon to be used in the process of photosynthesis. Carbondioxide in the atmosphere causes a global climate change and the use of carbon just like the forests do on land reduces the ratio of carbon. And seagrasses are nothing but prerequisites in the food chain of fish. They create a suitable environment for organisms to live in. 1 meter square plant mass at sea creates a 10 to 15 meter square area for algae. Due to its rhizoms and root structures, it holds the surface of the soil tightly and prevents the erosion occurring in the sea. Thus, the plant is ecologically very important.

This seagrass species spread in the Mediterranean, in salty and clean waters at the tempratures between 11C – 29C. Along with their sprout reproduction, sexual reproduction is possible too when in appropriate conditions. Flowering usually happens in September and October. The fruit leaves the plant when ripe. By its ability to swim along, it pops above the sea surface. A ripe fruit is about the size of an olive. A *Posidonia oceanica* bed takes years to become.

Seagrass beds spread over the ground like a net because of the horizontal development of the species' stems. Rips and deformations of this net occur through the damages caused by anchors, dredges, trawls, dynamite and the like. In this case, the growth of the seabed will stop, the damaged area will widen, the recovery will begin later. Since the species grows very slowly, recovery of the damaged area will take a long time. Sometimes, such areas may never recover due to environmental factors. Moreover, when environmental impact is intense, the length of leaves shortens and density of the meadow lessens.

Boat propellers and anchors create rips on seabeds and cause some gaps. The size of such rips vary in accordance with the type and dimension of the gear. *P.oceanica*, has the longest life span among other species, but its growth is the slowest. Even the anchors of small boats has impacts upon them. The more the boats use the dense seagrass areas, the faster their negative impacts increase in the years to come.

### 5.3. Zooplankton

The second link of the food chain is the zooplankton that include the larvae of the monocellular and multicellular animals. The size of the species in the category of zooplanktons vary from 2 micron the minimum (nanoplankton) to 20 cm the maximum (example:jellyfish). Like zooplanktons, the transfer of zooplanktons happens by means of currents rather than their own moves. Zooplanktons are the primary nutrients of many fish and some sea mammals.



Figure 4: A zooplankton



Figure 5 Shrimps (*Penaeus semisulcatus*) are very valuable species in the market. They are crustaceans. © Zafer Tosunoğlu/EÜ-SÜF



## 5.4. Invertebrates

Octopuses, squids, shrimps, lobsters and crabs are examples of invertebrate marine organisms.

Shrimps are in the class of crustaceans. They live in the European seas and in the coasts of North America. The species has a cylindrical body and long antennae. Their body is covered by an armor made of calcium carbonate. Its body is articulated. It swims backwards by wiping its flapper like a tail. The species lives in inland waters, lays their eggs and keeps them between their walking legs. Marine shrimps develop their eggs upon their back and release them into water before they slit open.

Shrimps are ten-legged arthropods that can live in both seawater and freshwater. Their size vary from 1 cm to 30 cm. There are seven genres of shrimps. The most wide-spread ones are Crangonidae. They have 5 pairs of legs, and at least two pairs of them have pincers. The species' tail is noticable and looks like a fan. Its antenea has two pairs, very long and forked.



Figure 6 Octopus vulgaris, a very wide-spread octopus (a cephalopod) in our county, and yet they are under pressure of illegal and overfishing © Murat Draman / KASAD



## 5.5 Fish (bony and cartilaginous Fishes)

Fishes are vertebrates and divided into two groups: *bony fishes* and *cartilaginous fishes*.

There are 450 fish species live in our country. Many of them belong to the group of bony fishes whereas 60 of them are shark species (in other words, cartilaginous fishes).

Examples of bony fishes can be groupers, turbot, soles, seabreams, seabasses, dentexes, bluefish, anchovies and mackerels.

Examples of cartilaginous fishes can be basking sharks, great white sharks, sandbar sharks and ray species.

There are 2 main categories of fish in accordance with where they live. Pelagic fishes live in the water column that is close to the surface, in other words, they live in upper parts of water, in coastal waters and open seas. Pelagic fishes do not live in areas that are connected to or next to the bottom. They live in schools. Examples are as the followings; silversides, anchovies, sardines, horse mackerels, bonitos and bluefin tunas.



Figure 7: A turbot (*Psetta maxima*), a demersal fish. © Luc Viatour [www.lucnix.be](http://www.lucnix.be)



On the other hand, the fishes living at the bottom or close to bottom are called demersal fishes. Demersal fishes are dependent on the sea bottom, they cannot live swimming in a mass of water, nor can they swim long distances. Examples of demersal fishes are groupers, dentexes, seabreams, brown meager, soles, sturgeons and turbot.



Figure 8: A grouper (*Epinephelus marginatus*) is a bony and a demersal fish. The species is on the brink of extinction in places where heavy illegal speargunfishing continues. According to IUCN studies, responsible recreational fishermen and restaurants that sell those fishes and consumers need to be conscious and help save this species in collaboration. © Murat Draman / SAD-EKOG



Figure 9: A sandbar shark (*Carcharias plumbeus*) in our waters, a cartilaginous fish. The species is seen in only 3 countries in the whole Mediterranean Basin. And in Turkey, the species is only seen in Boncuk cove in Gökova Bay. © Cem O. Kırac/SAD-EKOG

In the course of becoming a Responsible Recreational Fisherman and getting closer to the ideal recreational fisherman, one has to know more about the fish. In this book, we are going to cover 4 points as we consider them very important.

1. Distinguishing the Species (knowing the species of the caught fish)
2. The Minimum breeding length of the fish (the length of fish as they reach sexual maturity)
3. Sexuality changes of a fish as it grows old (hermaphroditism)
4. Occupying marine organisms (unwanted aquatic organisms)

1. First and foremost, every recreational fisherman should be aware of what they do as a pastime activity. It demands a heavy responsibility for marine organisms. Fishermen need to learn about the marine species as much as possible, in fact, they need to know them well. Otherwise, a "responsible recreational fisherman" can never distinguish the species that fall outside of his fishing goals and/or the species that are critical in the environment, and in the end, he becomes unable to do what he should do. There are many source publications in our country available with fish photographs and pictures prepared by locals and foreigners.

2. A responsible recreational fisherman should know the minimum catching length of a huntable fish thoroughly. The fish below the limits of such defined lengths should be released back into water. Information and warnings about this issue are available in the 3/2 Recreational Fisheries Fishing Regulation.

3. Some fish like groupers and dentexes are female in the first few years of their lifespan, then they turn into males. This is called hermaphroditism in fish. A Responsible Recreational Fisherman needs to know of the females' sexual maturity age and the age when they change into males.

4. Silver-cheeked-toadfish and rabbitfish and many other foreign species are in fact not the original fish of our waters. They enter into the Mediterranean either through ballast waters of ships that come into our ports from foreign seas or through the Suez Canal from the Red Sea. These marine organisms are in the group of "unwanted aquatic organisms". As an recreational fisherman, Knowing them well is very important because some of the species are very harmful and even deadly when consumed (ex: *Lagocephalus sceleratus*, a toadfish species). On the other hand, there are some foreign species that should be fought against or at least monitored (ex: *Caulerpa racemosa*, known as killer moss). Unwanted aquatic organisms that come from other seas into our ecosystem cause many kinds of pressures over the local species and negatively impact the marine ecosystem. For example, some nonoriginal seaweed species in the Mediterranean (*Caulerpa racemosa* and *Caulerpa taxifolia*) prevent the spread and natural development of the local seagrasses and dominate them.

It is beneficial to get detailed information about some of the local fish species that have high economic values. They are mostly under the pressure of overfishing. The more we know about those fish, the further we get on our way to become a conscious and responsible recreational fishermen. Thus, here in the following, there is a concise information about the local fish species for you to have a closer look.

### Bluefin tuna *Thunnus thynnus*

It is also known as tunny. It belongs to the family of Scombridae (Tunas and Mackerels). The family includes the species of *Thunnus*, *Euthnnus* and *Katsuwonus* that could weigh up to 900 kilograms and their length could reach up to 5 to 6 meters. The species is migrant.

They swim very fast. They are economically very valuable. The meat of tunas are usually canned. Their body is round. The front part is larger and it gets narrower towards the tail. There is a short distance between the two dorsal fins. The fish has 8-9 pinnuls, in other words, fake fins. These fins are found both on the back and behind the anal fin. The upper part of the body is dark blue and black, sides are silvery white. There are two pending parts between the ventral fins. The rim of the fin at the tail is white. They can release more than 1 million eggs. Their breeding season comprises March, June, July and August.

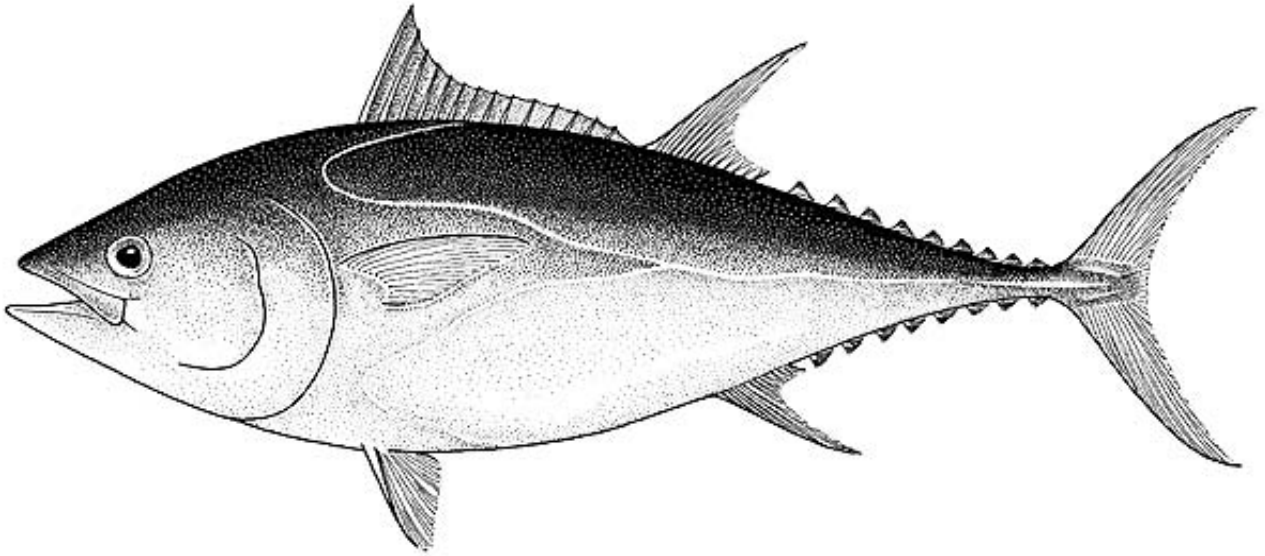


Figure 10: Bluefin tuna (*Thunnus thynnus*) © FAO

Tunas are migrant fish. They swim in large schools and feed on smaller fishes. They prey on sardines, anchovies, mediterranean shads, mackerels, bluefish and the like. They can swim 65-70 kilometers per hour. Adult tunas swim through Gibraltar strait with bonitos to reach their Mediterranean spawning grounds. They become adults in three years. An adult tuna weighs a ton and its length reaches up to 5 to 6 meters. Orkinos hunters have many different methods of fishing. These fish are caught with special hooks upon which there are dangling artificial fliers made of feathers or plant fibers or live sardines are tied to fixed fishing lines. But this kind of fishing can only be done with large vessels. Tuna vessels are about 20-25 meters in length. They have strong engines to speed up. There are sardines pools in these vessels to be used as baits and cold storage rooms for the caught tunas to keep them fresh. Recreational fishermen sit on a swivel chair at a tween deck and hunt these fish with reeled fishing rods. Catching them as a recreational sport requires substantial knowledge and skill.



### Grouper *Epinephelus marginatus*

A grouper is a demersal fish species that belongs to the family of Serranidae. Its body is flat and oval at the sides. Its head and mouth are big. It has a thick skin and covered with small scales. The first dorsal fin combines with the second dorsal fin. There are greenish yellow patches and vertical stripes at the head, back and sides, but they disappear when the fish dies. Its lower part is lighter in colour. Its gills are open and spiky. Its tail fin is round.

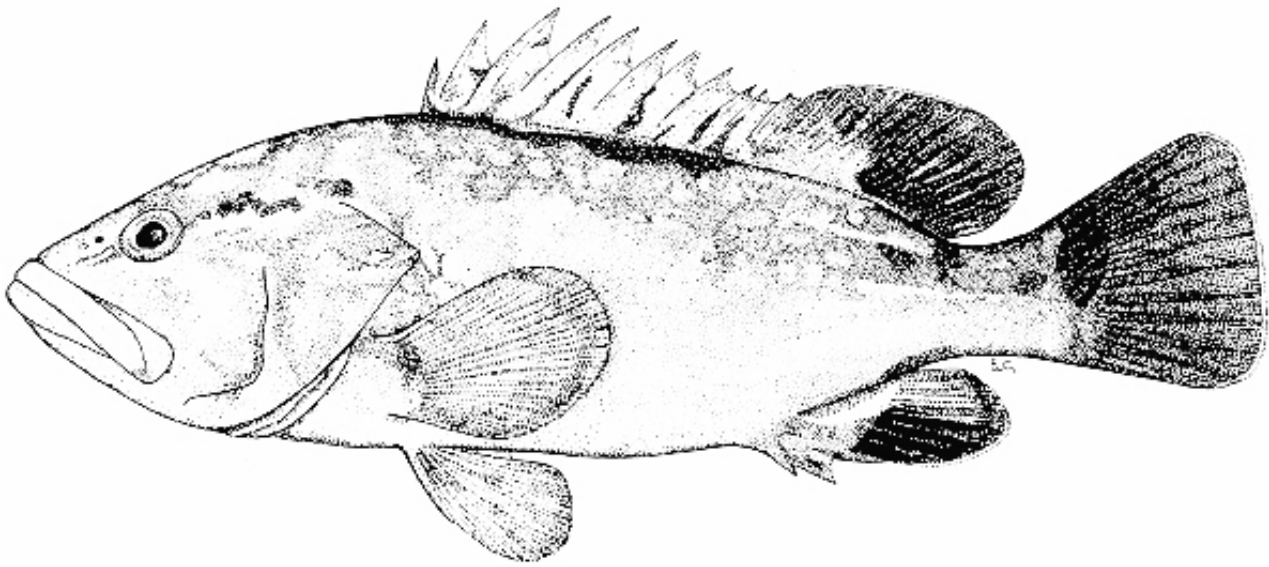


Figure 11: Grouper (*Epinephelus marginatus*) © FAO

A grouper is a hermaphrodite organism. As the fish reaches sexual maturity, female sexual organs are developed. The fish remains female until it is 18 years old. Then, the female sexual organs disappear and male organs are developed. The fish remains male for the rest of his life. It lives at the open cracks and crevices of the rocks in the depths down to 100 meters. Its average length is 60 cm and reaches a maximum of 140 cm. It weighs, on average, around 15 kg and may reach a maximum of 60 kg. It puts on 1 kg weight every year and it can reach up to 60 years of age. A grouper is a typical demersal fish. It never leaves the surroundings of the crevice it considers home. It grows and reproduces too slowly depending on the region and the latitude it lives in. Its population spreads in the Mediterranean basin (except Black Sea and Marmara) and the adjacent eastern shores of Atlantic Ocean. As it is a rare species, the demand and the economic value of it is high. It is mostly caught by spearguns or by longliners. Therefore, near-shore fishermen with a boat, longline fishermen and speargun fishermen have a larger responsibility in the conservation of this species. The studies on fish species and biodiversity show that the species population is decreasing inevitably and conditions will be far more negative if conservation measures are not taken and controls are not done effectively. According to IUCN red list, it is under the category of endangered species (EN). In France, the species is fully conserved by strict fishing prohibitions. In Spain, the species is under conservation only in marine conservation areas. Officials from the Ministry of Food, Agriculture and Livestock can check the illegal sale of groupers caught by speargunfishermen in the restaurants and deter the illegal marketing of the species. There has been many suggestions made to the Ministry about the issue as the checking on land is much more cost-effective compared to the checkings in the sea.



### Goldblotched Grouper (Golden Grouper), *Epinephelus costae*

It is a typical demersal fish that belongs to the family of Serrenidae and it is one of our most economically valuable fishes. Its population spreads in the Mediterranean Basin and Eastern Atlantic shores. In our country, the species is seen and hunted more in the Mediterranean shores than in the Aegean shores.

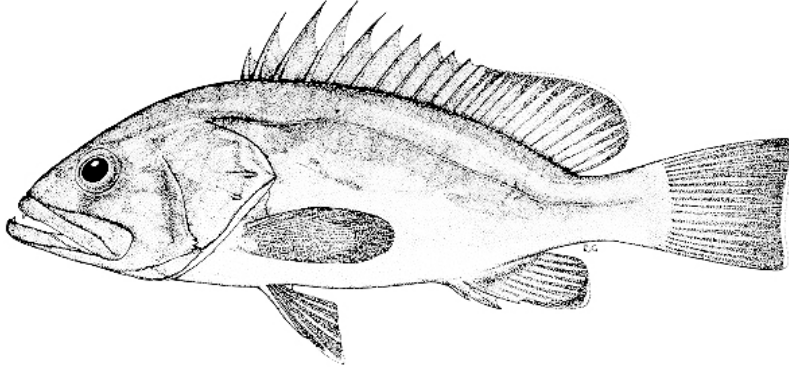


Figure 12: Goldblotched Grouper (*Epinephelus costae*) © FAO

It lives in waters 200 meters deep. When adult, its length reaches up 30 to 35 cm. It is known that the fish can reach a maximum of 140 cm. It lives in sandy, muddy and rocky bottoms. Young ones swim in small groups. The species feeds on crustaceans (like lobsters etc.), molluscs, and smaller fish (Heemstra and Randal, 1993). Their stocks in our country are on the brink of extinction due to overfishing in some areas. The recent scientific studies in Gökova prove that golden grouper stocks are so few that it might even be considered as non-existing (Ünal et al., 2009). Illegal and overfishing of the species are the most important pressures over them. Professional fishermen catch the groupers with longliners, the fish can be caught with nets too, though very occasionally.

### Dentex *Dentex dentex*

Dentex belongs to the family of Sparidae and have a high economic value among our other fish.

The species spreads widely in the Mediterranean, but it is also seen in the Black Sea, British Isles, Mauritania and sometimes in Senegal, Canary Islands and in the Eastern Atlantic Ocean. It lives in deep waters (down to 200 m) and at the sandy and rocky bottoms. It preys on other fishes, molluscs and cephalopods. It is a very effective predator.



Figure 13: Dentex (*Dentex dentex*) © FAO

Dentexes usually live a single life throughout the year, they live in groups but for a few weeks during their breeding period: adult dentexes live together in warm and surface waters for 2 or 3 weeks in Spring. An adult dentex can reach a length more than one meter and a weight of 20 kg. The fish shows different colouration. The young ones have blue fins and brown-blue skins whereas adults have grey-blue.

### Bluefish *Pomatomus saltatrix*

Bluefishes belong to the family of Pomatomidae and have a high economic value.

Its body is elongated, has two dorsal fins, a forky tail, a big mouth, sharp and strong teeth. Its lateral line is almost straight and covered with scales. The number of scales on the lateral line is 95-100. Its dorsal part is blue and greenish, below is silvery and its abdomen is bright white. Their length and weight can reach up to 130 cm and 14,4 kg, respectively. Their adult and reproductive length is 25 cm. Eventhough it is a marine fish, it may enter lagoons and deltas at river mouths. In other words, it is a species that can tolerate salt water, brackish water and fresh water. Known as a very skillful carnivorous predator, it preys on other fish, crustaceans and cephalopods.

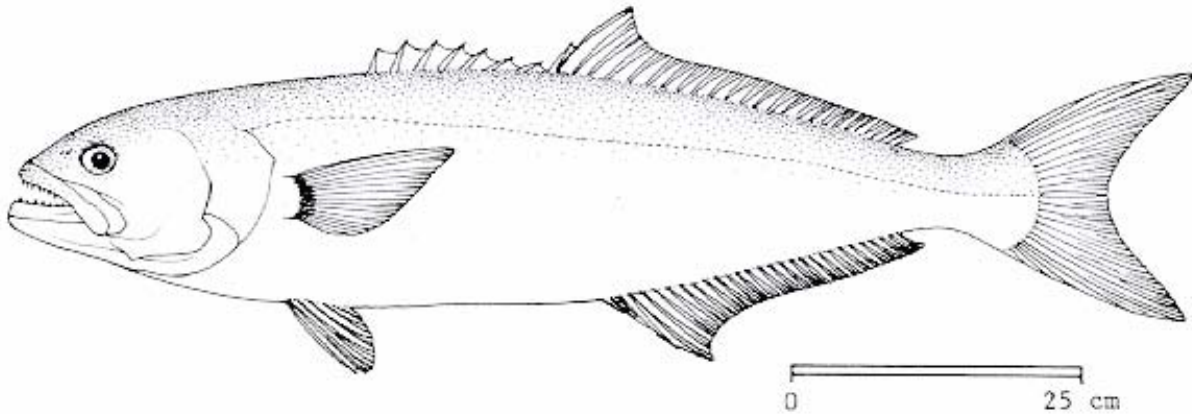


Figure 14: Bluefish (*Pomatomus saltatrix*) © FAO

After releasing their eggs in the Blacksea, they exit from the strait of Bosphorus in the end of September/the beginning of October (Dooley,1990).

Bluefish, small bluefish, medium-length bluefish, loufer, large bluefish have different local names designating the fish from the smaller sizes to the larger. There is even another size called "black-back", which is the largest, but it is rarely seen. The species is seen in all our seas around the country. It is a pelagic fish that migrates between the Mediterranean and the Blacksea. Both traditional near-shore fishermen and recreational fishermen rush in to catch this species. The fish has a very special place in our fishing culture, in fact, we have no other fish named differently for six of its sizes.

### Sturgeon *Acipenseridae* family

Sturgeons comprise the Acipenseridae family and they are large kinds of fish.

Sturgeons are very “primitive”. Their skeletons are just partly bones. They have large lateral scales. Their tails are assymetrical. Their mouths are directed downwards and their chins can protrude when necessary. They have four extentions downwards and they can search food with them in the bottom of the sea. Some sturgeons can reach up to 5 m, therefore, they are considered the largest fresh water fish. Some sturgeon species come to freshwater only to spawn, they normally live in salt water. The largest sturgeon *Huso huso*, lives in salt water almost all the time but they spawn upstream. Sturgeons live in fresh water , brackish water (river mouths and deltas) and salt water. Some species live only in fresh water. Migrant kinds pass their early period in fresh water and then migrate to the sea, but they come back to freshwater for mating when they are adults.

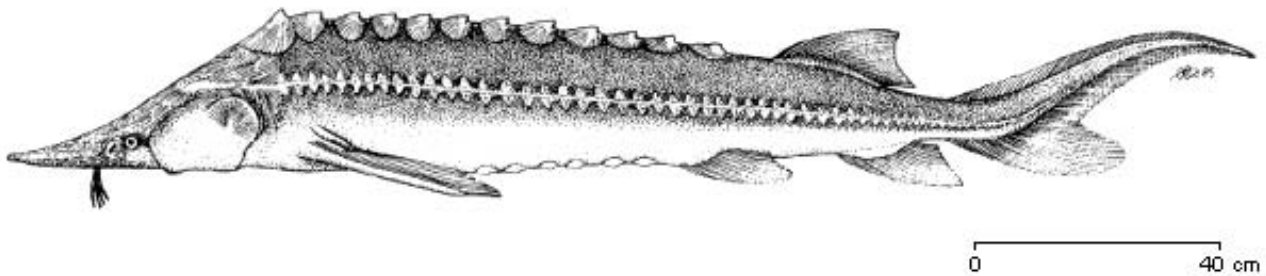


Figure 15: A Sturgeon (*Acipenser rudiventris*) The species is one of the rarest in Turkey. It is in the brink of extinction due to over and illegal fishing © FAO

Sturgeons reach adulthood very late. Specially the females need to be 20 years of age to release their first eggs. Only some smaller kinds reach adulthood when they are one or two years of age. It has been proved that some sturgeons can live up to 100 years of age. The ones who reach that age can weigh around 1,4 tons. They are renowned as being the largest fresh water fish. Sturgeons need high quality waters, therefore, they almost became extinct in Western Europe as the rivers there were polluted in the 20th century. Many sturgeons lifecyle continue between rivers and the seas and some have to end their journey at the walls of dams on the rivers. They cannot reach up to the upper parts of the river where they normally mate and breed. Sturgeons are hunted especially for their caviar, which is very expensive. Illegal sturgeon fishing have been increased tremendously after the breakup of USSR. Therefore, in Russia, sturgeons are on the brink of extinction. In our county, only 4 vulnerable sturgeon species are seen in the Blacksea Region. Three of them are Acipensers and one of them is a *Huso* species. They are in the first line of vulnerable species that need conservation. It is strongly recommended that you release the young ones back into the sea when hunted.

### Turbot *Psetta maxima*

A turbot (*Psetta maxima*) belongs to Scophthalmidae family. It is a demersal fish species that lies upon the sea bottom on its right side and have its eyes at the left side of its body. It is very distinctive with its flat and assymetrical shape. It lives in the east of the Atlantic Ocean adjacent to the Mediterranean and it lives in the Mediterranean, the Aegean Sea, the Marmara Sea and the Black Sea at the depths between 20 m and 70 m. It feeds on small fish, crabs and small marine animals. This circular and scaleless fish species is loved by consumers and it can reach up to an average of 50-70 cm in length. The ones that weigh 20 kg (apprx 1 m) are very rarely caught. The pressure of overfishing decreases the turbot stocks and this scarcity result in high market prices of the species. On the other hand, turbot stocks are in better condition at the territorial waters of Romania, Ukrania and Russia as compared to ours, it is simply because turbot are relatively better conserved in those countries.

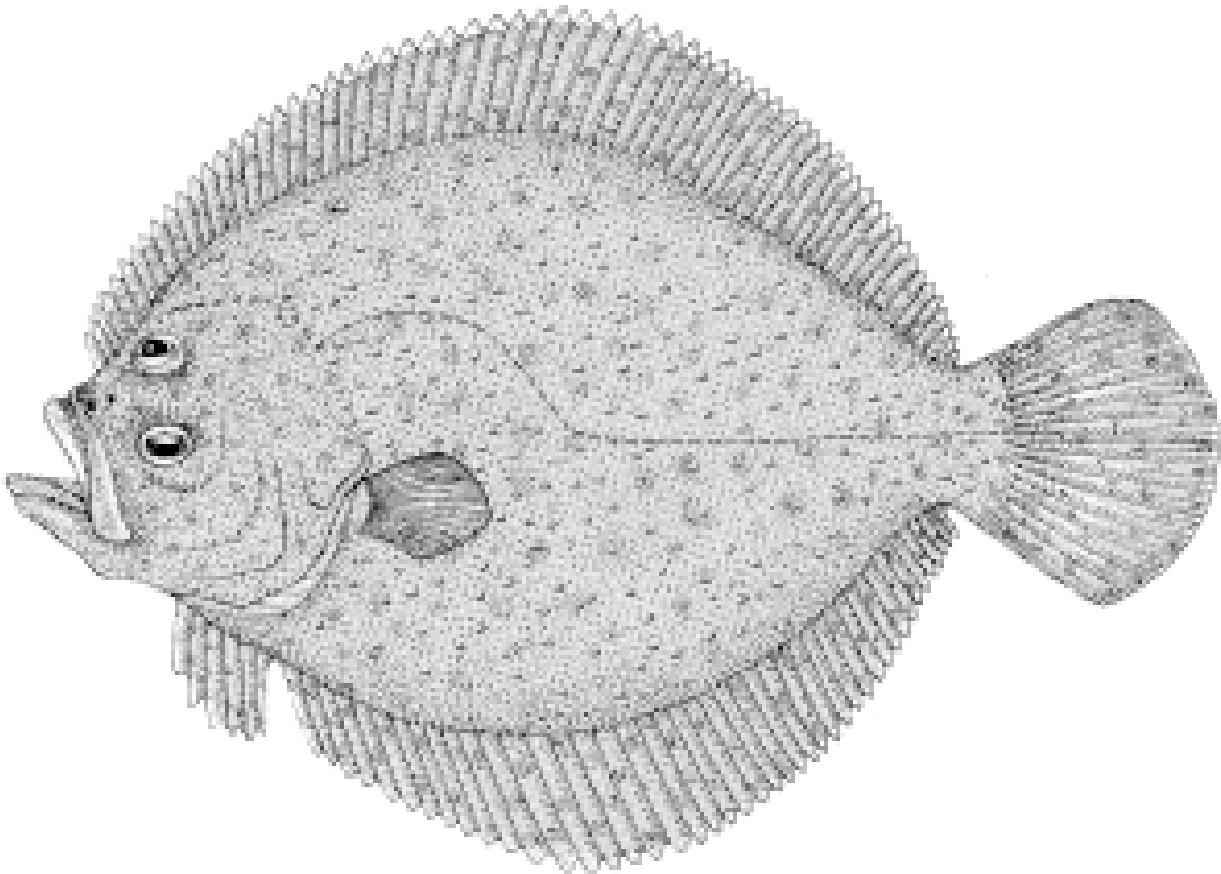


Figure 16: Turbot (*psetta maxima*)

Throughout the spring and the summer, the females spawn 10 millions to 15 millions of eggs (depending on the lenght of the female) at the depths from 10 to 40 meters. After 7 or 9 days, the males milt the eggs, juvenile fish come out in shapes of shuttles. The juvenile fish feed on planktons at shallow waters until they reach up to 8-10 cm and until their metamorphosis starts. They migrate to deeper waters as their right eye shifts towards the left side of their head and as their bodies flatten. They can mate and breed only when they are five years of age.

## 5.6 Sea Birds

Our fishermen encounter the species of gulls, terns, shearwaters and cormorants in our coasts and seas.

The most encountered species are lesser black-backed gulls, audouin's gulls, terns, little terns, yelkouan shearwaters, cory's shearwaters, cormorants, shags, and pygmy cormorants. Among those birds, audouin's gulls, cory's shearwaters, shags and pygmy cormorants are fewer in numbers and more sensitive to disturbances. Flamingos, white pelicans and dalmatian pelicans can be seen in deltas and lagoons. Dalmatian pelicans are listed as vulnerable among the birds cited above.



Figure 17: Shag (*Phalacrocorax aristotelis*) © Kazım Çapacı

All our seabirds cited in here feed on very small, small or medium-length pelagic fish. If you see terns, little terns, audouin's gulls, yelkouvans shearwater, cory's shearwater in the seas and deltas fishing in large or small numbers, you can conclude that they feed on small epipelagic (surface layer of the sea) fish. If you see white pelicans or dalmatian pelicans, you can conclude that small or medium-length pelagic fish schools are in the sea. If these small pelagic fishes do not exist, the sea birds mentioned above cannot survive in their coastal or marine habitats. Cormorants and shags, on the other hand, usually feed on demersal fish.

In case these birds entangle in nets or fishing rods/longliners by accident, the steps of rescue are given in this book at Chapter 14.





Figure 18: Dalmatian Pelican (*Pelecanus crispus*, on the left) and White Pelican (*Pelecanus onocratus*, on the right) comparison © Emin Yoğurtçuoğlu



Figure 19: Dalmatian Pelican (*Pelecanus crispus*) © Kazım Çapacı



Figure 20: Yelkouan (*Puffinus yelkouan*) © Emin Yoğurtçuoğlu



Figure 21: Audouin's gull (*Larus audouinii*) © Cem O. Kırac / SAD-DEZKUŞ

## 5.7 Sea Turtles



Figure 22: Loggerhead turtles (*Caretta caretta*) breed and overwinter in Turkey. The problem of entangling in fishing nets and hooks is frequently seen. © Murat Draman /KASAD

There are 2 kinds of sea turtle inhabit in Turkey; one of them is *Caretta caretta* "loggerhead turtle" and the other is *Chelonia mydas* "green turtle". This marine organisms reproduce only in 4-5 countries in the Mediterranean Basin including Turkey. Among those countries, Turkey is in the first line with 20 beaches available for sea turtle nesting. All of the nesting beaches in Turkey are lined on the Mediterranean coasts. These 20 nesting beaches are located between Ekincik Beach of Mugla in the West and Samandağ Beach of Hatay in the East. The interrelation of this species with the recreational fishermen and traditional fishermen occurs usually when they are tangled in fishing equipment. Both of the sea turtle species get tangled in fishing lines, the hooks, fishing equipment and nets. They are sometimes heavily injured when sea propellers cut their body. Other than the threats mentioned above, the second most important threat for both the loggerhead turtle and the green turtle is the habitat deterioration, in other words, the destruction of their single most breeding areas, the nesting beaches. Habitat deterioration occurs as beaches are turned into piles of concrete blocks of hotels and summer houses; roads are built upon the beaches; sand is removed; humans occupy every meter square of a beach.



Figure 23: Green turtles (*Chelonia mydas*) breed in lesser numbers compared to loggerhead turtles. The number of its nesting beaches are sparse. The problem of entangling in fishing nets and hooks is frequently seen with this species too. © Alexander Vasenin



## 5.8 Marine Mammals

They are not publicly known much, but there are many marine mammals of different orders in Turkey. We have toothed whales belonging to the Odontoceti suborder (this includes the dolphins as well); we have fin whales belonging to Mysticeti suborder, the Mediterranean monk seals belonging to Pinnipedia suborder, the European otters belonging to the Carnivora order, which is the only aquatic mammal living in freshwater ecosystems; it is also observed in the sea.

These marine mammals have very different life cycles and different habitats as compared to one another. The life cycle of toothed whales only takes place in the sea. Some live in the offshore and some live in the shallow waters close to the coasts. They mate, give birth in the sea and they lactate and nurse their young in the sea. Harbour porpoise is seen only in the Black Sea, other dolphins are seen in all our seas whereas whales are seen only in the Aegean and the Mediterranean.



Figure 24: The Mediterranean Monk Seal are among the most endangered 5 mammal species in Europe. The major impact upon their survival is the opening of remote coasts to development which results in the invasion of caves and coastal areas by humans. Habitat loss is the basic threat whereas the second threat is the entanglement of seal pups into nets that may cause drowning. © Cem O. Kırac/SAD-AFAG

The Mediterranean monk seal is a sea mammal very much dependent on shallow waters and the coastlines. Half of its life cycle continues in the sea and the other half continues in the land. It cannot survive in the absence of pristine waters and untouched coastlines. Seals give birth to their pups in remote sea caves in the land. Mother seals lactate and nurse their pups inside and surroundings of a cave. For fishing, wandering and mating, the species spends its time swimming and diving in the sea. In other words, monk seals cannot continue to survive without isolated lands and pristine waters. Likewise, the species is found in untouched and naturally conserved rocky shores in Turkey. Few seals still live in the remote Southern coasts of Marmara Sea and Marmara Islands.



European otters use both rivers and coastal marine habitats. But their real habitats are clean and untouched freshwater ecosystems in which fish can breed. The species is observed in all our seas, in the coastlines where rivers meet the seas and sometimes among the stones under the piers.

Our recreational fishermen occasionally run across these sea mammals cited above in our seas and coasts. What needs to be known in here is that the number of those aquatic mammals is getting fewer and fewer everyday. These mammals are predators and at the top of the food pyramid, therefore they are indicators and symbols of a healthy marine and coastal ecosystem, in other words, their conservation is crucially important. Along with this ecologic point of view, it is, in fact, not hard to appreciate the sheer beauty of this amiable creatures, they are somewhat like indispensable joys of our seas. They are irreplaceable in the lives of seamen, fishermen and locals living together with the sea and its creatures for thousands of years. I think none of us can accept the fall of those animals out of our marine life and our culture of nature.



Figure 25 : Common bottle nose dolpin (*Tursiops truncatus*) is a large kind of sea mammal. Deliberate killings, live catches for dolphinariums and decreases in fish stocks are the major threats for this species.

As for the Mediterranean monk seals and European otters, the most important threat to their lives is " habitat loss" . Developments on the coastlines damage the habitat of Monk Seals; Hydroelectric Power Plants constructed upon valleys and all kinds of housing activities in such areas damage the habitat of European otters. Habitat loss or the fragmentation of a once unified habitat is in fact the main problem and triggers irretrievable processes. Moreover, deliberate killings of these species is another very negative impact that we face, though the intensity of such illegal activities differ from one place to another.

Toothed Whales		Odontoceti
01	Bottlenose dolphin	<i>Tursiops truncatus</i>
02	Short beaked common dolphin	<i>Delphinus delphis</i>
03	Striped dolphin	<i>Stenalla coeruleoalba</i>
04	Harbour porpoise	<i>Phocoena phocoena</i>
05	Sperm whale	<i>Physeter macrocephalus</i>
06	Cuvier's beaked whale	<i>Ziphius cavirostris</i>
07	Grampus	<i>Grampus griseus</i>
Baleen Whales		Mysticeti
08	Fin whale	<i>Balaenoptera physalus</i>
Pinnipeds		Pinnipedia
09	Mediterranean monk seal	<i>Monachus monachus</i>
Carnivores		Carnivora
10	European otter	<i>Lutra lutra</i>

Table-1 Sea Mammals in Turkey

## 5.9 Food Chain

Just like terrestrial ecosystems, marine ecosystems too have food chains in between its species, in other words, they have a food pyramid. Primary producers, i.e. phytoplanktons (some groups of bacteria and algae) and seagrasses, are the first link of the chain that make their own food through photosynthesis and chemosynthesis. The second link is the herbivores that feed on primary producers, i.e. primary consumers (zooplanktons are the first in this line). After the primary consumers, there comes the Second Consumers (carnivores) and third consumers that feed on primary consumers. In biological systems, the energy extracted from the molecules used as food is never consumed with 100% efficiency. In fact, every chemical reaction to extract energy results in a loss of some important amount of energy.

Eventhough the loss itself varies from one food chain and its links to another, only the 10% of the energy taken in could be transferred to the next link. It means that an organism who aims to make up 1 kg of meat for itself is to consume 10 kg of meat. A tuna fish need to eat 10 kg of bonito fish, and 10 kg of bonito fish need to consume 100 kg of anchovy fish, and 100 kg of anchovy fish need to consume 1000 kg of zooplanktons, and 1000 of zooplanktons need to consume 10.000 kg of phytoplanktons. Therefore, the organisms at the lowest layer of the pyramid need to reproduce easily and be able to generate large populations whereas the organisms that share the top of the pyramid shouldn't be able to reproduce easily nor should they generate large populations. Decreasing numbers of the controlling species that dwell at the top of the pyramid via unnatural causes such as pressures of overfishing and habitat loss take dominant species' pressure off of the organisms that dwell at the lower layers of the pyramid and let them overpopulate, and this consequently ruins the balance of the ecosystem. For a healthy ecosystem, the population of every component species in the ecosystem must confine to a certain number.

This energy loss seen in between the layers of food pyramid brings out another danger. Pollutants, even if their concentration do not biologically affect the marine waters, will cause a "bio-accumulation in the bodies of organisms" along the line of foodchains, therefore, its concentration will gradually increase. This is the reason why the marine mammals, sharks and tuna fish, in other words, the top dwellers of the pyramid are the first ones affected by environmental pollution.

## 5.10. Local Species, Migrant Species, Exotic Species

Local species can be seen at all times, i.e. in winter and summer. And they live in some specific marine areas. Migrant species are the organisms that migrate in between different seas in spring and autumn, in other words, during the time between summers and winters. Exotic species are not naturally found in our seas but they enter the system through the ballast waters of ships coming from Red Sea and other oceans, or, through Suez Canal.

The Mediterranean has the share of 0,8% of all the Seas in the world in terms of surface area, but it includes 8% of the known marine species. These ratios indicate that its biodiversity is very high in comparison to its volume. 10% of the 17.000 fish species defined in the Mediterranean are endemic, i.e. these species do not live in any other sea in the world. Even though the biological diversity is high, many of the species do not compose large populations. Such small populations are very unlikely as to the much larger populations living in different seas. The reason is nothing but the scarcity of nutrients in the Mediterranean. Sharp temperature differences between the summer and the winter and the scarcity of food salts make the Mediterranean a harsh environment to live in.

The reason why the species migrate seasonally is usually for feeding and breeding. During these migrations, a significant amount of biomass is transferred to another area. This in itself constitutes a lot of serious impacts upon the ecosystem the migrating species pass through. Migrating species can be predators to or preys for the local species. The eggs released during the breeding time are very important food sources for many organisms. Therefore, migrating species moving along in large masses can be considered essential for an ecosystem.

Developments and increases in marine transportation activities pave the way for the transportation of species in between ecosystems through ships and/or canals. Ecosystems can be caught off guard as these transported organisms introduced by humans. A foreign species entered a new ecosystem may overpopulate itself in the absence of a predator and even start to dominate the ecosystem. Some species that one can easily think harmless may overpopulate, and this may deteriorate the habitat and affect the local species indirectly. It is known that in the ecosystems that have been subjected to human-based damages, the foreign species easily dominate the new environment and reshape the ecosystem in accordance with their own needs. It has been detected that many foreign species stick upon the ship bodies or are carried by ballast waters to the Mediterranean. However, many of the foreign species in the Mediterranean are in fact Indo-Pacific based organisms that pass into the Mediterranean from Red Sea through Suez Canal. These species are dominant in East Mediterranean ecosystems and they keep on moving from the East to the West in the Mediterranean due to global warming. The invasion of foreign species is unstoppable as the Suez Canal will remain open, but establishing a healthy ecosystem in which local species are well conserved will obviously slow down the invasion of the foreign species and lessen their negative impacts.

## 06 MARINE AND COASTAL HABITATS

### 6.1. Littoral Zone (Sunlit Area)

**Littoral Zone:** It is the coastal area upon which waves and tidal zone are active. It is composed of two subareas.

- a) Supralittoral area: it is the area that stays out of water, but is soaked with the movements of the sea.
- b) Mediolittoral area: it is the area that remains underwater from time to time due to movements of waves and water (tidal moves).

**Sublittoral zone:** starting from the littoral zone, it extends down to 200 meters deep, the area also defines the continental shelf.

- a) Infralittoral area: starting right from the coastal zone, it remains underwater and extends to the final depth of where phytoplankton weeds and seagrasses live (40-50 meters).
- b) Circalittoral area: starting from the depths where seagrasses and phytoplankton weeds end, it extends to an area where weeds are able to live by with the least light spread. The depth here is about 200 meters.

Littoral Zone and Sublittoral Zone are the most sunlit areas in the Seas and the Oceans, therefore, they are the areas where species and productivity are the richest.

### 6.2 Benthic Zone and Pelagic Zone

A marine environment comprises 2 zones in terms of its ecologic aspects: Benthic Zone and Pelagic Zone.



Figure 26 : Sea areas and zones



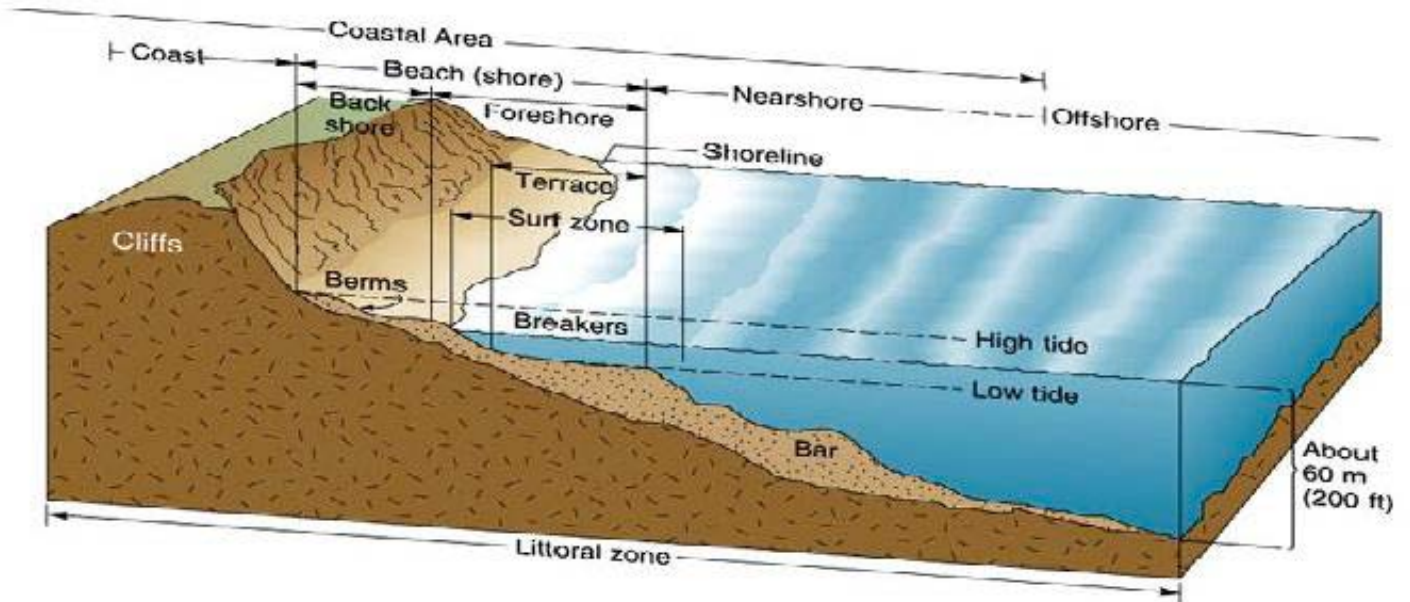


Figure 27: Coastal areas and zones

**Benthic Zone:** this zone starts from the coastline and goes down to the deepest parts of the oceans/seas, composing the ocean/sea bed. Benthic zone is composed of two zones: Littoral Zone and Deep Sea Zone. Deep Sea zone is divided into subgroups of bathial, abyssal and hadal zones in respect to their depths starting from shallow waters to the deepest waters.

**Bathyal Zone:** it is the steeply sea bottom that reaches down to 4000 meters. Organisms living there are adapted to darkness since sun light is not able to penetrate such depths.

**Abyssal Zone:** it defines the ocean bottoms deeper than 4000 meters.

**Hadal Zone:** it defines the ocean pits deeper than 6000 meters.

**Pelagic Zone:** it is the water mass that covers over the sea bed/bottom. In other words, the whole water mass that covers the benthic area is called pelagic zone.

It is divided into 4 main areas. The followings are the pelagic sea layers starting from shallow to deep waters.

1. Epipelagic
2. Mesopelagic
3. Bathypelagic
4. Abyssopelagic

Organisms living in the water column are grouped as pelagic organisms.



### 6.3. Lit and Non-Lit Areas

Seas are also divided into layers with respect to sun light penetration and no light penetration. There are two zones.

- 1) **Sunlit (Photic) Zone** : starting from the surface, it is the water layer into which light penetrates the farthest. Photosynthesis continues in this layer, therefore, the primary production, which is crucially important for the life in the seas, takes place in this layer too.
- 2) **Non-Sunlit (Aphotic) Zone**: it describes the deep sea environment where there is no light. Organisms dependent on light cannot live in this layer.

### 6.4. Deltas, Lagoon and Coastal Sand Dunes

There are large deltas in the coastlines where rivers meet the seas. These deltas can make up lagoons small or big. Both salt water and fresh water ecosystems are seen in deltas, moreover, there is a third aquatic ecosystem called brackish water where fresh water and salt water are mixed. Deltas are the primary areas where fish breed and juvenile fish grow. So deltas are acknowledged as the marine-coastline areas that need to be conserved, and consequently, aquatic fishing regulations need to be checked and monitored tightly.

Sand dunes are different than beaches, they have a different structure and locate at the back of beaches. Dune habitats are very special habitats with their endemic plants like Nerium Oleander. Dunes and beaches are the only areas the female sea turtles use for nesting.

### 6.5. Rocky Cliffs, Caves and Underwater Caves, Islands

With deltas, dunes and beaches, we have a long line of rocky shores in our country. Rocky shores sometimes have high cliffs. This coastal habitat is unique and important as they make home for endangered marine-coastal organisms. Seagrasses, groupers, golden groupers, dexters and the like inhabit underwater; peregrine falcons, alpine swifts, sea gulls, ..... shags and the like inhabit on the cliffs. Most important of all, the Mediterranean Monk Seal, one of the most endangered species in Europe inhabit the whole area. Surface and underwater coastal caves are carved into steep rocky coast . There are suitable Monk Seal breeding caves among them with natural platforms made of pebbles/sand/rock. This property enhances the importance attaced to this kind of areas. Biological diversity in the islands is lesser in comparison to the diversity in the mainland. But they are the places where wilderness still rules as they locate far away from the human activities and human threats. Remote islands are unique habitats for Mediterranean Monk Seals and for many sea birds, including species of gulls breeding in colonies, and for birds of prey like alpine swifts, peregrine falcons, eleonora's falcons, lesser kestrels.

## 6.6. Deep, Middle and Surface Currents

As the world spins around its axis, the waters upon the world move and the massive pull of the moon creates tidal waves. So, the currents with fixed directions are seen in the oceans. The Mediterranean is a closed sea and covers a much smaller area in respect to oceans. It is not affected by ocean currents and the levels of tidal waves are very small. However, the subtropical location of the Mediterranean Basin results in a hot climate that causes high evaporation rate. Due to this evaporation, the surface level of the Mediterranean is lower than the surface level of the Gibraltar Strait where it links to the Atlantic Ocean. Difference of levels makes the cold Atlantic waters enter the basin, which causes a surface current. This current moves anti-clockwise as Atlantic waters pass the coasts of North Africa and reach to the East of the Mediterranean and then turn to the West at Iskenderun Bay moving along our side of coasts in the Mediterranean.

The Mediterranean Sea has more salt and denser than Atlantic Waters. So in the depths of Gibraltar, the two contacting water masses replace one another due to the density difference. The denser Mediterranean waters run into the Atlantic Ocean in the depths of 200 meters. This deep current affects the overall condition of the Mediterranean. As this layer of water very rich with food salts runs into the Atlantic Ocean, it makes the Mediterranean as one of the most nutrient poor seas in the world.

A similar kind of current seen between the Mediterranean and the Atlantic Ocean is active between the Black Sea and the Aegean as well. Having higher water levels, the Black sea waters run into the Marmara Sea and pass through the Dardanelles and reach the Aegean Sea. And the denser and saltier deep waters of the Aegean run through the Dardanelles and fill up the bottom of the Marmara Sea and then run into the bottom of the Black Sea from the depths of Bosphorus.

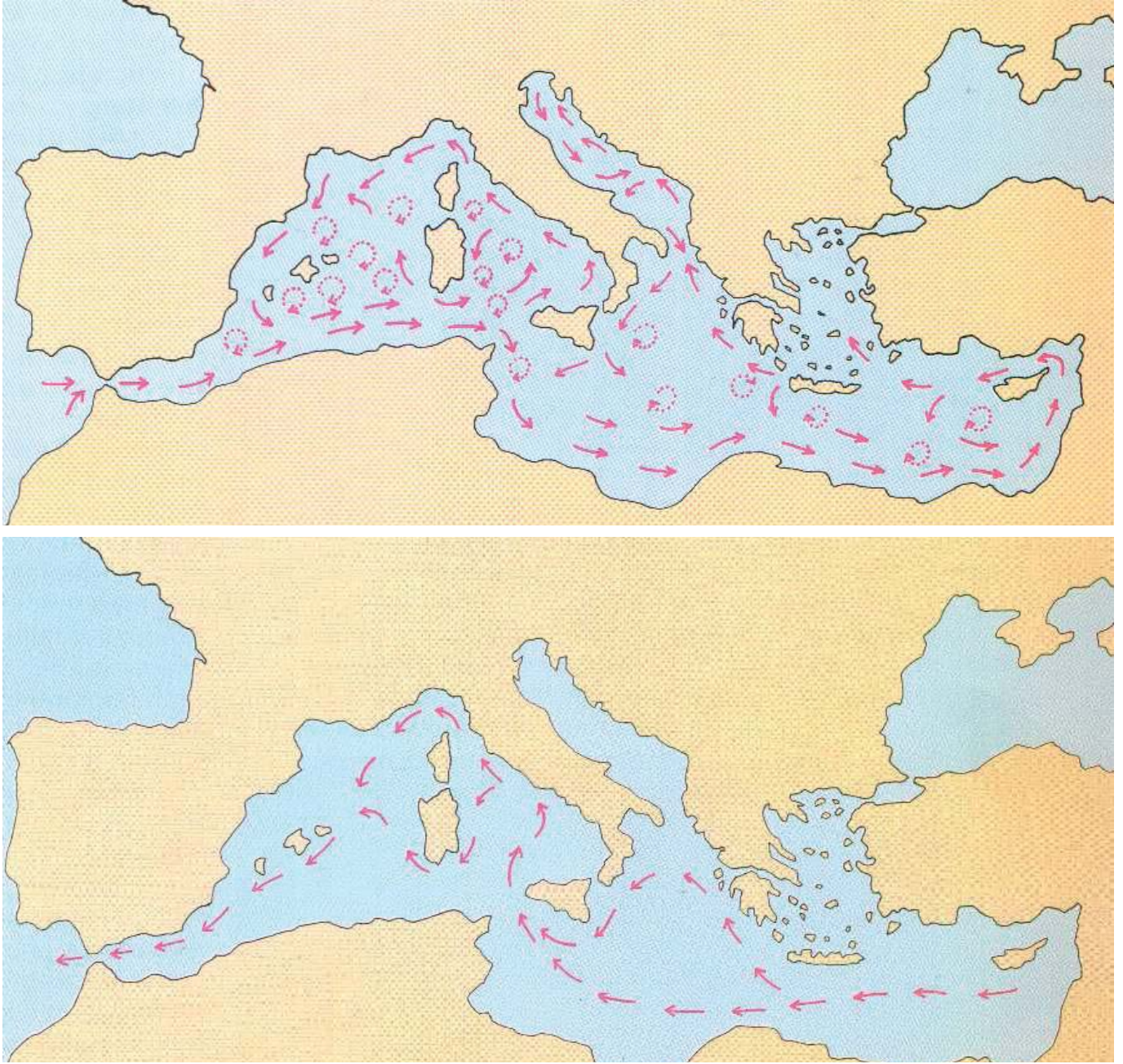


Figure 28: The scheme of the surface current that enters the Mediterranean from the Atlantic Ocean is given above. The scheme of the deep current of the water mass reaching to the Atlantic Ocean from the Mediterranean is given below.

Along with surface and bottom currents, smaller currents derived from local winds can be seen in the Mediterranean as well. As the dominant winds blow from the land to the offshore, the surface waters on the coasts are driven towards offshore and replaced with nutrient rich bottom waters coming from the depths. This kind of currents make the coastal ecosystem rich as they carry food salts. Contrarily, dominant and constant winds blowing towards the coasts accumulate the surface waters of poor nutrient content along the coastlines and cause a downpush of nutrient rich bottom waters to deeper.

Currents are very important for marine ecosystems as large water masses of different physical properties replace one another and provide a food flow for the local species.



## 07 ACTING IN HARMONY WITH THE ECOSYSTEM

### 7.1. Learning the Marine Ecosystem and Interpreting Nature

When you go fishing, you might see an Audouin's gull (*Larus audouinii*), a Shag (*Phaethon rubricauda*), and a Little tern (*Sterna albifrons*) in your fishing environment. This should make you think that the marine and the coastal ecosystem there has remained relatively unharmed. You may also consider that human based pressures impacting the sea and the coastline are lower than other places. As yellow-legged gulls (*Larus michaellis*), terns (*Sterna hirundo*) and cormorants (*Phalacrocorax carbo*) are used to crowds of people and less affected by humans, these species may inhabit polluted seas and coastlines to a certain extent. So the first three sea birds cited above are the indicators that the marine and coastal ecosystem you fish in is healthy, non-polluted and the human pressure there is much less than other places. Audouin's gulls, yellow-legged gulls, tern and little terns have no other choice but feed on pelagic fish (for example, silversides, sprats, anchovies, juvenile mullets). Please keep in mind when you see these bird species in a breeding colony, making nests or having fledglings, they indicate that the area is extremely important and needs to be conserved. And on top of all this, if you see a Monk seal (*Monachus monachus*) swimming or lying on the shore or if you observe a monk seal pup, you can easily say that the area is used by very few people, human pressure is low, there are fish and octopuses in the area as the seals feed on them in the sea; it also means that the coastline and the waters of the sea are still clean enough, and even pristine. Monk seals are the true indicators of a clean and a healthy coastal/marine ecosystem. Therefore, we need an utmost care in using such areas and build an awareness so that anthropogenic pressures do not increase. There is no need to stop fishing when we see these species except the situations they breed, nest or raise their youngs. After arranging your distance for not disturbing them and after making sure you do not make noise, you can keep on with your fishing or underwater hunting. Similarly, if you see groupers, golden groupers and dentex frequently and abundantly within a fishing zone, and if you run across a healthy and dense seagrass beds, you can shape an opinion that the benthic ecosystem in the area is less disturbed compared to heavily fished marine zone.

### 7.2. The Concept of Carrying Capacity

Carrying capacity is a concept built not only for fishing but for all other sectors and human uses in the world.

In the course of animate and inanimate natural resources are used, there must be criteria considered as to the intensity of the usage so the existence of those resources are not put into any risk. In short, carrying capacity defines an *optimal benefit ratio* that has been suggested by a scientific computation. Let us go on with different real life examples to have a better grip of the term "carrying capacity". For example, the allowed number of fishing boats to the maximum in a certain area so as not to eradicate the fish stocks, or, the number of divers and underwater photographers who are to dive simultaneously at a certain time in an area without harming the natural environment and the species could be the issues to be analysed.

Carrying capacity regarding fishing varies in accordance with every marine and coastal area. As some marine fishing areas rich with short-life-spanned paleogic fish stocks have the carrying capacity of fleets with hundreds of purse seiners, a very small Boncuk Bay in Gökova can be impacted negatively by the angler of a single amateur fisherman as the bay inhabits an endangered species, a sandbar shark, which is under conservation. Therefore, the carrying capacity of Boncuk Bay is “zero boat” due to its very different and special characteristics. In other words, conditions of an area should be understood well, an assessment criteria should be designed accordingly and a series of computations should be done in order to bring out the true carrying capacity of an area (Kaboğlu et al., 2012).

In fact, every ecosystem carry certain numbers of animate species; individuals of those species are directly and indirectly related to each other. The numbers of them are within the limits of their reproduction capacity; the numbers of deducted organisms from the system in a certain time limit should be recovered in accordance with the species’ reproduction skills (i.e. reproduction speeds of the populations), which is all in all a principle to provide sustainability. So the issue is to consider a balance between the fishing amount and the reproduction speed. Determining the reproduction speed for every species is a necessary but a difficult job to do, which leads us to the other option that is to have every new individual of species, the fishing targets, breed at least once in its life. Therefore, the huntable smallest lengths of every species are defined. So the carrying capacity for fishing shapes itself by calculating how many fish individual of such catchable lengths could be fished without decreasing the stocks in a certain period of time. However, while fishing with fishing lines and nets, there are no possibilities for direct and perfect selection and nor there is a way to know about the species and the length of the fish. Given the circumstances, if there is an endangered species in the ecosystem in which the fisherman go fishing and if fishing that species with available fishing gear is probable, the carrying capacity of that environment should be acknowledged as zero.

### 7.3. Boat Anchoring and Avoidance of Harming the Ecosystem

All boats need to drop anchor to stay fixed in the sea. Anchors inevitably damage the structure of sea bottom. Dropping and collecting the anchor, and sometimes dredging with the chain and the anchor damage the structure of the bottom. Recreational fishermen may think that the singular impact of anchoring of one single boat may not be too much as they go fishing only occasionally. But when we think about hundreds of boats going fishing for recreation in one day, it is very obvious that we should consider the total impact of consecutive anchorings in the same bay carried on by different recreational fishermen.

The most important subject here is that sea grasses (*Posidonia oceanica*), an endangered species and one of the critical elements of marine ecosystems, can be severely damaged. The main method to prevent this is to make projects of mooring-with-buoys for the areas and implement such systems at the bays where boats often drop anchors. There are also innovated anchor designs available. Such anchors do not damage the seagrasses when dropped and collected. Two of the methods can be used together. Specially designed anchors are not used in our country yet. A widespread usage of it will certainly take time. However, mooring-with-buoys systems are proved to be applicable as they have been implemented successfully in Göcek inlets, which the bay itself is a Specially Protected Area. After a feasibility study, concrete mooring blocks are left on some certain points at 10 to 15 meters offshore. Iron eyebolts to be used as tying points are fixed on the opposite shore. Boats are steered backwards or forwards and are tied to the rope of the buoy of the concrete mooring blocks at the stem or the stern, the other part of the boat is tied to the iron eyebolts on the shore. In this way, anchoring is avoided, seagrasses in the bottom are not screened; in short, a habitat loss is prevented. There is another benefit of this method and that is the system avoids bending the trees and breaking the rocks as ropes are usually tied to natural objects. Another precaution is to suggest every recreational fisherman boat abreast each other. This is another way of avoiding excessive anchoring.



Figure 29: Boat anchors and chains damage the ecosystem in the bottom very seriously. In the photo, the negative impact of a boat chain upon the seagrasses, which is an important species in our seas (*Posidonia oceanica*) and upon pinna (*Pinna nobilis*) can be seen. © Zafer Kızılkaya/SAD-EKOG

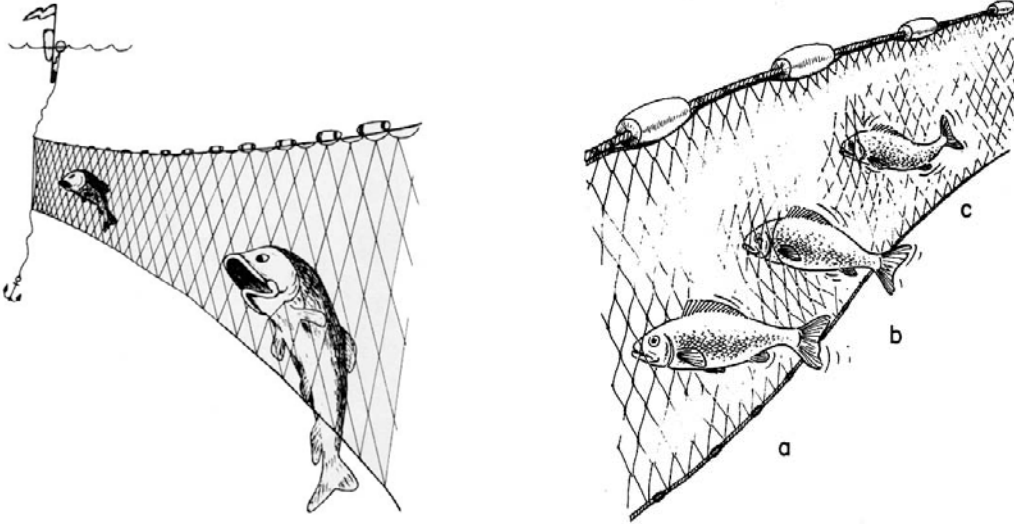
If we, the recreational fishermen, know the existence of dense areas of sea grasses, fan-mussels and rarely seen corals at the bottom in the places where we plan to anchor, being more careful about our anchoring so as not to damage the bottom structure would be the right thing to do.



## 08 FISHING METHODS AND THEIR IMPACTS UPON THE ECOSYSTEM

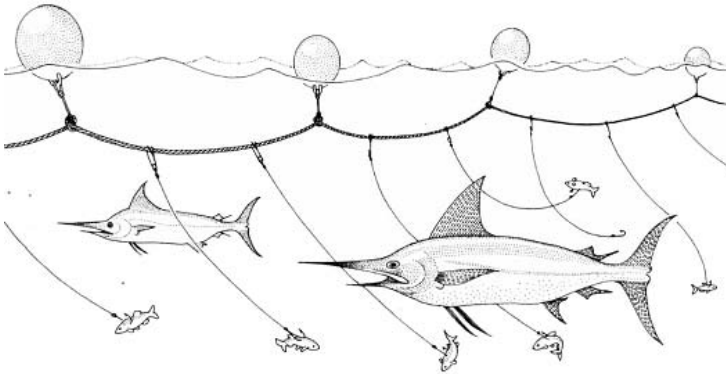
### Shore Fishing

Shore Fishing is the term for fishing done from the shore. Dragnets, longliners, traps, baskets and hooks are used for catching the local and migrating species in such areas, and on the offshores, fishing gears become trawlers and purse seiners.

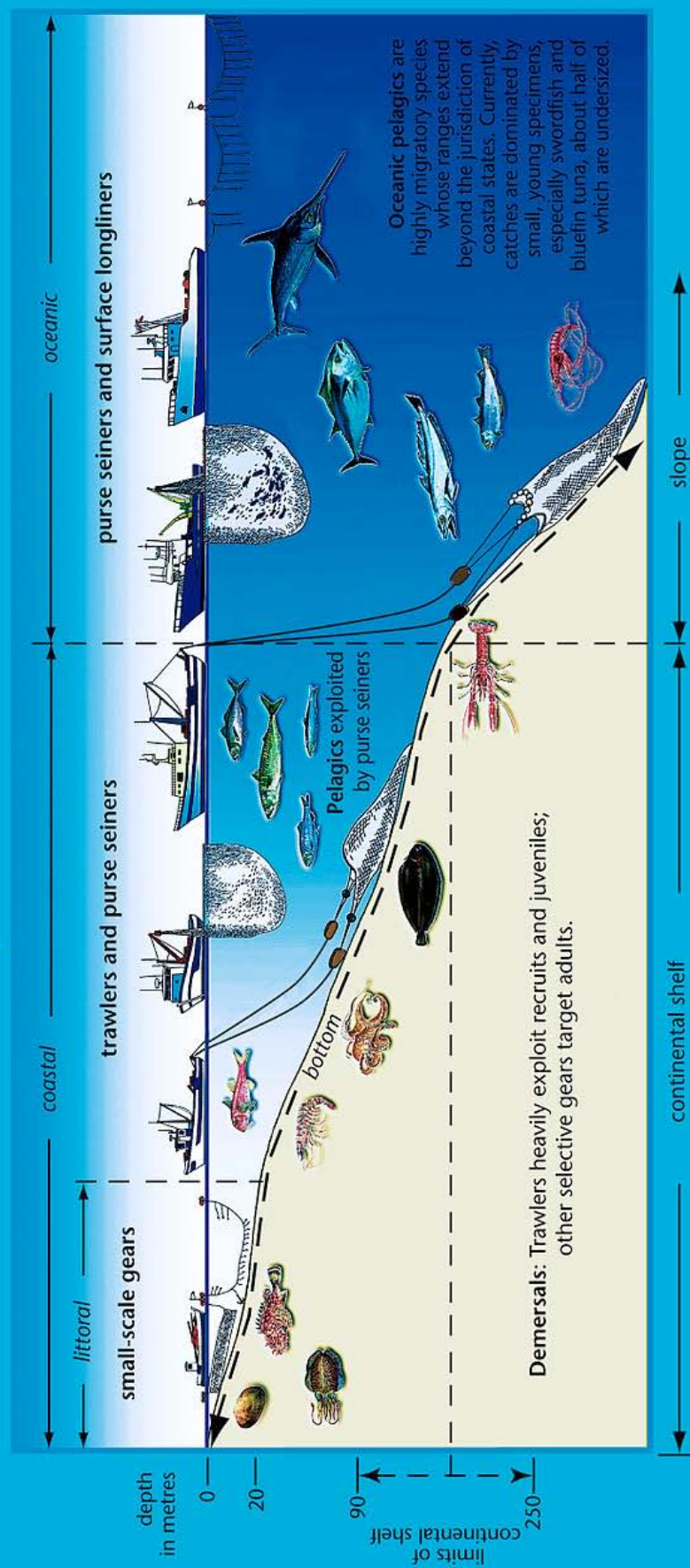


**Dragnets** are composed of gill nets and tangle nets and trammel nets. These nets aim the fishing of some certain species, especially with gillnets, it is possible to do selective fishing. In our country, there are very different kinds of dragnets in terms of their functions. Apart from the bait catcher nets, whose sizes are defined in the bulletin, dragnets are prohibited in recreational fishing.

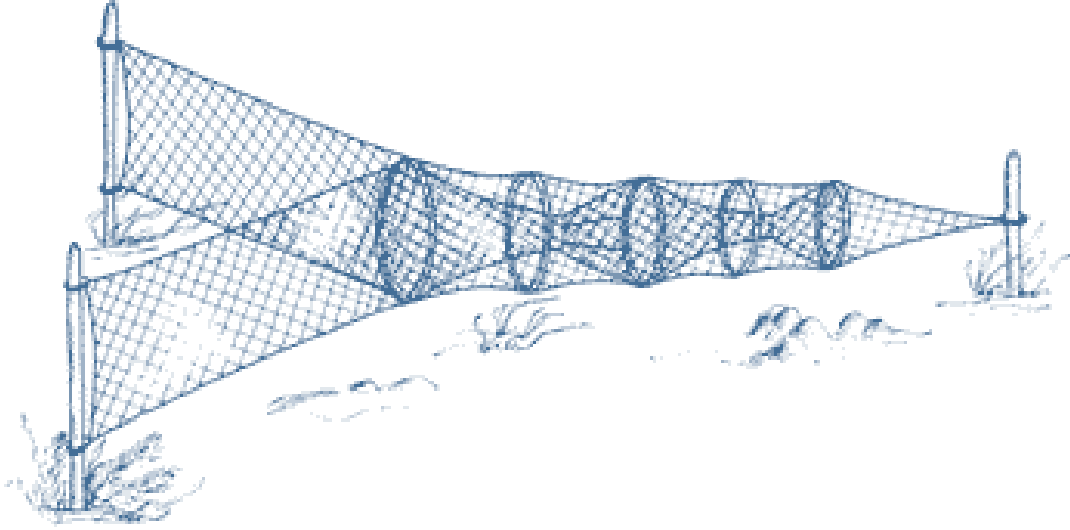
Longliner is a fishing gear that has many dangling hooks tied to one main fishline. It is a selective fishing gear as it aims the hunt of certain species. Deep water longliners are either a thin kind or a thick. Thin longliners catch the species like common sea breams, gilthead sea breams, black breams, boops and striped sea breams. Thick longliners catch the species like groupers, golden groupers and dentexes; tuna and sword fishes are also caught with pelagic longliners. All of its kinds are prohibited in recreational fishing.



## Gears most commonly used in the Mediterranean



**Traps** are passive fishing gears widely used in the hunt of eels, species of Sparids and crayfish in the lakes and lagoons. As soon as the fish caught are taken out of the last section of the trap, the trap is located back into the fishing area. Its hunt never ends and it occupies the area all the time. These are the unfavourable features of the gear. But it does not damage the bottom habitats. It is prohibited in recreational fishing.



**Baskets** are passive fishing gears. They have a wider corridor at the top getting narrower to the bottom. Juvenile fish passing this corridor are trapped inside, in other words, the fish easily get in but cannot get out. It is used with or without baits. Recently, the baskets are made of wires as they aim to catch more kinds of species on the shores. They frequently get lost in the sea and keep on fishing by itself (ghost fishing). Such properties of this gear are, of course, unfavourable. It is prohibited in recreational fishing.

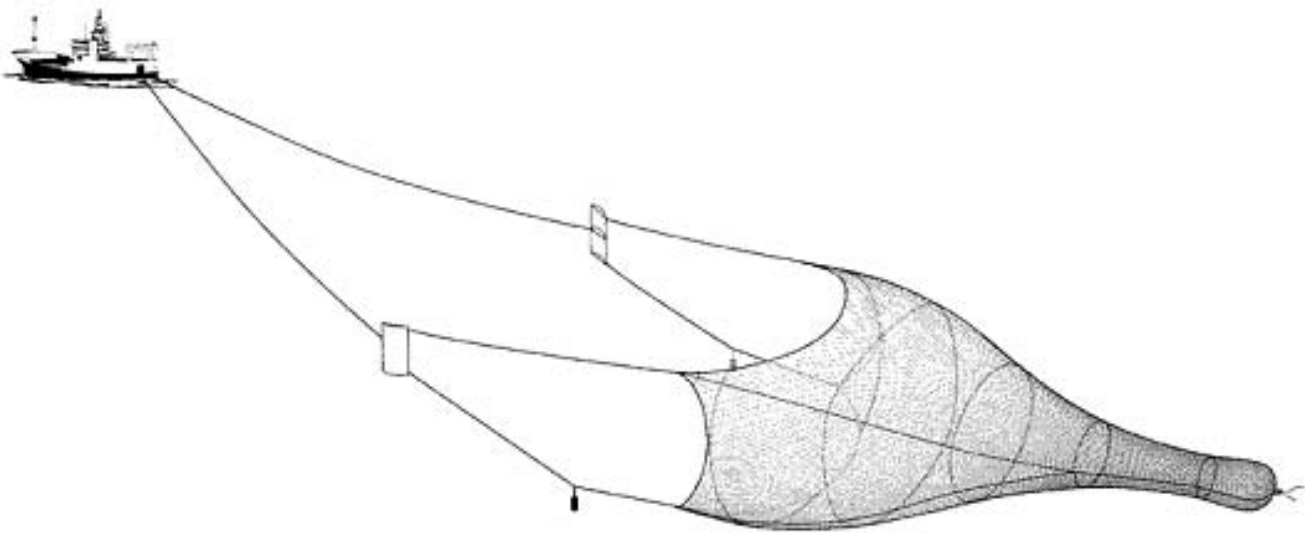


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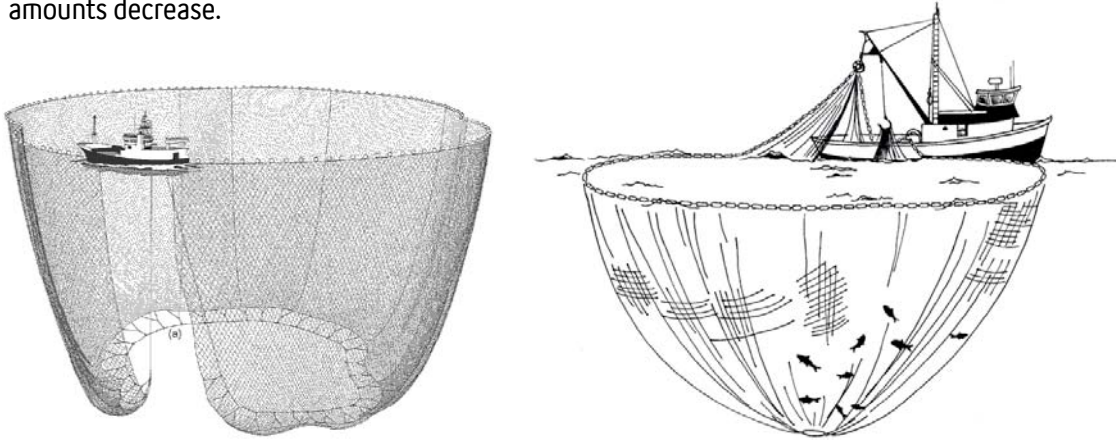
### Trawlers and Purse Seiners

A trawl, a large net, is a fishing gear that is pulled by a vessel along the bottom of the sea. A trawler is composed of a vessel, a trawl and some doors that help open the net widthwise and of steel ropes whose length between the doors and vessel is adjusted in accordance with the depth of water. A trawl has a wider mouth between the doors and the main net. This part is weaved with dragropes. The far end of the net narrows down and is closed. Deep trawls and beam trawls are used in fishing the species spread at the sea bottom. For catching the fish schools that inhabit in the layer between the surface and bottom waters, middle-water trawls are used. Some commercial species like whittings, red mullets, striped red mullets, haddocks and shrimps are caught with deep trawls. Anchovies, horse mackerels, sprats and sardines are caught with middle-water trawls. In our country, bottom-trawl-fishing has been significantly regulated and related regulations are announced through bulletins.



Misinformation prevails about the trawlers' direct damaging the spawns and larvae. The most important damage a trawler may cause is that destroying the adult fish populations and the ecosystem, but only when used illegally, as it is the case of any fishing gear used against the law violating the regulations. This fishing gear do accidental fishing, in other words, a trawler catches both the target species and unwanted species at the same time, i.e. it is not species selective. Moreover, it is also not selective either for the target species nor for the by-catch in terms of their lengths. There is also a well-known fact that it damages the benthic ecosystem and the bottom habitats as it screens the seabed.

**Purse Seiners** are fishing gears that catch the fish schools (anchovies, sardines, bluefin tunas, bonitos, bluefish, horse-mackarels, sprats) by surrounding them. The schools are detected by fish finders (sonar, echo sounder) in daylight and by lamp boats at night. The surroundings of the fish school is lined around with the seine net and then the bottom of the net is pursed with the help of a leech line. Then, the net is taken on board with a power block. The jammed fish are transferred to the seiner or to another carrier boat by the help of fish pumps and scoops. Due to the fact that the purse seiner fleets in our country are way too powerful (number of boats, their sizes, power of their engines, the length and depth of their seine nets), they overfish inevitably. As a result, stocks are getting smaller day by day and the production amounts decrease.



A fishing line, either tied to a rod or not, are made of hooks and these hooks are tied to a fishline; the hooks usually hold a sinker at the tip. Live or artificial baits (even feather like materials) can be hooked upon them. The length of the caught fish depends on the size of the hook. Larger hooks catch larger fish. As the size of the hooks get smaller, the length of the fish gets smaller too.

Horizontal jigging gear is a fishline with spoon shaped artificial baits and hooks dropped off of a boat that is en route 4 to 5 miles an hour. The concave spoons keep spinning around as the fishline is pulled. During this spin, the baits keep on glittering with daylight looking like fish moving along.

Vertical jigging is a comparatively new fishing method in our country. The fishline is released into notably deep waters with a solid sinker. The fishline at the tip of the rod is pulled up vertically and harshly. In the course of harsh pullings, the spoon at the tip of the hook spins like that of horizontal jigging gear and glitters. The fish jumps upon this glitter and is caught as it bites the three-way hooks.



## Underwater (Speargun) Fishing

Underwater fishing, in other words, fishing with spearguns is the oldest form of fishing in history performed with a gear. Eventhough it was done illegally and unethically at nigh with torches and/or with scuba gears both in our country and in many other countries, true speargun fishing is performed in daylight and by using no source of air other than holding breath in a skin dive.

Speargun fishing requires the most effort among the other fishing methods. High conditions of a body, skills of breath holding and swimming long distances, courage and fishing skills are to name the few. Besides, adequate information and experience on the issues like marine species, metrology and navigation is among the prerequisites of speargunfishing. Speargun fishing is the most selective fishing method. The reasons of its being selective are the fisherman's actual seeing of the catch before the fish is hunted and the advantages of diving limits.

1. As the fish hunted one by one, the amount of catch is limited even on a lucky day.
2. No matter what the number of the individuals are in a shoal - either 2 or 1000 -, only 1(one) fish at a time can be hunted as long as nothing extraordinary happens.
3. There are some rules for sustainable fishing, which are acknowledged as principles. One of them is that a fish needs to reproduce at least once before it is hunted. Another principle is the fish should be hunted in accordance with a fishing spectrum that the low end starts with the length as the fish reaches to its first reproduction stage and the high end finishes with its most productive, maximum length. Underwater fishing totally abides by these principles cited above only when it is done consciously.
4. As a result of its selectiveness and its one by one fishing, the rate of by-catch and unaimed fish catches is zero.
5. As far as legal methods are concerned, it is the fishing method with which the hunted fish dies the quickest. Living a short death, a fish does not loose much energy with convulsions and consequently it doesn't rot easily.
6. One doesn't need to kill or hurt other species in underwater fishing.
7. There is no physical, chemical or biological pollutants left behind in underwater fishing. Heavy metals like iron, petrol derivatives (machine oil, bilge water, etc.) are not left in the marine environment. Ghost nets, ghost fish lines and hooks as passive fishing materials (fishing gears drifting in the water unattended) do not take the lives of the species or put them into risk.
8. The habitat of the organisms remain untouched in speargun fishing. During and after speargunfishing, the areas where fish feed and breed remain intact. No harm is done to the corals and ridges where fish populations are seen, also the seagrass beds, the very important components of an ecosystem, are never damaged by this fishing activity. Rocky structures where fish hide and breed are remained untouched, so are the juvenile fishes and larvae.
9. Along with the items mentioned above, there are several more principles and methods of speargunfishing in compliance with regulations. The basic difference of it from the other fishing methods is that a fish is always advantageous in this type of fishing. Chances of escaping is high for a fish and the number of fishes caught in one dive is few. As the speargun fishing is done simply by holding one's breath and diving into water, both the depth a person could possibly dive along with his lung capacity and the duration of his dive are very short. Human physiology limits the fishing depths of speargun fishing and naturally leaves many species living deeper waters out on the fishing list.

## Illegal Speargun Fishing and its Impacts upon the Ecosystem

A responsible recreational fisherman truly knows the impact of illegal fishing upon the ecosystem and upon the traditional fishermen whose livelihood is dependent upon small-scale fishing. They know that traditional fishermen who fish with small-scale fishing gears are very negatively affected by recreational fishing especially when it was done illegally, so the responsible recreational fishermen revise their behaviour accordingly. Especially illegal speargun fishing targets the commercially valuable fish species that are crucial for the survival of small scale fishermen. According to a study (Ünal and Erdem, 2009), 2.5 tons of golden groupers, 1 ton of dentexes, 1.5-2 tons of seabasses are hunted and marketed in Gökova Bay every year. This amount is more than the catches of the traditional fishermen's in the Bay vicinity.

Eventhough it is selective, *skin diving in the course of underwater fishing*, is not the only diving method used in speargun fishing in our country and in the world. Speargun fishing and scuba diving with torches at night (and several other versions) can be legally performed in developing countries. Massive amounts of fish are hunted with speargun fishing performed with the help of scuba diving. This is obviously unacceptable for the severely damaged ecosystems where fish stocks living in the deep rocky areas are few. In our country, scuba diving at night or in the day for the purpose of speargun fishing is prohibited, pursuant to the regulations; but these regulations are unfortunately widely violated.

At night fish cannot move as the torch light almost paralyzes them. The fish who are wary and difficult to get close to during the day turn into defenceless animals in shallow waters at night. They are caught easily and effortlessly. Those fish who stand under the rocks sleeping (low metabolism) together with their schools are destroyed by irresponsible, murderous people who either skin dive or scuba dive with torches.

This system offers a commercial fish flow that is intense and illegal. It is performed widely because checking and controlling are too challenging, and because fish buyers are easily found. Especially in the South of Turkey, there are organized networks providing a flow of commercially valuable fish to the restaurants and fishmarkets. Illegal speargun teams work so organized that the transfers occurring back and forth between the sea and the end users are accomplished under three groups: the gears, the fish and the illegal fishermen. All are transferred by different vehicles and vessels. This in itself makes the controlling very difficult, for they mislead the law enforcement as they keep their system work smoothly.

The major target of this unethical and illegal fishing method, which has the power of damaging the marine ecosystem irreversibly, is the broodfishes of the commercially valuable species like groupers, golden groupers and dentexes. Easy and massive killing of those species without giving them a chance to escape endanger the survival of the populations. When we look at the bigger picture, we see that as the species are put into risk, the fishermen whose livelihood depend on those species are being harmed enormously.

Speargun fishing is a selective and elite kind of fishing when performed knowingly and legally. Otherwise it might easily destruct the demersal fish stocks in an area within few days when it was performed at night with scuba gears. Apart from the harm it causes to the environment, it might have other critical end results, like human lives can be lost or put into danger in the course of underwater fishing.



As an recreational fishing method, speargun fishing regulation in our country is put into order in the “Bulletin of Fisheries for Recreational Purposes”, which is periodically prepared by the Ministry of Food, Agriculture and Livestock.

1. Speargunfishing is legal only in day light, i.e. starting from the break of dawn to the sunset.
2. Except in densely populated tourist attraction areas, military zones, ports and reserved areas where fishing is prohibited, spearfishing is free.
3. The use of scuba gear, hookah and similar kind of spare air sources are prohibited.
4. Fishing limit is 5 kilos of fish per day per person, or, 1 big fish and 4 kilos of smaller fish.
5. As for larger species of Serranidae family, including groupers and golden groupers, only (1) one fish a day is allowed to be hunted by one (1) fisherman and the grouper has to be larger than 45 cm in length.
6. Like other recreational fishing methods, sales of the fish caught by spearguns are prohibited.
7. Speargun fishing at night is totally prohibited.
8. Speargun fishing at all inland fresh waters (rivers and lakes) is prohibited.



An underwater hunter using a speargun © N. O. Veryeri/SAD-EKOG

### Speargun Fishing Competitions

Like in the case of many other recreational fishing and sports activity, competitions are held for speargun fishing both in our county and abroad as well. Yet the jury is still out in our country like some other countries in hosting such competitions. Considering the fact that the marine ecosystem is under serious pressure due to illegal and overfishing that constantly decrease the fish stocks, we need to look at the overall picture of the whole process. The speargun fishing competitions are held at least 6 times a year. Numerous speargun fishing training activities are carried on in the meantime. So the competition/training areas happen to be under constant and serious fishing pressure especially for demersal fish species for short periods of time.

Any competition that does not serve for a wholistic conservation of a marine ecosystem would finally turn into a subject that is questioned and discussed, and that goes the same for the speargun fishing competitions. Participants of many platforms and panels have long been sharing the same worries about it. Within the scope of the project "Developing Responsible Recreational Fishing in Turkey", as this book is one of the outputs, there were meetings in Kaş and Ankara held in 2013. The participants to these meetings were of academics, members of Recreational Underwater Hunters Association and members of other nature protection NGOs. All of them questioned the negative impacts of the speargun fishing competitions as is today in Turkey and expressed their convictions by pointing out the current fishing pressure over sensitive species is increasing.

In conclusion, Turkish Underwater Sports Federation should come together with related official institutions, academics and NGOs (specialized in related ecological issues) and discuss all of the aspects of the matter. The discussions should be based upon scientific data rather than single minded point of views. The views of commercial and therefore illegal speargunfishermen should not be taken into consideration as they are in pursuit of making themselves legally accepted by showing interest in such competitions. It is pretty obvious that decisions are needed to be made in regard to some practices that every stakeholder agree upon and this needs to be done by taking the concept of "ecosystem-based fishing management" into consideration as it was explained at the beginning of this book.



An underwater fish hunter who abides by the rules contributes to the conservation of marine ecosystem © N.O. Veryeri/SAD-EKOG

### Technical and Environmental Factors

Marine organisms have adopted certain systems either to feed or protect themselves. These systems can come in different shapes and sizes like sharp teeth, sharp and/or irritation causing organs, venomous organs and cells. All divers and underwater hunters should have correct information about marine organisms in their local area so as not to be harmed by natural dangers. Otherwise,

1. Anemons, jellyfish, sea centipedes may cause painful and itching skin irritations,
2. Shells, sea urchins may cause cuts and spike penetrations,
3. Moray eels, conger eels may cause serious injuries and infections,
4. Scorpion fish, weevers, ray fish and the like may cause serious poisonings and deaths,
5. The bites of fishes like sea bream, bluespotted seabream and blue fish may cause injuries as well as the gills, ear bones and fins of groupers, golden groupers and seabasses do.

Besides, equipment and techniques of speargun fishing can be problematic when used without training. For example, when fishing beneath a rocky environment, the fisherman may suffer from head trauma as he gets excited with the hunt and loses his orientation. If the ropes around the reel of spear are unsuitable and if the buoyancy of the spear is not right, the fisherman may entangle to the rope and may die. Excessive usage of sinkers cause too much oxygen consumption when getting out of the water whereas missing sinkers cause too much oxygen consumption when diving deeper. Fishing and holding an unknown fish species may end up with poisoning. Long underwater stays in winter with insufficient equipment causes a fall in the body temperature, such severe hypothermia may even cause death. Fishing without buoys where there is intense boat traffic is somewhat like calling for accidents. In order to prevent similar kind of accidents, one needs to be trained before taking up speargunfishing.

## 09 NATIONAL LEGISLATION AND INTERNATIONAL CONVENTIONS

### Law of Fisheries

Law of fisheries starts up with the sentence “This law includes the aspects of the conservation, production, and control of the fisheries”. The law was once revised with another law numbered 3288 issued on 15 May 1986. As the current law does not meet the requirements of today’s conditions, it is still under revision.

### Regulation for Fisheries

This regulation was prepared on the grounds of the Law of Fisheries numbered 1380 issued on 22 March 1971. The regulation, which is issued by the Ministry, includes the aspects as to how the procedures of statute should be applied.

### The bulletin numbered 3/2 that regulates the fisheries hunt for recreational purposes

This bulletin is prepared on the grounds of the Law of Fisheries numbered 1380 and on the Fisheries Regulation issued in the Official Gazette numbered 22223 and dated 10 March 1995.

The aim of the bulletin is to determine the procedures and principles of fishing for the ones who will hunt fisheries in non-prohibited areas by using small vessels for the purposes of sports and non-commercial activities. The Framework of those set rules for recreational fishermen are valid between the dates of 1 September 2012 – 31 August 2016. The bulletin regulates the prohibitions, limitations and obligations that will be implemented for fisheries hunt for recreational purposes between the dates of 1 September 2012 – 31 August 2016. The bulletin is composed of seven parts that include many regulations and information. The first part explains the aim of the bulletin, its scope and grounds, the definitions of the terms like recreational fishing, recreational fishing tourism, recreational underwater diver, sportive fishing etc. The second part contains information as to how recreational fishing should be done, the third part explains the prohibitions and the limitations of the hunt of some species, the forth part explains the fishing methods and limitations, the fifth part cites the area prohibitions and the limitations, the sixth part explains the legal procedures and prohibition decisions, and the final part explains the latest provisions and gives miscellaneous information.

A responsible fisherman knows and implements the information, prohibitions, limitations and obligations announced in this bulletin. The bulletin is the single most resource to be used in regulating recreational fishing and informing the recreational fishermen. On the other hand, as the fishing and marine ecosystems have dynamic properties, the bulletin is open to improvements and alterations. In this respect, establishment of a cooperation between recreational fisheries associations, academics, related NGOs, Fisheries Cooperations and the General Directorate of Fisheries is very crucial and their discussions about the matter will provide reliable grounds in solving the problems. So it is suggested in here that prohibitions, limitations and obligations related to recreational fishing be brought out after all related stakeholders’ views and contributions are received and discussed. By this way, the thoughts and accumulated information of the sector, academics and specialized NGOs will establish an integrated approach as the grounds of General Directorate of Fisheries, the regulating official institution, will become more solid and its decision will remain indisputable.



## Monitoring and Checking

Checking illegal fishing is, in fact, one of the primary issues with regard to fishing management as well as to the conservation of coastal-marine ecosystems. Eventhough the fisheries legislation is regulated on the grounds of scientific facts and socio-economic priorities, the challenges of checking prevails. It should not be forgotten that checking in the sea is accepted all around the world as the most expensive and challenging method in checking fishing activities.

Within the framework of the legislation mentioned above, two of the competing institutions in terms of monitoring, checking and fining are the Ministry of Food, Agriculture and Livestock and the Coast Guard Command.

As it was mentioned in the reports and publications of universities and NGOs, it is thought that checking the caught fish at the places where they were landed at ports, at fish markets and at the last selling places like markets and restaurants will clearly intimidate illegal fishing. It is obvious that capacity building on this issue will be beneficial for the interests of our country. On the other hand, Class B type AIS transcievers, one of the electronic monitoring techniques used for fishing vessels and excursion boats, can be operated effectively to eliminate some missing points. In this way, it is pretty obvious that monitoring and checking activities will be improved considerably. In addition, for the fishing vessels that are obliged to mount Class B type AIS transcievers, a size limit revision by the authorized institutions, NGOs and academics should be considered. When decided, vessels of 9 to 10 meters can be put under scope of the regulation. This kind of regulation will provide support for the fishing vessels (that work along the coastline of 8.500 km.) land their catch at predefined points, fort he control of illegal fishing and for regular data collection to be used in fishing statistics. As the recreational fishermen will be included into the system, it is evaluated that unrecorded trade of illegal catches should be largely eliminated.

## Monitoring and Checking

Some marine organisms, either having a commercial value or not, are decreasing in numbers due to fishing activites. These species are pledged to be protected by national authorities that have ratified some international conventions. Here are the conventions that target the conservation of endangered marine species and of which the Republic of Türkiye is a party.

1. Bern Convention (on the conservation of European wildlife and natural habitats)
2. Barcelonan Convention (for he protection of the Mediterranean Sea Against Pollution)
3. Convention on Biological Diversity
4. CITES (Convention on International Trade of Endangered Species of Wild Flora and Fauna)
5. ICCAT (International Commision for the Conservation of Atlantic Tunas)

Endangered marine species living in our coasts have been given in this book at Chapter 12. By being a party to these conventions, the Republic of Türkiye is committed to protect these species and their habitats.

## 10 WHAT IS IUCN? WHAT DOES RED LIST MEAN?

Comprehension of the function of IUCN by the recreational fishermen is much more important than they think. Sometimes delicate issues like prohibited fish species, length limits and endangered species are discussed in the meetings or discussion platforms. Even if the IUCN and the red list criteria are referred to by conservationists and decision makers as scientific facts and the competence of IUCN is worldly acclaimed, neither the purposes of IUCN nor the red list criteria is well understood by some fishermen and underwater hunters. The provided information based on IUCN sources is naturally questioned by them. In this chapter you will find a brief presentation as to how IUCN works and the concept of Red List.

### IUCN

Intertantional Union for the Conservation of Nature (IUCN) was established in an international conference in 1948 with the name "International Union for Protection of Nature – IUPN". Since 1990, It has been decided that the union will be known as IUCN. Today, IUCN is a well-known global nature conservation organisation that holds the memberships of 160 nations including ours, 217 governmental organisations and 1050 non-governmental organisations. IUCN defines itself as being the oldest and the biggest nature conservation organisation in the world. IUCN operates under 6 Technical Commissions, 8 Area Offices, 5 Area Committees and 60 National Committees. Around 10.000 scientists take office in its technical commissions globally.

IUCN members are gathered once every four years at the World Congress, revise the policies and works of the Union and ratify the activity program. The council is an administrative unit and members of the Council are elected in the Congresses. Our country became a member of IUCN in 1993 with a status of State Representation. As a governmental organisation, Ministry of Forestry and Water Affairs, and as non-governmental organisations, Turkish Nature Protection Association, Turkish Foundation for Combating Soil Erosion, for Reforestation and the Protection of Natural Habitats (TEMA), World Wildlife Fund Turkey, and Nature Association are members of IUCN. IUCN National Committee was established in 2005 together with these members and began its activities.

IUCN is the single most organisation in the world in determining species' category of danger as to its place and conditions in the ecosystem. It also prepares conservation strategies for them. Whether the marine organisms (fish, cephalopods, crustaceans), all of which are in our case within the interest of recreational fishermen, are under threat or not both in the global and local scale are determined by IUCN expertise commissions. Within this framework, five more commissions work with Species Conservation Commission.

1. Commission on Education and Communication
2. Commission on Environmental, Economic and Social Policy
3. Commission on Environmental Law
4. Commission on Ecosystem Management
5. Species Survival Commission
6. World Commission on Protected Areas

### IUCN Species Survival Commissions (SSC) and the Red List

The IUCN commission concerning the readers of this publication is Species Survival Commission (SSC). SSC is a social network that is composed of more than 7.500 volunteers, usually with a scientific background. SSC defines its vision as "A world that values and conserves present levels of biodiversity." Most members are deployed in more than 130 Specialist Groups, Red List Authorities and Task Forces. Some groups address conservation issues related to particular groups of plants, fungi or animals while others focus on topical issues, such as reintroduction of species into former habitats or wildlife health. Members include researchers, government officials, wildlife veterinarians, zoo and botanical institute employees, marine biologists, protected area managers, experts on plants, birds, mammals, fish, amphibians, reptiles and invertebrates.

Working in close association with IUCN's Global Species Programme, SSC's major role is to provide information to IUCN on biodiversity conservation, the inherent value of species, their role in ecosystem health and functioning, the provision of ecosystem services, and their support to human livelihoods. IUCN's SSC brings out the world populations of the species and their distribution as long as researches and data are available for such evaluations. In doing this, all related scientific researches and data in the world are screened and classified. This information immensely contributes to the preparation of IUCN Red List of Threatened Species. The latest IUCN Turkey National Red List has been prepared by the coordination of Nature Conservation Center for butterflies. As for the marine organisms, red lists were prepared locally for cartilaginous and boned fish, fresh water fish, marine reptiles and mammals. In 2012, *Red List of Fisheries in the Mediterranean Region* was published by IUCN SSC with the contributions of many scientists. Some basic information about those species have been given in this book at Chapter 12.

In the process of preparing the bulletins, should the General Directorate of Fisheries and Aquatic Products take the Red List for Fish prepared by IUCN SSC into consideration in the discussions held with the contributions of fishing sector, recreational fishermen, university, and conservationist NGOs, their approach would be scientific and improve the implementation of sustainable fishing. Besides, it wouldn't be reliable to have recreational fishermen make subjective comments and manipulate the present conditions of the species and prohibitions periods, unit quotas and length limitations without basing them upon scientific data. From this point of view, Red List has a very important role.

## Species Categorization according to IUCN

The IUCN commission concerning the readers of this publication is Species Survival Commision (SSC). SSC is a social According to IUCN criteria, as it is seen in the categorization of all taxa, the evaluated species are divided into 5 categories starting from the best condition towards the worst.

1. Least Concern (LC)
2. Near Threatened (NT)
3. Critically Endangered (CE)
4. Extinct in the Wild (EW)
5. Extinct (EX)

Category of Critically Endangered are divided into 3 sub-category

1. Critically Endangered (CR)
2. Endangered (EN)
3. Vulnerable (VU)

The organisms whose populations have decreased to critical levels coincides to the category (CR) critically endangered.

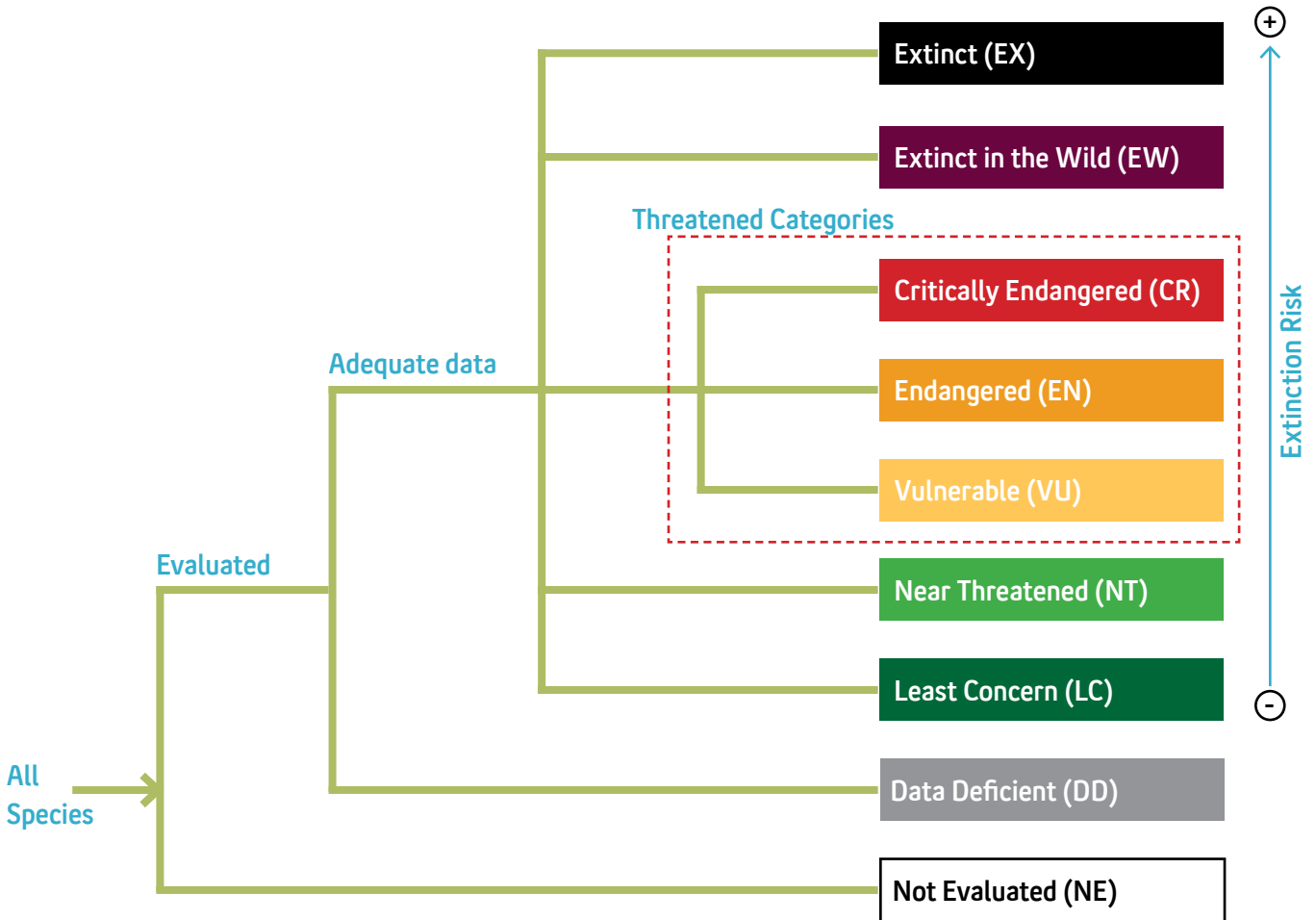


Table-3: IUCN Categories of Species (Kaynak: Akçakaya, 2008)



## 11 IN-SITU CONSERVATION AND MANAGEMENT

In order to conserve and manage an ecosystem or to conserve any organism whether it is economically valuable or not, learning of the species is very important. A good hunter need to know what species he should hunt and what not. He simply needs to recognise them in the marine environment. Otherwise, the risk of harming nature and the marine ecosystem increases significantly. If an recreational fisherman or an recreational underwater fisherman does not know about the species, he cannot momentarily decide what he needs to do about the fisheries he caught both in the course of and after the fishing activity.

From this point of view, responsible and conscious recreational fishermen primarily need to know about the critically endangered and vulnerable species and the reasons why these species should not be hunted.

Human-based deteriorations like overfishing, coast destruction, pollution affect the marine life very negatively. Minimum length and seasonal fishing period prohibitions are globally implemented methods to protect the hunted species from the pressures of overfishing. The main aim in here is to prevent the fishing of juvenile fish individuals that has not yet reached to adulthood, giving them a chance to reproduce for at least once and ceasing the hunt at the time of reproduction so that they can make enough numbers of juvenile fishes to sustain the continuation of the population. For a certain period of time, larvae and juvenile fishes of many fish species live in habitats very different than the adults live. Destruction of their habitats apart from the reasons related to fishing still paves the way of their extinction as juvenile fishes lose their suitable habitat even if the mating numbers are enough. This leads to another protection method used in large areas in the Mediterranean and that is establishing Protected Areas where human use is limited. These areas have rules to obey and geographical limits.

As we look at the marine protection areas, we see that they are usually comprised of three different zones. **1** – Nuthsell area: every human activity is limited and every kind of fishing is prohibited. **2** – Buffer zone: human activities are more free but still regulated with rules, commercial fishing is free only when some rules are obeyed and recreational fishing can be prohibited **3** – Outer zone: limits of human activities is at the least level, commercial fishing is free as they are regulated with some rules, recreational fishing is free on some certain conditions but speargun fishing is definitely prohibited. Rules that regulate commercial and recreational fishing and other human activities differ from one area to another depending on the area's physical, biological and oceanographic structure, the number of users, activity types and the current level of deterioration. Many good examples have shown that these areas protect the biological diversity and create an overall positive effect and help develop a sustainable fishing. It has been seen that some commercial and recreational fishermen who once have been the most defiant during the process of establishing such areas of limitations have turned into supportive groups as new protection areas established since they recognize that they are the true beneficiaries.

In order to have a successfully managed protection area, the area is to be established in the light of scientific data. A management plan that regulates the human activities is participated and supported by stakeholders and every activity should be thoroughly checked. An area cannot be protected without a Management Plan. The first and foremost prerequisite of a protection area is to make a just and science-based plan. The second prerequisite is the good implementation and the periodical revision of this plan. Unfortunately, in any of the protection areas in Turkey, an integrated approach, including both marine and coastal areas, is not applied. But at least for some marine-coastal protection areas (e.g. Gökova Specially Protected Area and Foça Specially Protected Area) we have the know-how, scientific data and knowledge to implement very well Integrated Management Plans. (Kıraç et al., 2012)

## 12 VULNERABLE AND ENDANGERED SPECIES IN OUR SEAS

Vulnerable, endangered and critically endangered species have to be known and recognized well by our recreational hunters. Some of the marine and coastal organisms of this kind, if not all, are given in Table-2.

	Names in Latin	Threats	IUCN Category
<b>Fish</b>			
Bluefin tuna	<i>Thunnus thynnus</i>	2	EN*
Common dentex	<i>Dentex dentex</i>	2-1-9	VU
Brown meagre	<i>Sciaena umbra</i>	2-1-9	VU
Shi drum	<i>Umbrina cirrosa</i>	2-1-9	VU
Dusky grouper	<i>Epinephelus marginatus</i>	2-3-1-9	EN*
White grouper	<i>Epinephelus aeneus</i>	2-3-1-9	NT
European hake	<i>Merluccius merluccius</i>	2-3-1-9	VU
Sand goby	<i>Pomatoschistus minutus</i>	1-2-8	VU
Green Wrasse	<i>Labrus viridis</i>	1-2-8	VU
Salmo	<i>Salma trutta labrax</i>	2	NE*
European sturgeon	<i>Huso huso</i>	2-3-1	CR
Russian sturgeon	<i>Acipenser gueldenstaedtii</i>	2-3-1	CR
Sandbar shark	<i>Carcharias plumbeus</i>	1-10-6	VU*
Basking shark	<i>Cetorhinus maximus</i>	3-6	VU*
<b>Reptiles</b>			
Loggerhead sea turtle	<i>Caretta caretta</i>	1-4-5	EN
Green sea turtle	<i>Chelonia mydas</i>	1-4-5	EN
Leatherback turtle	<i>Dermochelys coricea</i>		CR*
Spiny softshell turtle	<i>Trionix tringuis</i>	1-3-4	NE*
<b>Birds</b>			
Yelkouan	<i>Puffinus yelkouan</i>	1-5	VU
Dalmatian pelican	<i>Pelecanus crispus</i>		
European Shag	<i>Phalacrocorax aristotelis desmarestii</i>	1-10	VU*
Audouin's Gull	<i>Larus audouinii</i>	1-4	NT*
<b>Mammals</b>			
Monk Seal	<i>Monachus monachus</i>	1-5-4	CR*
Bottlenose dolphin	<i>Tursiops truncatus</i>	2-4-5-1	VU (Blacksea EN)
Short beaked common dolphin	<i>Delphinus delphis</i>	1-10-2-3	EN (Blacksea VU)
Striped dolphin	<i>Stenella coeruleoalba</i>	1-5	VU
Harbour porpoise	<i>Phocoena phocoena</i>	4-6-1-2	EN
Cuvier's beaked whale	<i>Ziphius cavirostris</i>	1-5	DD
Risso's dolphin	<i>Grampus griseus</i>	1-5-10	DD
Sperm whale	<i>Physeter macrocephalus</i>	5	VU
Fin whale	<i>Balaenoptera physalus</i>	10-1	VU
European otter	<i>Lutra lutra</i>	1-3-4	NT*

Table 2: Endangered species in our seas and coasts (source:IUCN, 2012)

The factors causing the decrease of a species population

1. Habitat deterioration
2. Overfishing
3. Illegal fishing
4. Deliberate Killings
5. Entangling in the ghost nets and dying
6. Nonselective fishing
7. Anchoring
8. Bottom dredging of trawls
9. Serious changes in marine ecosystems at trophic level
10. Intensive human activities leading to disturbance of species

\*The asterisk shows the organisms that are rarely seen and on the downside trend in terms of their populations in Turkey regardless of their being listed as globally endangered.

In Table-2, the factors causing the decrease of the species populations are given in the related column in order of priority.

Main threats for many species comprise habitat destruction/habitat deterioration, illegal fishing and overfishing.

It is very obvious that recreational fishermen will never disturb, harm, kill or injure the species cited above when they choose to be conscious and responsible. On the other hand, it is possible that we harm them unintentionally even if we know they are rarely seen, or we can harm them without knowing. This can happen while we are a) at sea on a boat, or underwater b) on land, driving a vehicle or walking. When we see these species and when we understand that they are breeding (courtship, mating, carrying nesting material, nesting, incubating, nursing their youngs, roaming with youngs) in the area, we should stop fishing and get away from the place calmly. In other words, we should leave the area and go somewhere else to keep on with our fishing. That would be a responsible fishing behaviour. If you are not in the breeding area of those species and there are no youngs at sight, as we have mentioned above, you can keep on fishing in the area.

## 13 LOST FISHING GEARS AND THEIR HARM TO THE ECOSYSTEM

### What kind of negative impacts does a ghost net cause?

"Ghost nets" are fishing nets that have been lost or deliberately left in the sea by fishermen. They entangle on the rocky sea bottom or drift in the open sea. These nets keep on fishing uncontrollably for years and have serious negative impacts upon the fish stocks. With the help of recreational fishermen's observations and recent studies, negative impacts of ghost nets are given a closer look. The best precaution to take is not leaving the nets in the sea. Another option is the immediate pulling of the nets out of the water by their owners. If this is not possible, the owner of the net should ask for help from the related government offices and from the NGOs so as not to let the net remain underwater.

When Mediterranean a Monk Seal (*Monachus monachus*), a loggerhead sea turtle (*Caretta caretta*) or a green sea turtle (*Chelonia mydas*) – one might see them more often than seals – is entangled in ghost nets, it cannot swim to the surface of the water and may drown as all of these species have lungs. There have been many cases of entangled Monk Seals in our country. We can cite in here that some pups and young seals have once been entangled in ghost nets in Foça and Karaburun, the vicinities of Izmir, an adult has entangled in ghost nets in Yeşilovacık too, the vicinity of Mersin.

After the invention of net knotting machine in Scotland in 1820, cotton fibers instead of hemp fibers began to be used by around 1840s. Synthetic fibers were invented in the years 1930s, and by 1960, all nets began to be made of synthetic materials and evolved themselves into their present condition. Synthetic materials are very durable, they aim to fight against hostile environments, so, when they get lost or left in the sea, they remain in the water much longer without rotting. This property of them makes them widely used in fishing. However, synthetic fishing gears have some undesired effects when lost in the sea.



Figure 30: a remnant of purse seiner net covering the bottom (a ghost net) © Adnan Ayaz / ÇOMÜ-SÜFAK



Loss of fishing gears are related to: bad weather conditions, the seabed /bottom structure, the condition of the navigation, running into other fishing activities, human-based mistakes (mark buoys may not be well tied), the impacts of sea birds and large animals (sea birds may cut off the buoy ropes by pecking them with their beaks; dolphins, whales, seals and the like may drag the nets far away), cut-off marking buoys meant to harm a fisherman by another fishermen, cut-off deep-sea ropes ripped by other lost fishing gears, and decoration mistakes.

There are two major effects of the lost fishing gears over an aquatic environment. One of them is to kill the organisms or make them run away from the area (the place are no longer used by organisms) by simply covering upon them (figure 42). The other effect is "ghost fishing".



Figure 31: a dentex caught by a small piece of ghost net (Dentex dentex) © Adnan Ayaz / ÇOMÜ-SÜFAK

Ghost fishing is the undesired fishing condition as lost longliners and lost traps and similar fishing gears in the sea or in the fresh water keep on fishing (figure 43 and 44).

Fishing gears keep on fishing after they are lost, and other animals that feed on the caught species turn into preys too as they try to eat the caught fisheries. This negative effect continues until the fishing gear is completely deteriorated in the water.

It has been reported that there are 267 species in the world influenced by lost fishing gears. Sea turtles, sea birds, sea mammals and many fish species are the first in line. According to the studies, dumped drag nets in the sea can keep on the "the activity of fishing" by itself for at least two months or to the maximum eight years depending on the material the nets are made and the environmental conditions. On the other side, synthetic fishing gears may withstand in a marine environment for about 10 years. Wooden traps with no chemical applications may withstand for two months whereas the ones with chemical applications (chemical paints, preservatives etc.) may withstand in the marine environment for two years without being deteriorated. The baskets whose structures are made of stainless steel wires can resist water from 10 to 15 years. And the plastic baskets using the latest technology stay in water in good conditions from 10 to 30 years without being deteriorated

The numbers of researches done in the area of determining the amount and the impacts of lost fishing gears are very few in Turkey. It has been found out that the interrelation between lost gears and ghost fishing varies regionally in Izmir and Gökova Bay. The data shows that ghost fishing continues in Izmir Bay for six years whereas in Gökova Bay more than one year. In a research to determine the amount, it has been found out that in one fishing season from 200 to 280 km of dragnets are lost in Izmir Bay, 226km in Adana Karataş and Yumurtalık and 229.48 km on the coasts of Istanbul. A research has found out that in a screened area in Gökova Bay, there are 157 meters of dragnets per hectare (Ayaz et.al, 2010). And finally in Iskenderun Bay, it has been found out that 4741 baskets/traps are lost due to various reasons in one fishing season. Researches shows that the lost nets and traps are very high in number and it proves the enormity of the problem of ghost fishing.



Figure 32: A set net left on the shore in the Dardanelles and the crabs constantly entangled in it. © Adnan Ayaz / ÇOMÜ-SÜFAK

### What shall we do if a marine species entangled to the fishing nets or ghost nets is alive?

When you find a Mediterranean Monk Seal, a Seaturtle or a Seabird entangled in a net, first of, you need to have them take a breath as they have lungs. The order of the intervention follows:

1. If a seal, a sea turtle or a sea bird is on the surface and entangled in the net, the net is pulled out to let the animal breathe. You should do it carefully trying not to touch the animal. If contact is necessary, please do it as little as possible.
2. If the marine organisms entangled in the net is underwater, the net or whatever the fishing gear it is should be quickly pulled out.
3. As the previous item is guaranteed, the net or the floater rope should be immediately cut off and the animal should be saved.
4. If the animal is not entangled in a net but in a longliner (especially sea birds), one fisherman closes the wings of the bird and holds two of its feet, and the other fisherman cuts the tip of the hook and carefully takes the pin out of the bird's flesh with pliers. After a short check, the animal is released to the sea.
5. If the animal gets away from the area by itself, it means there is no problem and you have been successful in saving its life.
6. If the animal still stays in the area even if the net is cut or the animal is released from the hook/fishliner, you should observe the the animal for a while and see if it gets back to its senses. In the meantime, watch over its breathing. Again there is no problem if it gets back to its senses at the end of this period.
7. If the animal is still numb and listless eventhough it has been released from the net and the hook/hooks, it should be taken carefully on board (if it is found numb and listless on the shore, the same practice applies). You need to call 158 Coast Guard Command and the related organisations for the first aid and rescue. Please prevent the well meaning interventions of non-expert people and stay with the animal until the help arrives.
8. For Monk Seals, please contact SAD-AFAG (Underwater Research Society – Monk Seal Research Group) through 0533-4885858, for Sea Turtles DEKAMER 0533 – 573 53 39, and for Sea Birds Vet. Ahmet Emre Kütükçü (please see Index-3)



## 14 MARINE SAFETY AND FISHERMEN'S LIFE SAFETY

Conservation of a marine ecosystem and fishing in accordance with rules by professional and recreational fishermen is just one of the important issues, the other is to take precautions to ensure the safety conditions of fishermen and others on the boat to the maximum.

The followings are some rules that fishermen should obey and some precautions they should take, which we assume very beneficial to consider.

1. Port Authorities do not demand seaworthiness certificate from recreational fishermen as long as they are active within the bay limits that remain inside the Turkish territorial waters, but the obligation of acquiring a Certificate of Seaworthiness applies to any boat with engines.
2. The maximum number of persons carried on a boat as it is written in the documents should not be increased so as not to endanger the safety of navigation, life and property.
3. One life jacket ready for use should be available for each fisherman. If the life jacket could inflate as it was thrown upon the water and its flashlights could activate with water, it is definitely preferable.
4. In the fishing boats longer than 14 meters, an AIS-Class B device (Automatic Identification System) should be mounted on the boat and always kept in operating state. Even for the boats smaller than 14 meters, we highly recommend that boat owners mount AIS-Class B on their boat and always keep it on.
5. Responsible Recreational fishermen should closely follow the meteorological conditions and weather forecasts before sailing and should not sail in stormy weather.
6. On their boat, fishermen must have a VHF wireless in working order and a Turkish Flag of an appropriate size. It is strongly recommended that a waterproof torch be included into this list.
7. Fishermen need to have in their boat a 1/100.000 scaled navigational charts of their fishing area.
8. For navigational safety, starboard and port left beams should be checked and made sure that they are in working order each time a fisherman goes sailing.
9. Fishermen should keep their certificate of seafarer on them.
10. Divers must always dive with a buddy. At least one person should be waiting for them on the boat.
11. A surface marker buoy should be used in every dive whether the dive is for speargun fishing or not. Marker buoy should be checked by the person who stays on the boat to see if it floats in the correct area.
12. Speargun fishermen should not dive in areas where there is intense tourism activities. Spearguns should be carried in discharged position before and after a fishing.
13. First aid materials should be available in every boat and recreational fishermen should have a first aid training especially for the cases like drowning and hypothermia.
14. A lifebuoy should be put somewhere accessible on the boat, in case someone falls into the water.



## 15 ESSENTIALS OF RESPONSIBLE RECREATIONAL FISHING

The essential point of recreational fishing is that it is “an activity which is done only for recreational or sportive purposes. It never pursues profit or commercial gain and the fish caught is never sold”. (The Bulletin numbered 3/2 that Regulates the Fisheries for Recreational Purposes). As recreational fishermen should have no worries of making money out of this activity, the aim, the enthusiasm and the pleasure of the activity will be very subjective. The motivations of and the expectations from fishing may differ among fishermen. But, and apart from the definition above, he

Whatever his motivations and expectations are, a *Responsible Recreational Fisherman* (RAF) is able to put them aside if needs be. Beyond the definition given above, a RAF knows marine creatures very well, and he can release his catch back into water when he thinks it is necessary regardless of his catch does abide by the regulation, he first cares about the marine ecosystem and then he fishes, he is a fisherman who is “aware and proactive”.

Fishing is in fact a matter of chance but fishing at the right place at the right the time with appropriate fishing techniques will surely rise the chances of success. The true success is to perform fishery as a conscious and sensitive fisherman and pave a way for the next generations to have their own share out of this pleasure. What points a RAF should be aware of, what precautions he should take and how he should take them at different stages of his fishing activity are explained in this chapter. Recreational fishing can be done either underwater (Spearfishing) or on the surface (by boat) or from the shore. What a Responsible Recreational Fisherman should do in principle in the course of fishing is closely related to how and with what gears he uses for fishing as the awareness and precautions change accordingly.

### Essentials of recreational fishing: General

A Responsible Recreational Fishermen (RAF);



- A RAF knows about the impacts he causes before/during and after fishing and takes responsibility of them.
- A RAF determines the method and standarts of his fishing by considering his target fish species and their lengths.
- A RAF knows and obeys the rules and regulations written in the bulletin that regulate fisheries fishing for recreational purposes.
- A RAF is informed and prepared about life safety requirements in the sea.
- A RAF does not sell the fish he catches, nor does he barter them for commercial purposes or for some other interest.
- A RAF releases the small fish back into the sea.
- A RAF does not fish above the daily limits.
- A RAF does not leave his fishing gear or fishing-based trash on the shore.
- A RAF does not use illegal fishing gears, nor does he use a subsidiary gear.

- A RAF does not anchor where the seagrass spreads in the bottom as much as possible.
- A RAF does not fish breeding fish.
- A RAF releases the fish back into the water in case he fishes more than he can consume.
- A RAF abides by the ethic rules in the acquisition and the make of live baits.
- A RAF knows of the sea, he knows about the organisms whether they make good fishing for him or not.
- A RAF uses ceramic or sand-made sinkers instead of lead.
- A RAF can distinguish vulnerable fish species and knows about the fishing prohibitions, species, length, place and time period prohibitions very well.
- A RAF distinguishes and knows about the rarely seen marine-coastal organisms like sandbar sharks, sea turtles, Mediterranean monk seals, audouin's gulls; he protects them and help them be protected.
- When he runs across an endangered species or when an endangered species is caught in his fishing gear, a RAF knows what to do.
- A RAF never fishes with scuba dive gears , nor does he dive with torches at night.
- A RAF never sells the fish he cathces, nor does he sell the catches of another recreational fisherman, and he never consumes such fish. If he finds out a sale of this kind, he reports it to the authorities.
- A RAF shares what he knows with other recreational and professional fishermen, he spreads the ethics and the correct information.

### A Responsible Recreational Fisherman (RAF) should

- Learn about his rights and limitations by law; implement them and set a good example for the people around him. (Please look at Chapter 9)



Figure 33: If you disobey the rules and regulations, you can never be a "Responsible Recreational Fisherman" © N. Ozan Veryeri / SAD-EKOG

- learn about the regulations related to where fishing is prohibited – the areas prohibited to speargun fishing or fishing with a boat or fishing from the shores). Besides, he should develop behaviours concerning the betterment of nature when fishing in a conservation area even if there is no prohibition.
- take the certificate of recreational fisherman from the Ministry of Turkish Republic, Food, Agriculture and Livestock, and he should keep it on him when he goes fishing.
- acknowledge that the sustainability of the fish stocks is the only guarantee to the continuity of his fishing activities, he also should be very selective and careful, he should not fish more than he needs or more than the quota set by the regulations. He should know the length prohibitions very well and abide by them.
- update himself and learn more about weather conditions and maritime activities for the safety of himself and of his fellows fishing with him. Freshwater fishermen ( fishermen of rivers, lakes etc.) should comprehend the different characteristics of these waters.
- learn about the features of the fish he catches, and should know by heart the endangered fish species and the prohibited fish species.
- be eager to gather local information; should acknowledge that he can learn a lot from the experiences of local people, which can make his own fishing activity productive and safe.
- Know the communication numbers of medical emergency, police, fire brigade, coast guard, gendarmerie by heart, and should be able to call these authorities calmly if needs be.

Neither the insufficient checking activities nor the nonprocedural activities of fellow fishermen should impede a Responsible Recreational Fishermen from abiding by the ethics. Every recreational fisherman shows effort to learn every related legislation and makes an effort to act accordingly.



Figure 34: An underwater hunter who obey the rules and regulations

### Before Fishing:

1. The main principle is nothing but safety. Precautions should be taken during the preparation stages of speargun fishing, fishing with boat or from shore. Communication devices (telephone, wireless), firework equipment for emergency, and life jackets should not be forgotten when fishing with boat.
2. First aid bags should be prepared and ready. Medicine should be available for the stings of poisonous fish and insects. It might be dangerous to be in close contact with animals we do not know of. There should be a pair of gloves in our equipment bag, in case we need to touch them.
3. As a precaution, it is significant that you let some people know when and where you are fishing.
4. The selectiveness of a RAF who does speargunfishing totally depends on his rule of thumb and it happens in the course of fishing. But anglers need to be careful with the hook sizes when preparing for the fishing and should not stray from being selective in any and every circumstances.
5. Before going fishing, a RAF should revise what he knows about the fishes he aims to catch and about the fishes he might catch unwillingly, and update himself about the fishing area.

### In the Course of Fishing

1. A thorough observation of the environment during the fishing is very important for safety. For example, when fishing from shore on the rocks, one needs to be careful with the waves that large ships can make. Such waves can be deadly. If a large ship or a very fast boat passes through, one needs to go upward to protect himself from its waves. Speargun fishermen should be careful with surges in the course of swimming and diving. Freshwater fishery RAF should be careful with swamps and be wary of the level of water in case it floods.
2. A RAF should avoid any behaviour that might place himself and other people with him into a risk. When fishing with boat, there is a risk of capsizing when people on the boat cause imbalance or when the boat gets the waves at the sides. In speargun fishing, the spear itself should not become a threat to another person, so it should be used accordingly. Freshwater and saltwater anglers should be very careful with their fishing rod when throwing a hook, for they might hurt somebody.
3. A RAF should never forget that the environment he is using is inhabited by other organisms. Seals, dolphins, seaturtles, seabirds and many other animals and plants exist in that environment for feeding and sheltering. These organisms should be monitored closely and a RAF should avoid any behaviour that might harm or disturb them. Some of those species might come for the caught fish or even for the bait. The best behaviour in this case is to pull out the fishing rod. If you hurt the animal accidentally, you should inform authorities immediately.

### After Fishing

1. Pursuant to national legislation, the fish caught with spearguns cannot be consumed at restaurants and at similar business places.
2. The fish hunted for recreation purposes cannot be sold to make profit.
3. Untrained hunters should be clearly informed about the fishing techniques and fishing areas of vulnerable and endangered species in order to reduce the pressure over those fishes.
4. Information about the fishing should be submitted to the authorities in writing. This issue is in fact going to be handled in the years to come, but in any case, it is within the scope of responsible fishing. After the hunt, the fishing effort subjected to the target species and the results of it including its productivity variations (even if the fishing is not much or not at all successful) should be reported to the related government office.
5. Fishing data should be recorded in a record book.



## My Approach as a RAF

1. I never hunt fish nor do I go fishing without acquiring an recreational fisherman certificate from the Ministry of Food, Agriculture and Livestock, eventhough having this certificate is not compulsory.
2. If I run across an recreational fisherman who does not have an recreational fisherman certificate, I advise him to have one.
3. I never hunt fisheries that are below the length limits.
4. If I unwillingly catch a marine organism under the size limits, I release it (a fish or another marine species) into the sea without causing an injury.
5. I search for and learn if there is a fishing cooperation or a similar kind of organization in my local area, and if there is any nature (marine-coastal) conservation organizations (GOs or NGOs), I keep in touch with them or at least learn their telephone numbers.
6. I know about the coastal and bottom structure of the sea, I know where the seagrass beds are, the ridges and potential fishing areas and I anchor my boat based on my knowledge of them. When anchoring, I pay a lot of attention so that seabeds are not destroyed.
7. I make my excursion plan as to where I will go, how long I will stay and the time of sailing. I let my excursion plan and my cellphone number known by people who is able to help me in case of emergency.
8. I have a training on first aid. I have a complete first aid medical kit in my boat.
9. Based on the information I gathered about the coastal area and marine life, I select appropriate equipment and gears for myself and for the fishing.
10. I learn about the difference between machine emissions that are fueled by benzine and diesel and learn about the difference between the 2-stroke and 4-stroke engine types, and I choose accordingly and consciously.
11. I know what damages that devices (emitting sound, smell or physical properties), left fishing gears, and wastes may cause in the sea. I strictly avoid causing such damages.
12. I know the impacts of my choice of baits (sea cucumber, juvenile fishes etc.) and act accordingly.



Figure 35 : A baby grouper caught under the dimension limits. A Responsible Amateur Fisher is aware and knowledgeable and never hunts like shown above.

13. I adopt the the least harming procedures and behaviours (avoiding the discharge of chemical pollution, liquid wastes, heavy metals, cigarettes into the sea).
14. I know the rules of navigation and life safety, and I abide by them.
15. I mount a Class B type AIS transceiver on my boat for the safety of my life and property, no matter it is not compulsory for recreational fishermen yet.
16. Being an recreational fisherman, I do not sell the fish and other aquatic fisheries I caught, nor do I profit them in any commercial way.
17. Even though I do not exceed the regulated limits, I chose not to hunt more than I will consume.
18. The fisheries I caught is for my consumption only and I share them only with my family and friends. As for the excess of what I need, I release them into the sea without killing or hurting them.
19. I do not keep illegal fishing gears, nor do I use illegal fishing methods.
20. I use legal fishing gears at all times.
21. I protect the fish I caught from rotting, I do not leave the dead/rotten fish to the environment.
22. I do not leave any waste, I never throw anything into the sea, I keep all of my equipment sealed in boxes or in bags.
23. I deposit some of my suitable wastes into recycling trash containers.
24. I collect both my own trash and other trash I found in the fishing area, and dump them into trash containers.
25. As I notice pollution more than usual, in case of stressed or dead fishes, exotic fishes and environmental problems, I immediately call for the authorities.
26. Without having the permission of the authorities, I never transport exotic species, nor do I keep them or release them among the local species.
27. I do not damage flora on coast when I enter fishing areas, I avoid crushing and harming the plants, I avoid causing any harm when constructing wooden piers and the like, even if the pier's permission does not oblige me for it.
28. I avoid behaviours that might cause fire.
29. I do not disturb, nor do I harm the wildlife. I keep the fishing baits and hooks away from the habitats and breeding areas of seabirds to have them safe and sound.
30. I use smaller leads as sinkers, and if possible I go for the alternatives (ceramics etc.).
31. I am careful about not causing too much marine traffic, I decrease the speed and noise of my boat, I reduce my potentials of disturbing or harming a marine ecosystem, I pay attention not to harm the fish, plants, sea birds or organisms living in the sea.
32. I never anchor my boat outside the permitted areas. If possible I do not anchor at the places where seagrass beds lie in the bottom. I tie my boat to buoys attached to arranged concrete mooring blocks if there is any.
33. I avoid walking on the coasts of wetlands and shores when it is the breeding season for many species. I do not set foot on the areas when seabirds breed and live in colonies.
34. I do not use poisonous/pollutant chemicals, nor do I use this kind of baits.
35. I do not transfer an organism from one area to another including my baits.
36. I do not harm the natural environment and the habitats while I collect my baits. I do not catch juvenile fishes from deltas and lagoons.
37. I release the unwillingly caught fish that does not match with my targets back into the water very carefully.
38. I learn the techniques like bursting the air bladder and placing back the stomach of a fish when it is out and I use these techniques in rescuing the groupers (Serranidae family) and dentexes. After the rescue, I release them back into nature.

## 16 RESPONSIBLE RECREATIONAL FISHERMAN CERTIFICATION

Today it is known that fish stocks are so decreased that some fish species are on the brink of extinction. In this hostile circumstance, the impact of illegal and overfishing done by commercial fishing fleets cannot be denied. On the other hand, the gross impact of wrong doings and wrong fishings of recreational fishermen, who are hundreds of thousands in numbers, should never be underestimated as well. In this case, recreational fishermen who act responsible and care about ethics will have an important role. People who do recreational fishing in harmony with nature or the ones who perform their activities without damaging nature, or, as in our case, the fishermen who choose to meet the requirements of responsible fishing cannot be grouped under the same category with the ones who do not act this way. Therefore, the distinction criteria should be put forward. The fishermen who meet the requirements should be given a certificate of "Responsible Recreational Fisherman" presented by the Ministry of Food, Agriculture and Livestock in cooperation with NGOs.

This implementation should precede the incentives and targets for increasing the number of fishermen who fish without damaging the ecosystem. Recreational fishermen who act responsible can be suggested by NGOs, fishing and diving clubs and by individual people. Every year, recreational fishermen who are evaluated as responsible fishermen can be given these certificates in a formal ceremony organized by the General Directorate of Fisheries and Aquatics. The concept can be spread by the Directorate as the certification process encourage fishermen to remain responsible and improve themselves to reach the ideal recreational fisherman standards.

The amount of time we need to achieve this project's goals and how successful the outputs can be will depend on the approaches of both recreational fishermen (us) and of regulating and controlling authorities. The duration of the transition from Conventional Recreational Fishing to Responsible Recreational Fishing will be determined by recreational fishermen, decision makers and implementors. In fact, how much they care the concept of Responsible Recreational fishing and when they embrace them are the key determiners.

In this project, the stakeholders had the opportunity to gather and discuss about "Developing Responsible Recreational Fishing in Turkey" for the very first time. Please visit the official website of the project [www.1balikcokbalik.org](http://www.1balikcokbalik.org) for further information.





## ANNEXES 01 - BROCHURES

Spearfishing at night is forbidden

**Gece Sualtında  
Zıpkınla**



**Balık Avlamak  
YASAKTIR**

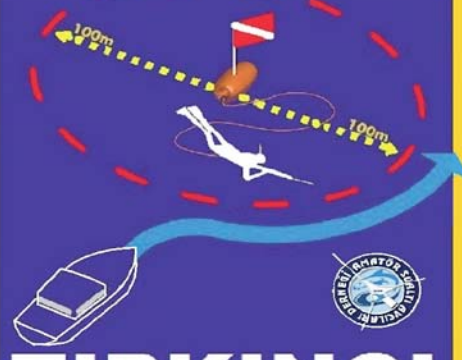
İhbar : Jandarma 156  
Polis 155  
Sahil Güvenlik 158

Amatör Sualtı Avcıları Derneği  
[www.amatorsad.org](http://www.amatorsad.org)




Becareful! Spearfisher is here!

**DİKKAT  
ET**



**ZIPKINCI  
VAR..!**



Underwater fishing is an amateur fishing activity and it is free under certain conditions.

**SUALTI AVCILIĞI BİR AMATÖR  
BALIKÇILIK FAALİYETİDİR**

Tarım ve Köy İşleri Bakanlığı 2/2 Numaralı Amatör (Sportif) Amaçlı Su Ürünleri Avcılığını Düzenleyen Tebliğ Madde 17/2

Denizlerde amatör avcılık parakete , pinter ve sepet gibi tuzaklar hariç olmak üzere; her türlü olta takımı, serpmeye, yemlik uzatma ağı ve sualtı tüfeği ile yapılabilir.



Gün doğumundan gün batımına kadarki sürede tebliğce ve güvenlik nedeni ile yasaklanmış karasularımızda, kendi nefesi dışında ek bir hava kaynağı kullanmadan dalarak su altı tüfeği ve yardımcı ekipmanla su ürünleri avcılığı yapmak

**SERBESTTİR**

**YASAL DAYANAK :**  
Tarım ve Köy İşleri Bakanlığı 2/2 Numaralı Amatör (Sportif) Amaçlı Su Ürünleri Avcılığını Düzenleyen Tebliğ

Amatör Sualtı Avcıları Derneği  
[www.amatorsad.org](http://www.amatorsad.org)



This flag is a diving flag, showing a diver is underwater.

**BU  
BAYRAK**



**DALIŞ  
BAYRAĞIDIR**

Birinin daldığını çevredeki deniz araçlarına belirtmek için kullanılır.

**AMATÖR SUALTI AVCILARI DERNEĞİ**

## ANNEXES 02 - CERTIFICATE OF RESPONSIBLE FISHERMAN

# SORUMLU AMATÖR BALIKÇILIK SERTİFİKASI

Ad : \_\_\_\_\_

Soyad : \_\_\_\_\_

Telefon : \_\_\_\_\_

Kan Grubu : \_\_\_\_\_

İletişim Adresi : \_\_\_\_\_

*Sorumlu Amatör Balıkçılık kural ve limitlerini biliyorum. Amatör Balıkçılık Resmi Belgem var.  
Doğal ve kültürel değerleri koruyarak, yerel hassasiyet ve kurallara uyarak avlanıyorum.  
Her yıl yenilenen sirküler ve güncel teknolojik, bilimsel verilerle bilgilerimi sürekli yeniliyorum.*

Bu sertifika gönüllük esasına dayalı olarak alınır.

TÜRKİYE DENİZ KORUMA ALANLARINDA  
SORUMLU AMATÖR BALIKÇILIĞIN GELİŞTİRİLMESİ PROJESİ  
PROJECT FOR RESPONSIBLE AMATEUR FISHING  
IN MARINE PROTECTED AREAS - TURKEY
























































































































































































































































































































































































































## ANNEXES 03 - SOME IMPORTANT TELEPHONES AND ADDRESSES

Ambulance **112**

Coast Guard **158**

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Gendarmerie **156**

Ministry of Food, Agriculture and Livestock

**<http://www.tarim.gov.tr/BSMG/Anasayfa.aspx>**

Ministry of Forest and Water Affairs

**[www.milliparklar.gov.tr](http://www.milliparklar.gov.tr)**

DEKAMER

**[www.caretta.pau.edu.tr](http://www.caretta.pau.edu.tr)**

SAD-AFAG

**[www.sadafag.org](http://www.sadafag.org)**

Vet. Ahmet Emre Kütükçü

**[www.facebook.com/ahmetemrekutukcu](https://www.facebook.com/ahmetemrekutukcu)**

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**TRANSITION TO RESPONSIBLE FISHING IN TURKEY**

