

Republic of Türkiye Ministry of Environment and Forest
Environment Protection Agency for Special Areas

FOÇA and MEDITERRANEAN MONK SEAL Conservation and Monitoring of the Mediterranean Monk Seals (*Monachus monachus*) in Foça Special Environment Protection Area



T.C.
Çevre ve Orman
Bakanlığı





**Republic of Türkiye Ministry of Environment and Forest
Environment Protection Agency for Special Areas**



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(*Monachus monachus*) in Foça Special Environment Protection Area**

Cem Orkun Kır   and Harun G        

December, 2008

FOÇA and MEDITERRANEAN MONK SEAL
Conservation and Monitoring of the Mediterranean Monk Seals (*Monachus monachus*)
in Foça Special Environment Protection Area

*This book is prepared by the **Underwater Research Consultancy Ltd. Co.** for **Republic of Türkiye Ministry of Environment and Forest, Environment Protection Agency for Special Areas**, as part of the project **“Conservation and Monitoring of the Mediterranean Monk Seals (*Monachus monachus*) in Foça Special Environment Protection Area”***

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Preface

With pristine coasts, relatively clean sea and its islands, Foça and in the immediate vicinity of marine areas are special containing the unique natural and cultural assets. Foça, standing on the northeastern entrance of İzmir Bay, is very rich in coastal and marine biodiversity in the global scale and has a significant history inherited from the ancient times. Among the most important components of the biological diversity are birds (especially breeding sea birds, water birds and raptors), fish (whether having commercial value or not), posidonia (*Posidonia oceanica*) and Mediterranean monk seal (*Monachus monachus*). The area was declared as the Important Bird Area (IBA) in 1997 thanks to the breeding marine birds and raptors on the Foça Islands.

The area was also declared as 1st and 2nd degree natural, archeological and urban SIT areas and in 1990 it was declared as the Special Environment Protection Area thanks to its importance in terms of biological diversity including endangered fauna species. However, it is a fact that having the protection status doesn't necessarily mean that the area is protected strictly. The pressure of excessive and unplanned tourism, coastal development, illegal fishing and over fishing were all standing against us. The most important gaps are lack of sufficient scientific data on the biodiversity and absence of comprehensive management planning for the sustainable development and conservation of habitat & species in Foça SEPA. Briefly, it has been found out that a management plan must be formed taking local conditions into consideration after detailed research and data collection.

The aim of "Conservation of the Mediterranean Monk Seals in Türkiye; Foça Pilot Project" and the other long term projects executed by SAD-AFAG in the region is the protection of the coasts, marine and island ecosystems of Foça and biodiversity as a whole considering endangered Mediterranean monk seal as a symbol and an umbrella species. The other important target, which is parallel to the previous one, is to contribute to fishery -one of the most important socio-economic elements in Foça- in terms of sustainability. In fact, Foça Pilot Project aimed not only the protection of endangered monk seals but also the protection of the whole coastal & marine ecosystem and help regulate fishery having minimum impact on marine and the coastal ecosystem by developing sustainable *use vs conserve* principles.

On behalf of Underwater Research Society Consultancy Co., this book has been funded by EPASA and prepared by SAD-AFAG as an output of the project entitled "**Conservation and Monitoring of the Mediterranean Monk Seals (*Monachus monachus*) in Foça Special Environment Protection Area**". It is supposed that the book on *Foça and Mediterranean monk seal* as a comprehensive assessment on the species, its habitat and threats in Foça area will fill a gap. Moreover, the data and analysis from this project combined with the previous studies will be a source for the other bodies which may carry out further research. In this context, with the financial support of EPASA and with the studies of SAD-AFAG, crucial information has been reflected on the comparison of past and current status of the endangered Mediterranean monk seals and its habitats in Foça SEPA, analysis on the problems and further measures to be taken for protection. This information has enabled to EPASA, which is a responsible body for the area, to prepare management plans for sustainable development and nature conservation in Foça SEPA in the near future.

The book entitled *Foça and Mediterranean Monk Seal* which has been prepared within the context of this project underlines the importance of Mediterranean monk seal as one of the rarest animals in the world, and it serves the protection of the whole marine & coastal ecosystem as well. I would like to thank all who has contributed to the preparation of this book.

Ş. Önder KIRACI
President of EPASA
December 2008, Ankara

1. Overview of the Mediterranean monk seals

1.1. Taxonomy

Mediterranean monk seal, being a marine mammal, belongs to the subordo Pinnipedia. In Pinnipedia (=fin-footed), it is a member of “true seals” (Phocidae) family and of “monk seals”, genus *Monachus*. The Mediterranean monk seal is the rarest among all pinnipeds worldwide and they survive only along eastern Mediterranean and on some parts in the eastern Atlantic coasts (Figure-2).

The systematic classification diagram of Pinnipeds in the world is given below:

1.2. The status of the species in the world and in Türkiye

Until the beginning of 1900s, this rare marine animal lived on the coasts of whole Mediterranean basin and on eastern Atlantic coasts from Portugal to Senegal - on the western coasts of Africa. After 1950s, its number started to decline within its distribution range and the colonies were divided into remote sub-colonies. In 1980s Mediterranean monk seals remained only in the eastern Mediterranean and on the eastern Atlantic coasts. Today, this rare marine mammal mainly exists only along the coasts of Türkiye, Greece, Maurita-

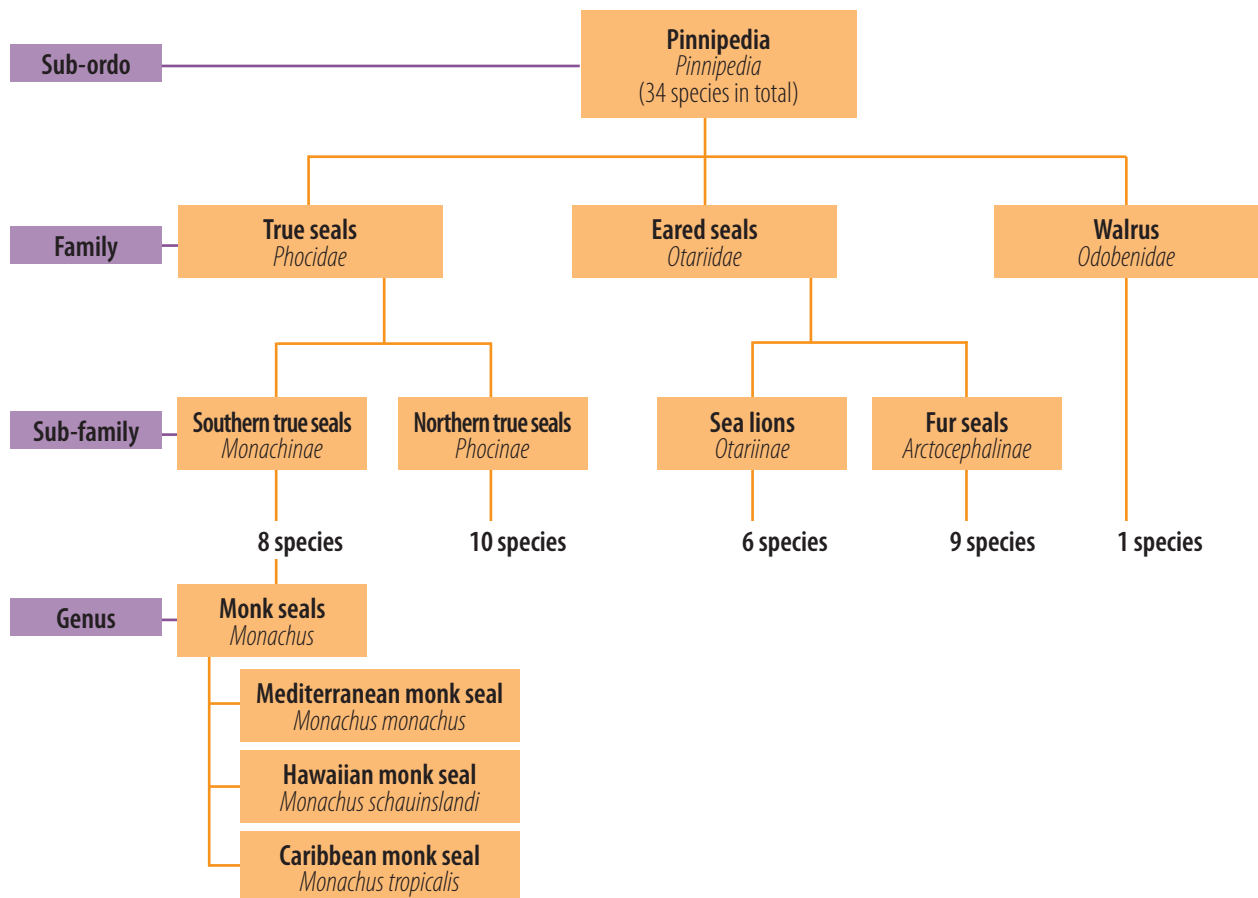


Figure 1. The Pinnipeds of the world and the place of *Monachus monachus* in the taxonomy¹

¹ Riedman, 1990

nia and Madeira islands of Portugal. Total population is in the range of nearly 500-600 individuals. It is supposed that approximately 100² Mediterranean monk seals live along Turkish coasts, 200-250 and according to another source 234-300³ in Greece, 180⁴ in Mauritania and 25-35⁵ in Maderia (Figure-2). The Mediterranean monk seals in Mauritania coasts have been living together in the region of Cape Blanc proving the characteristic of real colony of Mediterranean monk seal; the eastern Mediterranean population living in the waters of Greece and Türkiye are forced to live in scattered groups or individuals and hence monk seals generally wander alone. In the Aegean Sea, monk seals live separately from each other instead of conglomeration due to the pressure of human activities. The monk seals in Madeira Islands (Deserta Grande, Ilheu Chao, Bugio and to a lesser extent in Madeira) and as they are less subject to human pressure, they live in less scattered groups in comparison with Türkiye.

The biggest population of the species exists in the Aegean Sea in the world. Hence, Türkiye and Greece bear a very critical responsibility so as to contribute the species to render its existence in the ecosystem and to continue its generation in the Mediterranean Sea. Therefore, Türkiye is among the countries that has ultimate responsibility for the protection of the species across the world distribution range.

In Türkiye, based on different researches conducted between 1987-1998, 32 to 44 seal individuals were

identified determining the distinct marks on the bodies⁶. In 2004, thanks to the more comprehensive data using more recent sighting information collected in SAD-AFAG's database FokData, it was foreseen that nearly 100 Mediterranean monk seals live along Turkish coasts⁷. Considering that the total world population comprises of 500-600 individuals, this number refers to an important proportion.

The distribution range of the Mediterranean monk seals in our coasts shows intermittent characteristics and concentrating along certain coastal segments. The Mediterranean monk seals mainly exist along Turkish coasts as given below:

- 1. Marmara:** The coasts between Güreçaltı and Karabiga, Marmara Islands and Mola Islands, Kapıdağ Peninsula, some coasts between Bandırma and Mudanya, the north western coasts of Armutlu Peninsula.
- 2. Aegean:** Northern Aegean: Saroz Bay, the Aegean coasts of Gelibolu Peninsula and the Coasts between Çanakkale and Behramkale, Southern Aegean: the coasts between New Foça and Cape Knidos of Datça Peninsula.
- 3. Mediterranean:** Cape Knidos of Datça Peninsula to Kemer, along the coast from Alanya to

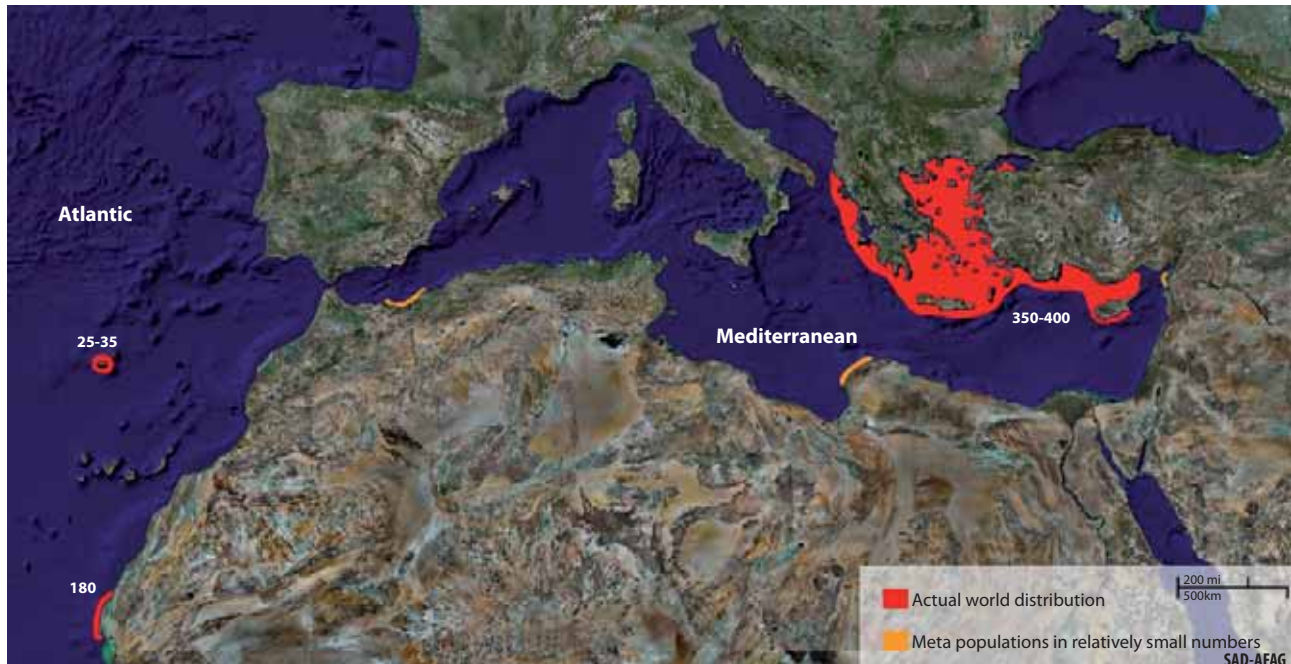


Figure 2. World population and distribution of Mediterranean monk seal.

² Güçlüsoy et.al. 2004
³ Johnson et. al. 2006; Cebrian et.al. 1998
⁴ Larinnoa pers. comm. 2008
⁵ Pires pers.comm. 2008

⁶ Kırac et. al. 1998a; Öztürk, 1998
⁷ Güçlüsoy et.al 2004



Figure 3. The coasts between Ölüdeniz and Kalkan Photo: SAD-AFAG C.O.Kıraç



Figure 4. Foça Orak Island Siren Rocks Photo: SAD-AFAG C.O.Kıraç



Figure 5. Datça Peninsula northern coasts. The habitat of the Mediterranean monk seal is remote and rocky cliffs difficult to reach by human. Photo: SAD-AFAG C.O.Kıraç

Taşucu and along the coast from İskenderun Arsuz to Turkish-Syrian border.

The Mediterranean monk seals have been struggling to survive along above given Turkish coasts (Figure-2).

In Turkish Black Sea marine and coastal areas, the number of the monk seals have decreased drastically mainly due to deliberate killing and also sharp decline of fish stocks due to overfishing⁸ and since 1997, no confirmed sighting record has been reported on the existence of the species⁹ along Turkish Black Sea coasts.

In the recent years, seal deaths are rare while breeding has been regularly occurring along Turkish coasts¹⁰.

1.3. Habitats

The habitat of the Mediterranean monk seal in Mediterranean Sea and on our coasts shows characteristic aspects: *“along the remote and untouched coasts that have no urban development, or coasts difficult to be reached by man or far away from human activities, and rocky/cliff coasts preferably having coastal caves or caverns for breeding and/or resting purposes”*

Primary habitats of the Mediterranean monk seals are remote and untouched coasts and in order to con-

⁸ Kıraç and Savaş, 1996; Güçlüsoy et.al.2004

⁹ Kıraç, 2001

¹⁰ .e.g.Veryeri et.al 2001,Güçlüsoy and Savaş 2003; Kıraç 2008



Figure 6. Mediterranean monk seals are carnivorous and forage diving underwater. Photo: SAD-AFAG Z. Kizilkaya



Male: There is a distinct white patch on abdomen while its overall color is nearly black or dark brown



Female: Top is light or dark grey and underpart from neck to tail is paler or nearly white colour. On the waist there are scratches giving a pale patch made by males during copulation.



Pup: When it is nearly 4 weeks old, starts to replace hairs and at the end of the six weeks short, glossy, grey hairs replace long, black hairs.



Newborn pup: Except the distinct white patch on abdomen, the body is covered with longer black hairs of 1-1,5 cm. The shape of white patch in the abdomen is useful for determination of sex

Figure 7. The morphology of female, male, young and pup Mediterranean monk seals. (Drawings: © Eduardo Saiz)



Figure 8. Just one-week old Mediterranean monk seal pup. Photo: SAD-AFAG C.O.Kıraç

tinue its generation, the species needs suitable habitats, untouched coasts as identified above. As they are relatively large marine animals, they can't survive and breed in narrow sized habitats (e.g. coastal areas comprising of one or two bays). This species can only breed safely in the case of existence of a coastline in optimum sizes. The species only safely breed and continue its survival in relatively large and suitable untouched coasts such as Foça and its vicinity, Karaburun Peninsula, Dilek Peninsula National Park, Datça Peninsula, Reşadiye Peninsula, Kalkan-Kaş-Kekova coasts, Olimpos Beydağları National Park, Cape of Gelidonya and Beşadalar region or the untouched coasts lying between Gazipaşa and Taşucu¹¹.

1.4. Feeding

Mediterranean monk seals are carnivorous and marine creatures such as octopus, fish and lobster are among their food. In Turkey, despite being opportunistic animals, monk seals seem to prefer sea bass, grey mullet, red mullet, turbot, common dentex, conger eel, squid and octopus based on our own observations in the field and 1st hand sighting information collected from local fishermen. It has been

determined that their foraging strategy can be categorized into two; mobile foraging by scanning a certain region and spot foraging on the same reef¹². As the Mediterranean monk seals are mammals, they have to make respiration with air and usually dive for 5 to 10 minutes and get out to surface again breathing. According to the observation records along the Turkish coasts obtained from the free ranging monk seals, the average dive time is 6 minutes and 45 seconds and the maximum is 18 minutes¹³. The Mediterranean monk seals are described as shallow water divers compared with other fin-footed species. Until very recently, it was thought that the monk seals dive in shallow waters not exceeding 100 meters deep compared with other seal species. However, according to the latest data obtained from a young monk seal with a transmitter, the seal dived to 180 meters deep¹⁴. However, among the other seal species capable of diving up to 1500 meters deep, the Mediterranean monk seals are still shallow water divers. It is known that from time to time, they are also known to take fish from the artisanal fishermen's nets. This situation causes competition which may result in deliberate killing of the monk seals by artisanal fishermen.

¹¹ Öztürk et. al. 1991; Kıraç et. al. 1998; Güçlüsoy et.al. 2004

¹² Güçlüsoy and Savaş, 2003

¹³ Kıraç et.al. 2002

¹⁴ Dendrinos et.al. 2007



Figure 9. Sometimes, the Mediterranean monk seals may be obliged to take fish from nets of artisanal fishermen, which may be attributed to lack of fish due to overfishing. Both fish loss and damaged nets push coastal fishermen in a difficult economic situation. Solution: It is of utmost importance to take necessary measures and to have consistent fishery policies to attain healthy fish stocks. Photo: SAD-AFAG Y. Savaş

1.5. Morphology

Mediterranean monk seal is a huge marine mammal and its length varies between 2,1 and 2,5 meters and weight between 250-300 kg. Not longer than 0.5 cm, hairs densely cover skins of adult seals. When they are seen swimming, the most outstanding feature is the huge glossy head without external ears, long whiskers and coal-like black eyes. There is no distinct difference in terms of weight and size between males and females but they have colour pattern distinction (Figure-7). Their large bodies can easily be recognized when they are seen lying on open beaches. There are fore fins on both sides of their body and at rear there are back fins in two parts. Newly born pups have all black hairs of approx. 1, 5 cm. while there is always a white patch on abdomen. When they get 6 months old, the long black hairs are replaced with short and glossy grey hairs¹⁵.

1.6. Behaviour and Breeding

Mediterranean monk seals are timid, and when compared with other fin-footed species they are less social animals. The monk seals in the eastern Mediterranean including the coasts of Türkiye live very scattered and they are rarely seen together in relatively high numbers. The researchers in Türkiye sometimes observe 2-4 seals wandering together and this number hardly increases up 7-8 animals¹⁶. Although we have some basic knowledge, there isn't much information about their behaviours. There are some assumptions that,



Figure 10. It may be possible that this young monk seal in Ankara Zoo was born by a female captured alive from Turkish Black Sea coasts on inquiry. Photo: SAD-AFAG Archive

from time-to-time, The Mediterranean monk seals come together and spread out again. Adult males generally keep a territory on remote and rocky points or capes and continue living in those selected territories. Based on our observations along the Turkish coasts, females wander more than males, but in pupping period, females spend their time in breeding cave and vicinity. Young seals are long distance travellers in their juvenile period and can go far distances.¹⁷

Female seals reach sexual maturity at the age of 3-4 years¹⁸. Copulation occurs in the sea¹⁹. After the period of 10-11 months of pregnancy, females give birth to a pup every year or every two years.²⁰ Therefore, breeding rate of Mediterranean monk seals is slow which affect its global population. Thanks to the observation data collected along in Turkish coasts, birth takes place usually in October autumn. Birth takes place along inhabited coasts and at the end of a cave in which there is air, or on a rocky beach where waves cannot reach easily or on a rocky platform which is dark or dim light. Platforms can be composed of sand, pebbles or rocks. Mother suckles pup nearly for 4 months with her milk²¹. Then, pup with the help of its mother starts to forage itself with live fish. Based on the data that SAD-AFAG has been collecting in the field since 1987. The Mediterranean monk seals are surely in need of land to give birth to their pups and bring them up. The monk seals need especially *untouched coasts and coastal caves with air and platform* for breeding. The Mediterranean monk seals are surely in need of land to give birth to her pup and bring them up safely and they need especially coastal caves for breeding. Conservation of the pristine coasts is of vital importance for breeding and hence survival of the species.

¹⁵ Dendrinos et.al. 2000

¹⁶ AFAG 2008

¹⁷ Güçlüsoy et.al 2004 Johnson 2 et.al 2006

¹⁸ Cebrian, 1993

¹⁹ Kiraç and Veryeri, 1996; Pastor et.al 1998

²⁰ Marchessaux and Pergent-Martini 1991, Pasto rand Aguilar 2003

²¹ Mursaloğlu 1986

2. Factors Contributing to the Decline of the Species

The decline of the Mediterranean monk seals is not caused by only one problematic issue. Five main factors combine and cause the extinction of the species along Turkish coasts. This decline has reached the level of extinction in some regions such as Turkish Black Sea coasts, where monk seals can not be observed any more²².

2.1 Deterioration of coastal habitats

The habitats of seals are untouched and remote coasts that keep their natural forms. In Türkiye, such pristine areas have been gradually declining along certain regions. As new roads are built, constructions of summer houses or tourism develops along the coasts, natural characteristics and peculiarity of coasts are deteriorated. As a result, naturally monk seals leave such coastal areas²³.

Moreover; this negative factor affects the Mediterranean monk seals but also the archaeologic sites



Figure 11. The most important reason affecting the endangered Mediterranean monk seal negatively is the deterioration of coastal habitats. The coastal road that was opened along the southern coasts of Dilek Peninsula National Park in 1997 could be stopped and closed for further use to protect the natural habitats by D.G. National Parks with the initiative taken by SAD-AFAG. Photo: SAD-AFAG C.O.Kıraç

that have a history of thousands of years along Anatolian coasts. Besides, this factor causes the natural landscape to be deformed, it also devastates the fertile agricultural areas and corrupts the historical & cultural values. The deterioration of landscape is another result of unplanned construction.

2.2 Overfishing and/or illegal fishing:

Marine creatures consist of foods of monk seals. The fish stock has been decreasing largely as a result of chronic illegal and/or overfishing practices. Illegal fishing methods such as trawlers, tratas, purse-seiners, dynamite fishing, spear fishing by scuba divers or with torch seriously harm the fish stocks. Until 2001, trata fishing was allowed in the legislation. As trata fishing whether it was legal or illegal occurred in 0-10 meters deep and in the coasts, it has had negative effects on the stocks of fish, crustaceans and mollusks.

As a result of illegal and overfishing, both seals foraging in shallow seas and small scale (artisanal) fishermen are affected very negatively; seals can not have enough food, which shall have a direct effect on physiology and breeding of animals as well



Figure 12. A purse seiner operating near the coast in Foça. Photo: SAD-AFAG C.O.Kıraç

²² Kıraç 2001

²³ e.g. Savaş et.al. 1998



Figure 13. The skull of an adult monk seal which was shot dead in Anamur, Mersin in 1995. Photo: SAD-AFAG C.O.Kıraç

as coastal fishermen suffer from lower incomes and decreased life standards²⁴.

2.3 Deliberate killing of the monk seals:

The Mediterranean monk seals that have difficulty in finding fish or other preys in sea and sometimes have to take fish from fishing nets set by the fishermen at night. Due to the reason identified in the 2.2 topic (decrease of fish stocks), competition between seals and small scale fishermen -as they are hunting / fishing in the same waters- has been ascending. At the end, the small fishermen may sometime show great reactions even they have small losses caused by monk seals, as they are suffering from poor incomes.

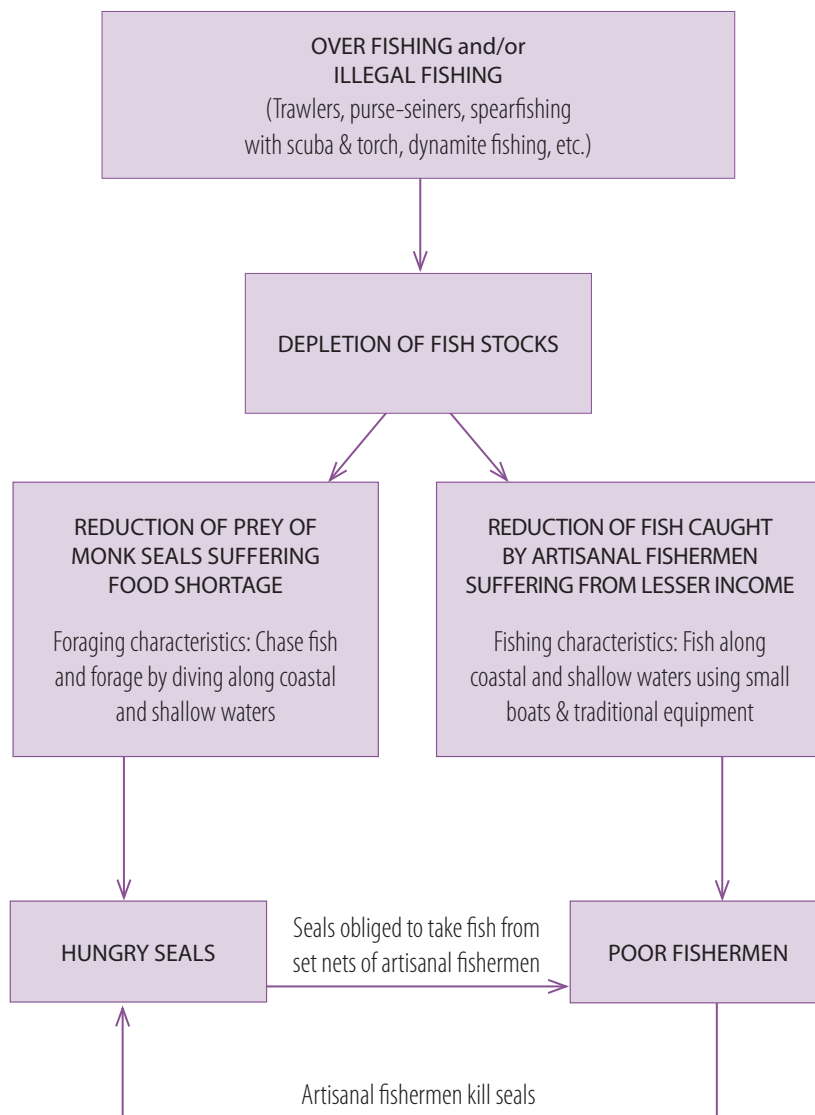


Figure 14. The competition diagram between the Mediterranean monk seals and artisanal fishermen²⁵.

²⁴ Kompanje et.al. 2000

²⁵ Kıraç et.al. 1998b



Figure 15. Tourist divers entering into monk seal caves.

Photo: SAD Murat Draman

2.4 Disturbance in monk seal caves

The places where the monk seals live (breed, rest or hide) are coastal caves whose entrance from the sea. In the recent years, some seal caves have been deteriorated under tourism pressure because of disturbance by tourists diving activities, anchorage of ships nearby seal caves and use of caves as recreational areas by holiday makers etc. As a result, some caves have been abandoned by monk seals.

Although it is banned according to the relevant legislation, every year lots of notice reach SAD-AFAG about such activities giving disturbance in

seal caves. Some diving companies let tourists dive especially in Bodrum, Marmaris, Fethiye, Kemer, Kalkan, Kaş, Kekova and Alanya vicinity and some are under the guise of ecotourism let tourist's diving in the western coasts of Mersin, in Aydınçık and Bozyazı. The people who deliberately dive or wander around the monk seal caves make use of gaps in patrolling. This is a threat for monk seals, which may cause abandonment of the caves, as mentioned by Mursaloğlu.²⁶

2.5 Marine and coastal pollution

As a result of marine pollution but specifically the pollution in their habitats they abandon polluted coasts. We rarely face with this problem that is not frequently observed in our seas but it is a potential threat. It is also suggested that there is heavy metal accumulation in the Mediterranean monk seals, even if at low levels.²⁷

The following can be given as the examples of the pollution along Turkish coasts: The oil pollution which happened in 1996, in Gümüşlük Çavuş Island, one of the important monk seal habitats; observation of the excess domestic waste pollution (nylon, rope etc.) in Sinop İnceburun Cape during the field research in 1997; observation of diesel or oil on the



Figure 16. Young female seal "Yeşim" was found stranded in an ailing condition in İzmir Aliağa in 2004. Due to marine pollution, her fur was covered with diesel or other type oil and her eyes were infected.

Photo: SAD-AFAG Archive

²⁶ Mursaloğlu 1988

²⁷ Yediler et.al 1993



Figure 17. As a result of the oil pollution that was caused by a coaster grounded in Gümüşlük Çavuş island in 1996 summer, many monk seal habitat were damaged and the coasts were heavily polluted. In 1997, the coasts were cleaned after meticulous and cost effective operation. Photos: SAD-AFAG A.C. Yalçiner

fur of “Yeşim” stranded ashore in an ailing condition in İzmir Aliaga in 2004; (the tightly curling rope around the head of the monk seal named “dişi korsan” (which lived until 1998, a ghost net entangled

on the back fins of the monk seals in Mersin Akkuyu in 2009) are some concrete examples of pollution observed by SAD-AFAG. However, they aren’t as common as the first three factors afore mentioned.

3. The Mediterranean Monk Seals in Foça

3.1 History

Foça Special Environment Protection Area contains essential habitats for the monk seals on the coasts of Turkey. It is clearly known that the Mediterranean monk seal lived in this part even in ancient times and today this local area takes its name from monk seals. Also, it is evident that coins on which one can find monk seal figures were discovered during the archaeological excavations and the dates of these coins go back to BC.625²⁸. Accordingly, it is thought that in that period, the number of monk seals was relatively very high and they were respected by the colony of Phokaia living there.

3.2 Study Method

Within this monitoring project which started in 2008 May, the results of previous studies have been compiled and we worked on some different issues within the context of field studies and public awareness activities. First of all, both unpublished and published data, which were obtained within the context of "Protect on of the Mediterranean Monk Seals in Türkiye: Foça Pilot Project" carried out between 1991 and 2004 by SAD-AFAG, have been compiled and collected. As a part of the project,



Figure 18. General view of Foça Büyük Deniz Port and Dış Kale Castle. Photo: SAD-AFAG C.O.Kıraç

the data of monk seal observation including the period between 2005 and 2008 are compiled from local residents; and the current quality of habitat, monk seal caves, human activities in the area, the relationship between human and monk seals examined again.

3.2.1. Compiling the Mediterranean Monk Seals Sighting Data

Monk seal observations are compiled from local residents who live on the coasts of Foça, especially, these seal sighting results are compiled from the interviews made with fishermen at least once a week during the project between 2005 and 2008. We have added some data from previous observation results belonging to 2004 to the new ones, so these results contain five-year-period. Monk seal sighting data are taken only from first-hand observers and ques-



Figure 19. Survey studies in the Mediterranean monk seals caves in Foça SEPA Photo: SAD-AFAG Z. Kızılkaya

²⁸ Johnson and Lavigne 1999; Özyiğit, 2008



Figure 20. The Mediterranean monk seals and cave surveys. a) The Mediterranean monk seal sightings from land, Orak Island b) Monk seal cave surveys with minimum disturbance by sea-kayak. Photos: SAD-AFAG Z. Kızılkaya

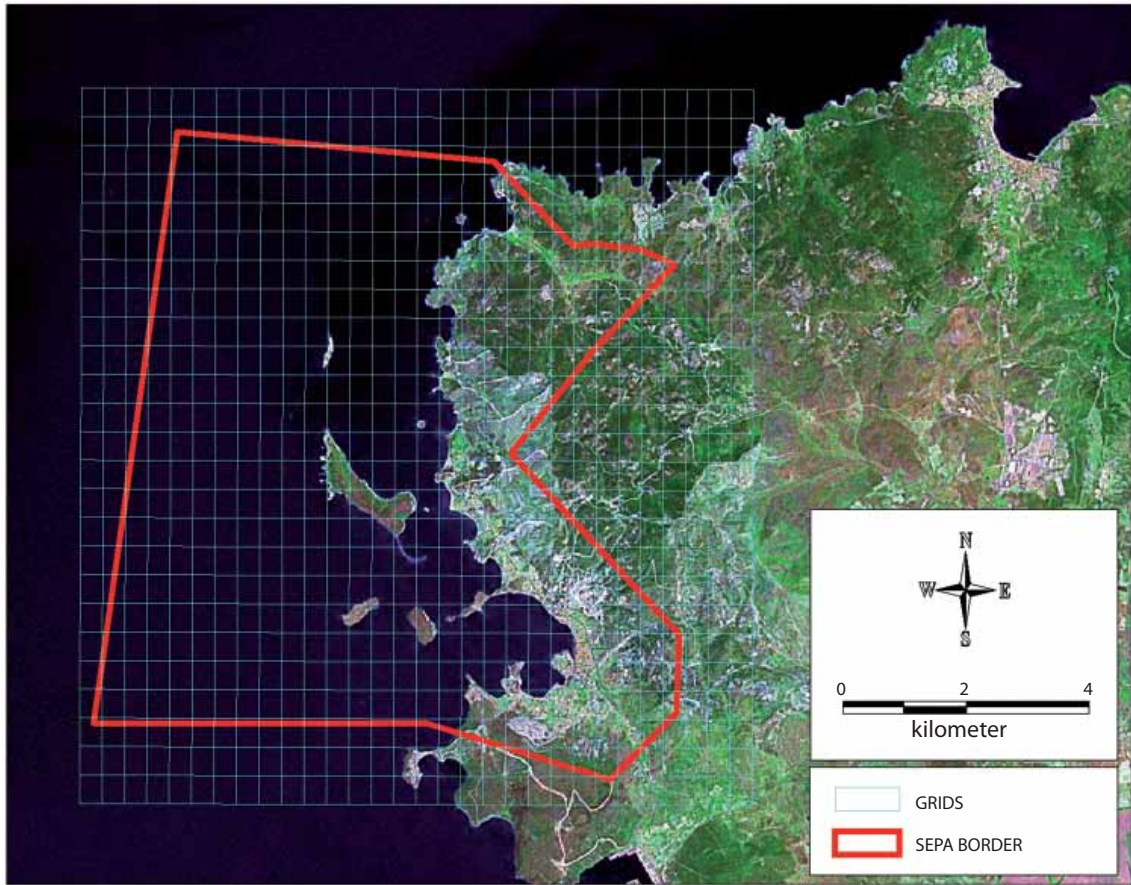


Figure 21. Foça GIS Grid System.

tions are asked by researchers under the supervision of experienced project coordinator. Questionnaires are especially applied to people from targeted occupational groups spending the whole day in Büyük Deniz and Küçük Deniz port areas in Foça. The information asked for each monk seal observation are as follows: personal information about the observer, location of seal sighting, date of observation, distinctive features (morphology) of seal, time of sighting, behavior of seal, number of observers, what are observer doing during seal sighting, duration of observation, nearest and farthest distance to seal.

3.2.2. Checking Monk Seal Caves

The Mediterranean monk seals use coastal caves in order to rest and hide, and to breed where possible. Use of caves by the monk seals focuses on particularly six coastal caves in the Foça Special Environmental Protection Area.²⁹ These caves were viewed by research navigations at least once in two week's time as long as the conditions were appropriate. Cave surveys were made by using a patrol boat allocated for Foça SEPA by EPASA (Environment Protection Agen-

cy for Special Areas) in December 2007, sea kayaks and fishing boats with the participation of a group of researchers in the coordination of SAD-AFAG. During cave checks it was searched that whether any monk seal is in cave presence of seal traces or tracks on beach or feaces etc. Together with these data, the date and the hour of cave checks were noted down. In the light of these data; use of the caves, frequency of usage and whether there were breeding in those caves or not were assessed.

3.2.3 Geographical Information System (GIS) of the Monk Seal and Habitats in Foça SEPA

Geographical Information System (GIS) used for monitoring the Mediterranean monk seals in the Foça Special Environment Protection Area is based on assessing the data of sighting in a grid system. The reason for developing the grid system is mapping the records of the monk seal sightings carried out in the fieldwork and first hand sighting info compiled from the local people (mainly artisanal fishermen) in a single system and making a rapid analysis.

²⁹ Güçlüsoy and Savaş 2003

Grid system covers the borders of new Foça Special Environment Protection Area and consists of 750 cells whose sizes are $15'' \times 15''$ (size of "x" is approximately 360 m. and of "y" is approximately 460 m.). The sizes of cells in the system have been determined considering the optimum approximation in defining sighting location from reporters and is similar to previous studies in which monk seal sighting data from Fok-Data had been assessed from 1991 until 2004³⁰.

GIS also includes a coast line of 2005 created by on-screen digitizing from Quickbird satellite image having a resolution of 60 cm. The coast line is used for

providing more clear-cut visuality of sighting mapping and easy recognition.

3.2.4. The Structure of Geographical Information System (see Figure 23)

3.2.5 Entering Sighting Data between 2004 and 2008 to Geographical Information System

The sighting data collected between 2005 and 2008 period and old 2004 data which were added to the former entered in related layers of the grid system as "number of sighting and number of observed seal



Figure 22. a) Foça coasts and islands in Quickbird satellite image, b) Coast-line digitized from the satellite image

30 AFAG 2008; Kaboğlu 2007

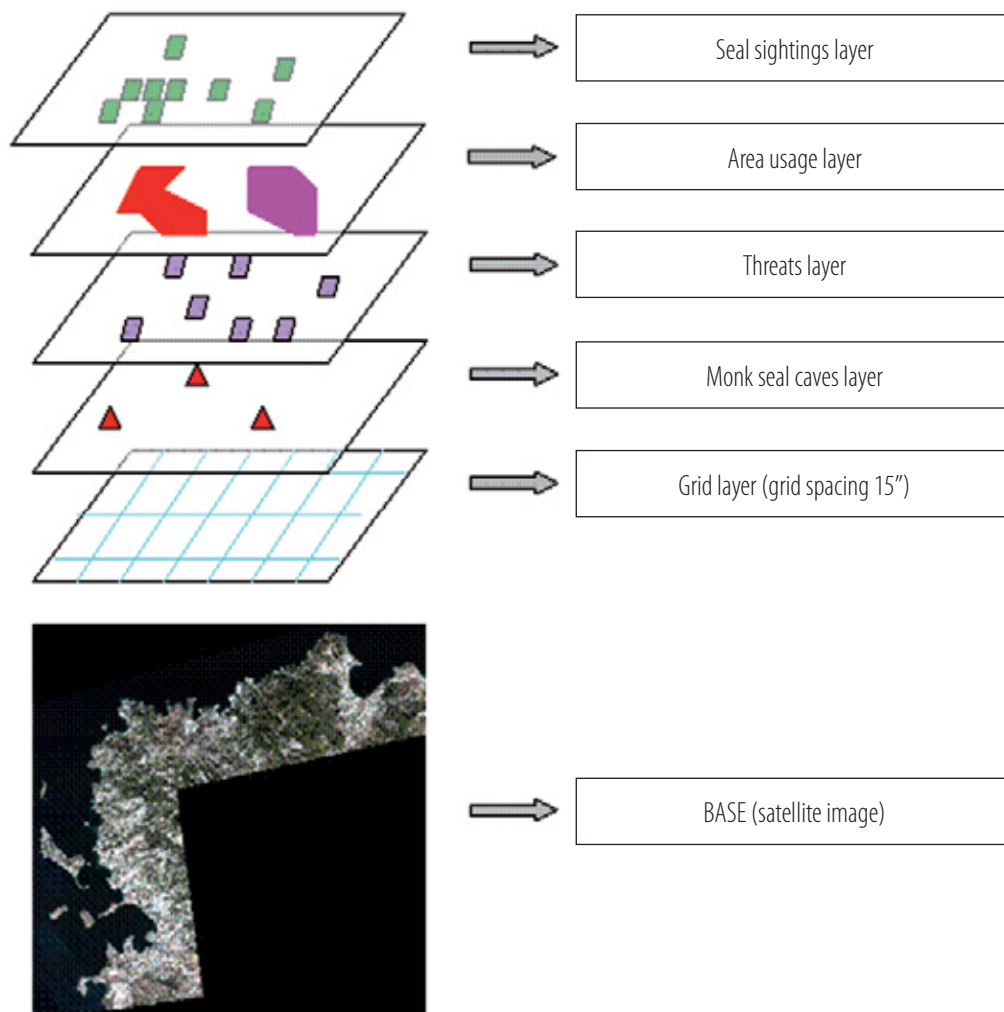


Figure 23. The structure of GIS for Foça Special Environment Protection Area the Mediterranean Monk Seals and Habitat Monitoring Study.

GRID CODE	SIGHTING NUMBER_ 2004	INDIVIDUAL NUMBER_ 2004	-	-	SIGHTING NUMBER_ 2007	INDIVIDUAL NUMBER_ 2007
A1						
A2						
-						
AD24						
AD25						

Figure 24. The database matrix related with the transfer of data of the Mediterranean monk seal sighting records.

OBJECT NO	AREA INFORMATION	NOTE

Figure 25. Breeding and feeding area chart

GRID CODE	THREAT 1	THREAT 2	-	-	-
A1					
A2					
-					
AD24					
AD25					

Figure 26. The matrix of “threats against the Mediterranean monk seals” in GIS



Figure 27. The Port of Foça, İngiliz Cape in the centre (right) and İncir island (left) and in the background Orak Island.
 Photo: SAD-AFAG C.O.Kıraç

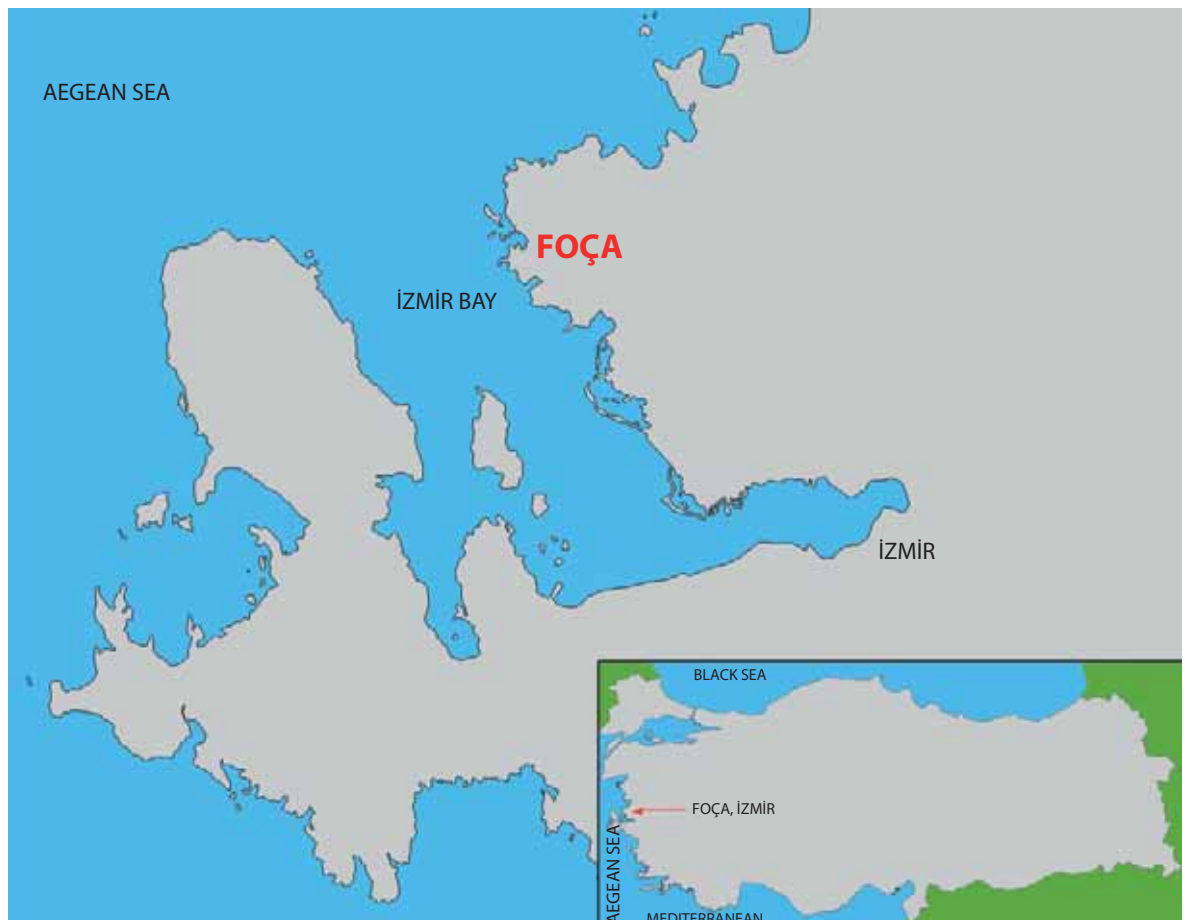


Figure 28. Location of Foça and İzmir Bay



Figure 29. S9 “Derya” born in Foça SEPA on October in 1995 resting on a pebble rock near birth cave. Photo: SAD-AFAG C.O. Kırac

individual”. While the field of sighting number indicates total sighting number in a cell belonging to that year, observed seal individual number denotes total individuals observed in that cell throughout the year. Grid chart that takes place in Geographical Information System is prepared as follows:

3.2.6 Digitizing the Results of Cave Surveys

Cave surveys data were entered and sightings during the fieldwork in the layer of “monk seal caves” built up within the context of project. In this layer, there is information about the use and the status of the caves together with the sighting data related with the caves.

3.2.7 Entering “Areas of Breeding and Feeding” to Geographical Information System

Available data related with the areas of breeding and foraging of species is digitized as polygon in the layer of “usage of area” built up within the context of project. The graph of “usage of area” is prepared in Geographical Information System as follows:

3.2.8 Entering Threats to Geographical Information System

The list of existing and possible threats to the Mediterranean monk seals and their habitats in Foça were composed in the compilation study done before the fieldwork. During the fieldwork, the information of yes / no in each grid cell was attained and this data was processed into the “threat layer” in the Geographical Information System. Confirmed threats during the fieldwork are entered each cell as “1=yes” and “0=no”. The chart of threat is prepared in Geographical Information System as follows:

3.2.9 Mapping and Geographical Information System

The Mediterranean Monk seal sighting records between 2004 and 2008; cave observations in 2008, threats on the species and its habitat and the areas of breeding and feeding area maps are produced on the scale of 1/25.000. Geographical Information System is built up in Manifold software and the physical structure of GIS is configured as shown in Figure 23.



Figure 30. Dişi Korsan foraging in Orak Island Siren Rocks (background is Hayırsız island). Photo: SAD-AFAG C.O.Kıraç

3.3 Findings Concerning Existence of the Mediterranean Monk Seals and their Habitats

Foça has been a focal point for everybody who is interested in the Mediterranean Monk seal research. Prof. Fikret Berkes (1979) and French researcher Didier Marchesseaux (1987) did some research in Foça. Although the existence of the species on the coasts of Turkey and in Foça has been known since 1964 (Mursaloğlu, 1964), systematic monk seal sightings in Foça SEPA were made by SAD-AFAG and by İstanbul University Faculty of Aquaculture for a short period. Though SAD-AFAG has been in the area since 1991, the methodical study of SAD-AFAG covers just ten-year period between 1993 and 2004. When these long-running studies and other short-term research carried out by SAD-AFAG are taken into consideration, adequate information and experience are acquired about the status of the Mediterranean monk seals in Foça SEPA, in terms of its breeding and feeding areas, habitats and interaction with people and threats over the species. Therefore, adequate information and experience to

be reflected into the management plan have been obtained.

3.3.1 The Status of the Mediterranean Monk Seals in Foça SEPA

The status of the Mediterranean monk seals in Foça SEPA is discussed in this chapter so as to cover the population, marine areas used chiefly, frequency of usage of area according to the years.

Öztürk and Dede (1995) defined 3 monk seals between 1992 and 1994 with the help of questionnaires done with local fishermen. As for long-term studies carried out by SAD-AFAG, detailed field research and direct sighting results and First hand sighting data from the local fishermen were compiled covering the period between 1991 and 1998 and it was determined that 9 monk seals were using Foça and its vicinity³¹. Defined individuals were categorized according to the phenotypical features of West Sahara populations³². Accordingly, the population in Foça Special Environmental Protection Area consist of 6 old and medium-sized grey

³¹ Güçlüsoy and Savaş 2003

³² Samaranch and Gonzales 1996

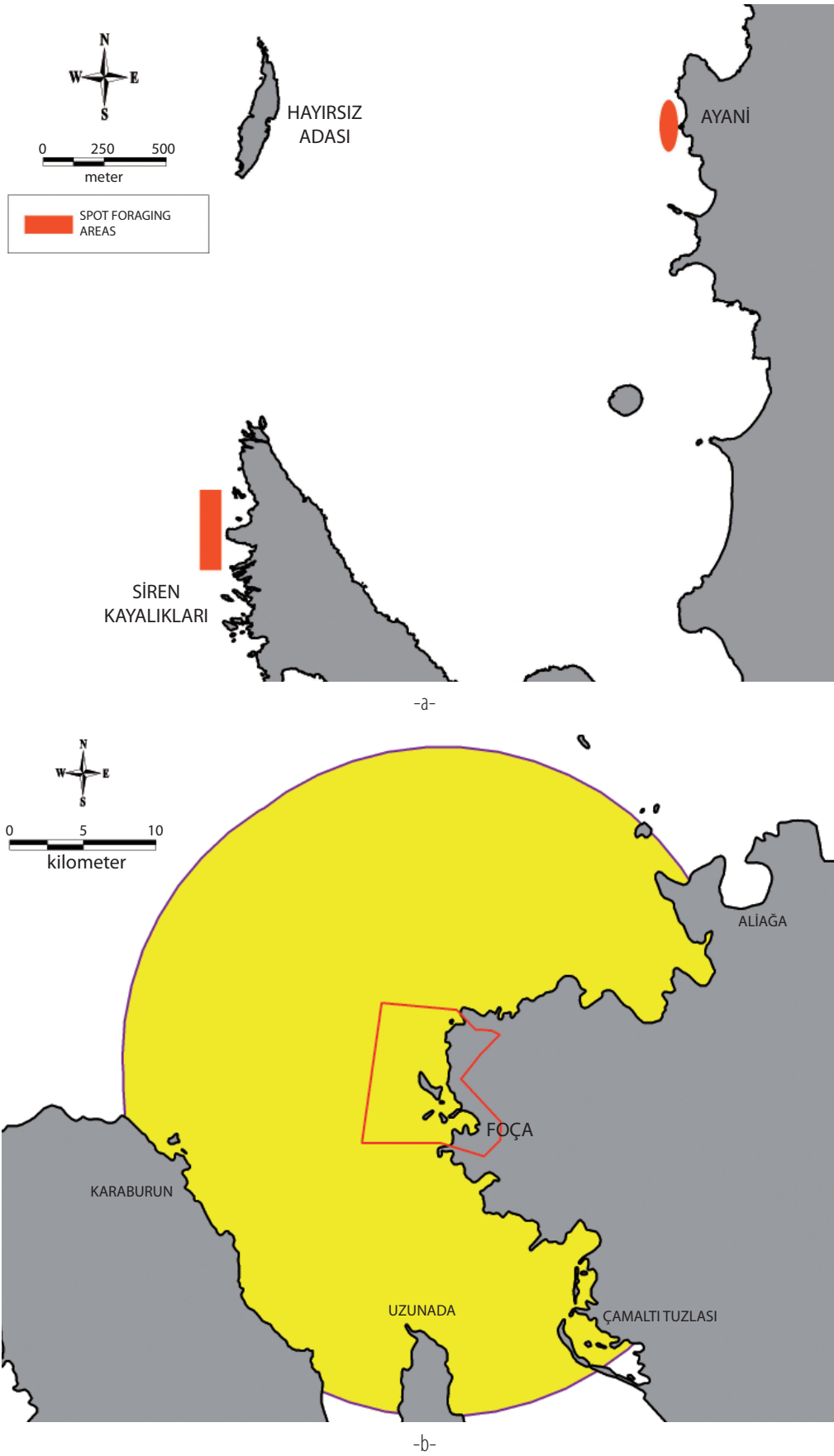
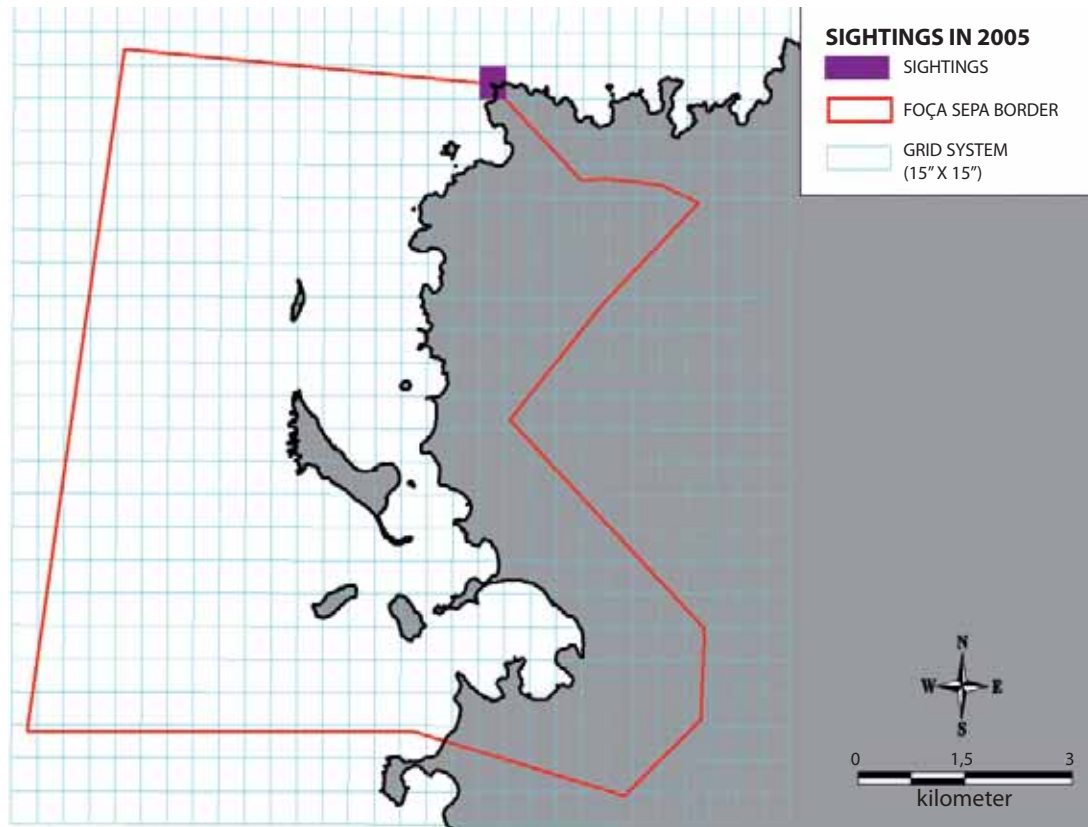


Figure 31. The Mediterranean monk seals a) spot (observed), b) mobile foraging area (potential).

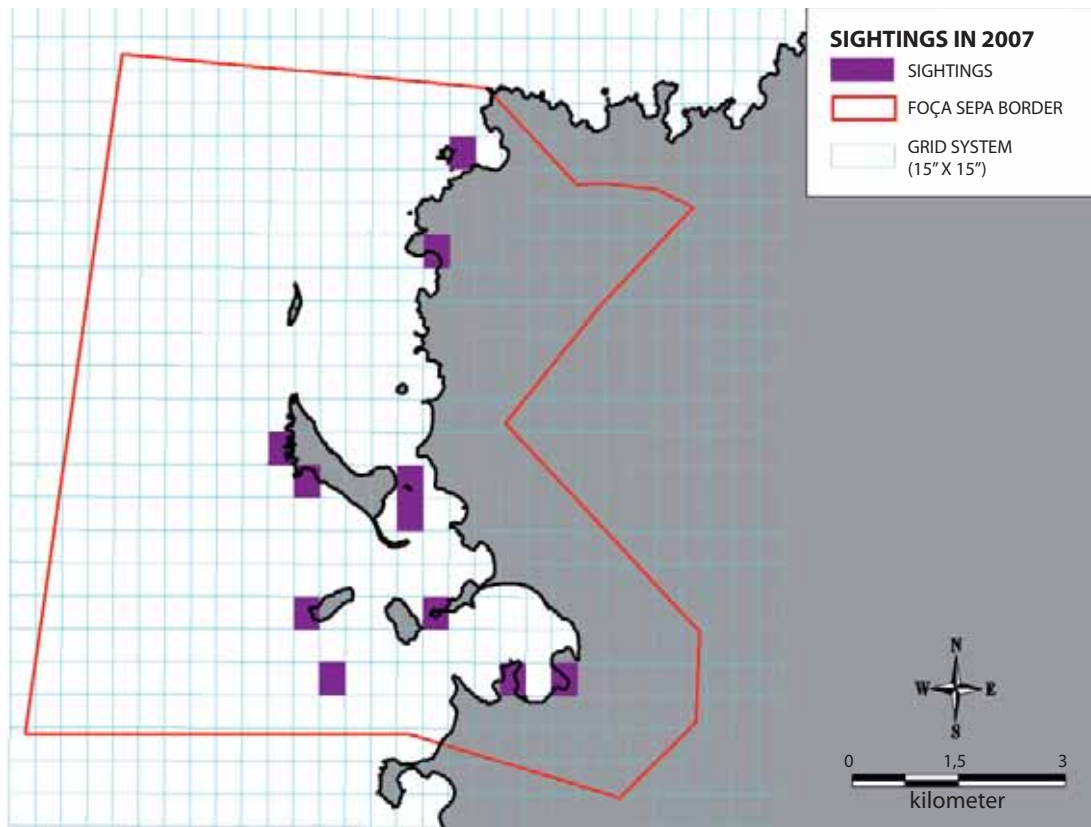


-a-

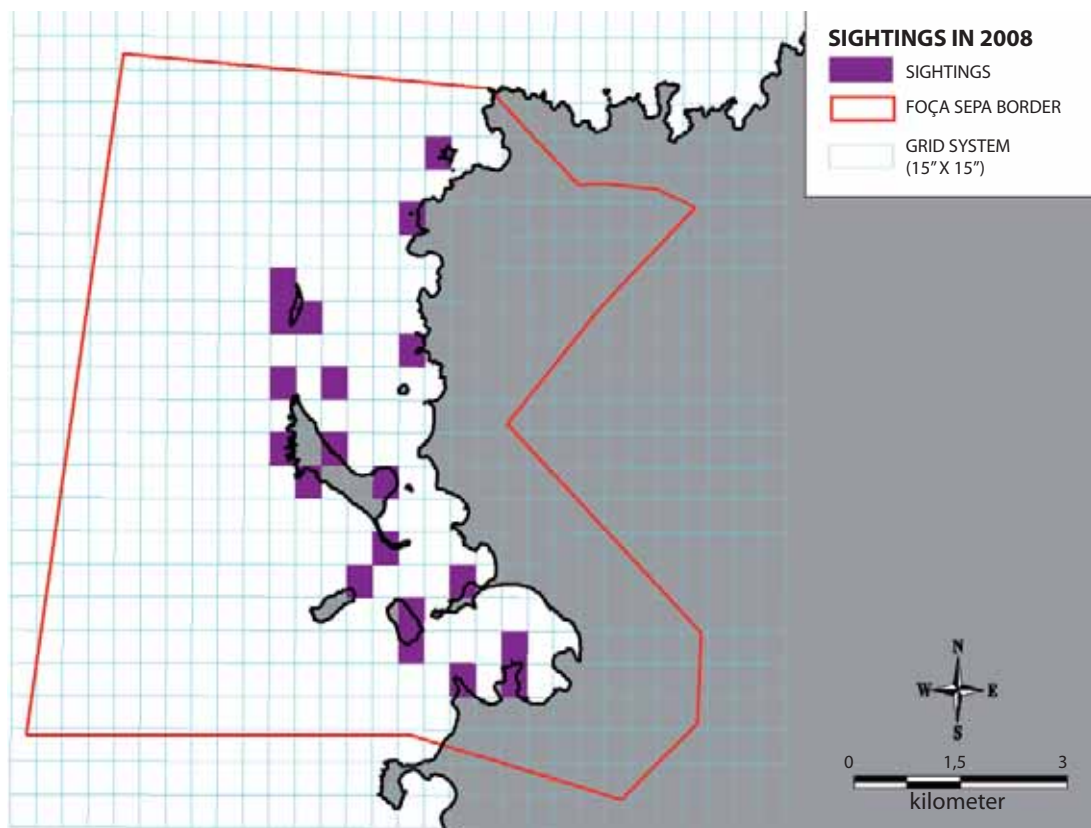


-b-

Figure 32. a) 2005, b) 2006 (the areas in which seals were sighted in 2005-2006)



-a-



-b-

Figure33. a) 2007, b) 2008 (the areas in which seals were sighted in 2007-2008)

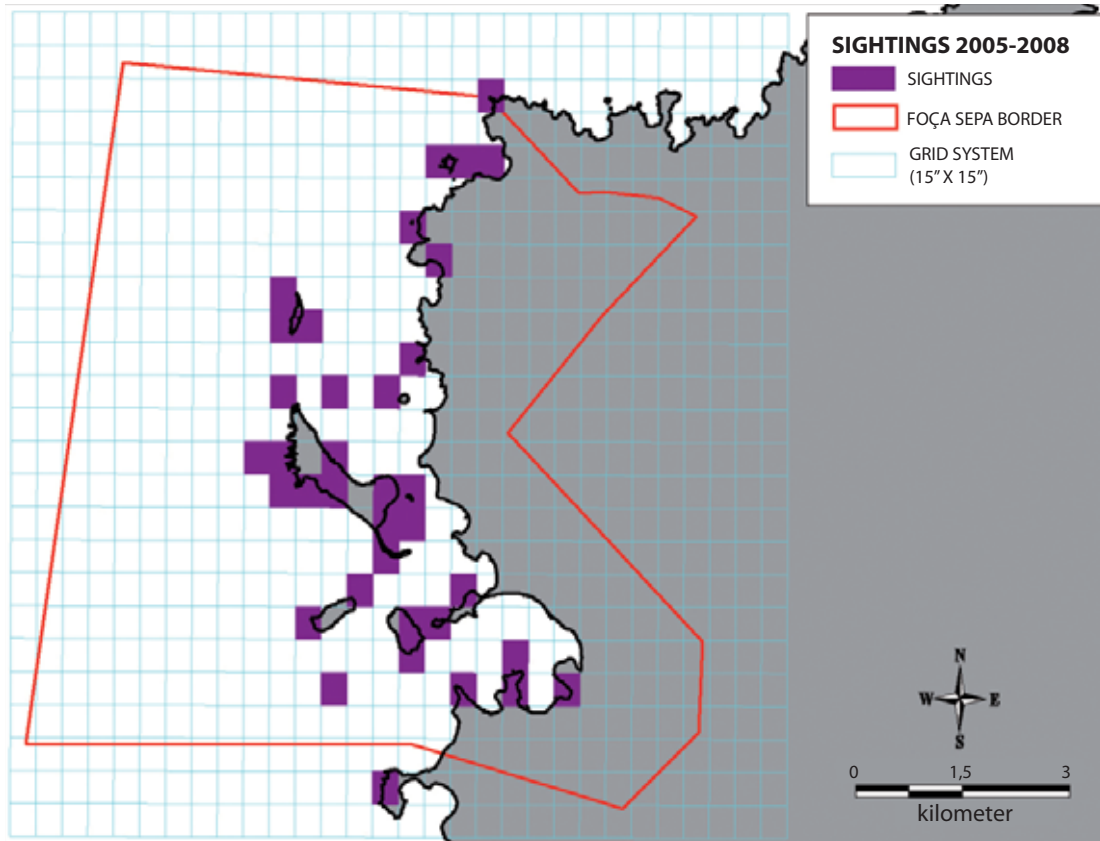


Figure 34. Foça SEPA cumulative monk seal reported sighting distribution in marine and coastal areas between 2005–2008.

females and 3 young individuals by 2004³³. Defined individuals so far are as follows: S1-Duygu (210–240 cm); S2-Dişi Korsan (210 cm – as a result of necropsy); S4-Sühendan (220–250 cm); S5-İlksen (200–230 cm), S6- Marianne (210–240 cm); S7-Bahtiye (157 cm - as a result of necropsy); S8-Emine (210–240 cm); S9-Derya (150–180 cm) and S10-Fatma (150–180 cm). Since the field research by SAD-AFAG was completed in 2000, no new monk seal has been identified to be added to the catalogue.

When the data compiled by SAD-AFAG are taken into consideration, in Foça Special Environment Protection Area, you can see the Mediterranean Monk Seals notably in İngiliz Cape, Kumburnu, Ayani and Kartdere areas on mainland; and important islands are İncir Island, Fener Island, Orak Island (especially Siren rocks), Hayırsız Island ve Kartdere Island³⁴ (Figure 22a).

When the areas and home range used by the Mediterranean Monk Seals are considered, it is seen that Foça Special Environment Protection Area is smaller

than this home range. Home range of the Mediterranean Monk Seals was defined approximately as 40km by Berkes (1978), again 40 km by Mursaloğlu (an interview, 1997), and again 37–56 km by Gücü and Ok (2004). A monk seal identified by SAD-AFAG during the field research in Foça was observed swimming in the eastern coasts of Karaburun Peninsula. The distance between Foça and Karaburun Peninsula is 11 nautical miles (nearly 20 kms). Accordingly, as a result of the observations, (made by) it has been understood that the monk seals living there do not use only this area-which is in Foça Special Environment Protection Area³⁵. In regular cave surveys carried out in sea and on coasts by SAD-AFAG researchers in 2008, just twice monk seal tracks in a cave were found in six month time. This rate is very low when compared with the term between 1993 and 1998. We can categorize the process of monk seal research and conservation in Foça area into three: 1) 1993–1998, 2) 1999–2004 and 3) 2005–2008. If we have a look at the monk seal sighting data, an apparent decrease between the

³³ Güçlüsoy and Savaş 2004

³⁴ AFAG 2007; Kaboğlu, 2007

³⁵ Güçlüsoy and Savaş 2003

GRAPH ON THE MONK SEAL SIGHTINGS REPORT and THE MONK SEALS OBSERVED (1993-2004)



GRAPH ON THE MONK SEAL SIGHTINGS REPORT and THE MONK SEALS OBSERVED (2005-2008)

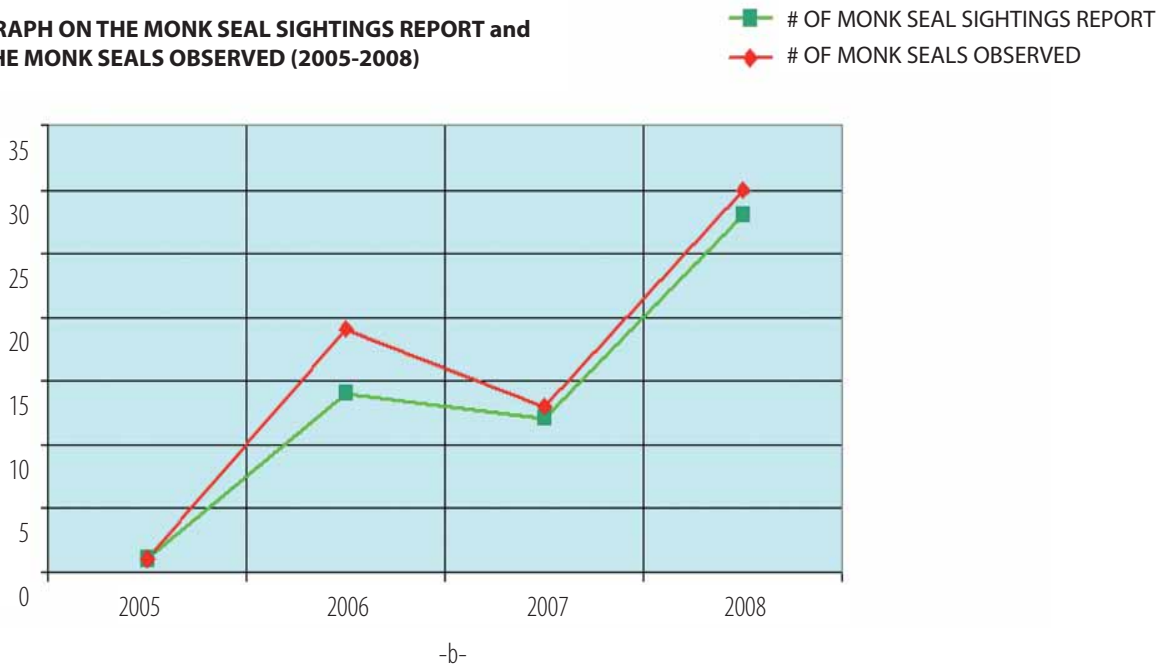


Figure 35. Annual distribution of seal sightings and number of individual a) 1993-1994 b) 2005-2008

first and second terms attracts our attention (Figure 22b). The reason for this decrease can be a result of expiration of Foça Pilot Project carried out actively between 1993 and 1998. During the project, active field studies covering observation and monitoring tasks were intensely carried out while field studies decreased after the project ended. After 1999, we can easily conclude that boat traffic, human activities on the sea (daily excursion boats, spearfishing etc), trawlers, purse-seiners and artisanal fishery in-

creased as a result of decreased patrolling due to gradually decreasing synergy created by the project. Consequently, it is considered that the Mediterranean monk seals have been disturbed by the increased human activity in the marine & coastal areas in Foça region. This can be attributed to the fact that effort of field research, protection, raising public awareness, supervising illegal fisheries and monitoring the Mediterranean monk seals were not continued by the relevant responsible government-

tal departments after the project, which was mainly funded by WWF and executed by SAD-AFAG.

3.3.2 The Mediterranean Monk Seals Breeding in Foça SEPA

There were two concrete and reported birth occurrences of the Mediterranean monk seals in the area. The female monk seal S8 gave birth to two pups (S9 and S7) in October 1995 and October 1996 respectively³⁶ (Figure 8). In addition to these births, in Foça SEPA, a young female monk seal (S10) was identified in 1998.

Since these two births, breeding has not occurred in Foça. However, some young monk seals using the area have been monitored by the fishermen and local people in Foça SEPA and such sighting and observation data have been reported to SAD-AFAG by the local people.

3.3.3 Foraging of the Mediterranean Monk Seals in Foça SEPA

Güçlüsoy and Savaş (2003) reported the spot and mobile foraging strategies as a behaviour characteristic of the Mediterranean monk seals using Foça SEPA comparing the result of the research in Madeira by Costa Neves (1998) in the monk seal population in the Atlantic (Figure 29). Moreover, Kırac *et.al* (2002) conveyed a detailed information on the foraging areas and diving behaviour of monk seals during the Foça Pilot Project implementation period. The adult individual seen at Figure 30 was observed at Siren Rocks while foraging on the same spot for a long time. The spot foraging strategy means chasing fish and feeding through diving age in the same area for a long time measured in hours while the mobile foraging strategy means foraging while swimming from one point to another on a certain route. (It had been observed in the previous research that the monk seals with spot foraging was observed at Siren Rocks, on the coasts of Ayani and Küçük Deniz area in Foça). It can be clearly seen that other island's coasts of Foça have potential foraging and alimentation coasts. Yet, this statement can only become evident after a detailed field research.

The other foraging behaviour is to take fish from fishing gear (set nets) of artisanal fishermen. This situation is not specific only to the Aegean Sea; it is a known fact that the monk seals take fish from the set net and other traditional gears such as paragadis, both on the coasts of the Mediterranean and the Black Sea³⁷. Öztürk and Dede (1995) and also Güçlüsoy (2008a and 2008b) stated that the artisanal fishermen in Foça SEPA were affected by this interaction. The former researchers found out 20 damages among 87 set net surveyed in the period 1992–1994 while Güçlüsoy (2008a) determined 90 damaged nets limited to the reports from the local fishermen damages given to set nets, both gill nets and plain set nets.

The Mediterranean monk seals are thought to be opportunistic animals in terms of foraging. Species on which monk seals forage differ in each region where composition of fish species varies. Bony fish and cephalopodes are frequently reported as types of preys³⁸. Grey mullet (*Mugil Spp.*), common dentex (*Dentex dentex*), striped red mullet (*Mullus sp.*), bogue (*Boops boops*), squid (*Loligo vulgaris*), conger eel (*Conger conger*) and octopus (*Octopus vulgaris*) are the marine animals that the monk seals forage in Foça SEPA.

3.3.4 Threats Against the Mediterranean Monk Seals and Their Habitat

All the factors that threaten the Mediterranean monk seals in Türkiye have emerged from the human activities³⁹. The two basic factors that negatively affect the Mediterranean monk seal are: *deterioration of the coasts as a result of constructions, loss of habitat and diminution in fish stocks*.

Deterioration of habitat quality by coastal development or constructions is an irreversible process and acts as the prime reason for the decline of the species. Once construction occurs on pristine coasts it is almost impossible to re-gain the original characteristics of said coast. Other reasons (such as high tourism pressure by human activities, marine pollution or overfishing and illegal fishing etc.) are, however, reversible and negative impacts are seasonal and can be reverted after they are eliminated, interaction between monk seals fishery sometimes results in deaths due to accidental entanglement of

36 Güçlüsoy and Savaş, 2003

37 Kırac and Savaş 1996; Kırac *et.al.* 1998; Güçlüsoy 2008b

38 Costa Neves 1998; Salman *et.al.* 2001; Güçlüsoy 2008b

39 Kırac *et.al.* 1998b

pups or young seals (less than 1 year old) to set net fishing gears.

When the threats on Mediterranean monk seals are taken into consideration in Foça SEPA, habitat loss was not observed after the area was announced as SEPA in 1990. Although the number of the secondary houses inland of Foça has been increasing fortunately, it does not destroy the coastal habitats in Foça SEPA. Especially in summer months, due to excess human activities in the sea, pressure on the species has been observed. In winter periods, as Foça is one of the important fishing ports on the coasts of the Turkish Aegean Sea, the effects of intense sea traffic have been prevailing⁴⁰. It is very difficult to make a comment as the quantity of fish stocks⁴¹. This can be the result of diminished fish stocks due to overfishing in the area. Since AFAG started its activities in the area in 1991, deliberate killing of the monk seals by the artisanal fishermen or other local people have never been observed. The two pups born in Foça entangled in the fishing net when they were only of 3–4 months and the one with the code of S9 was saved in cooperation with a fisherman and the local people while the

other monk seal S7 was entangled in a set net and drowned⁴². To decrease such kinds of deaths, some regulations must be designed and implemented on the quantity of set nets used in the area as well as the application of “no fishing zones”.

3.3.5 Assessment of the seal sightings and data transfer to GIS

Within this latest study, the seal sightings between January 2005 and 23rd November 2008 were gathered through having interviews with the local people. During this period (approx. 4 years in total), 55 sighting records in total were collected. In 2005 only one seal sighting report could be obtained. In the remaining 54 records, 62 individuals have been reported to be seen. The reason why there was only one sighting record in 2005 is that the fishermen were not capable of remembering the number of the seal sightings three years before. The seal sighting records collected during the study are assessed according to the absence/presence info on the grid cell and they are mapped based on annual periods (from 2005 to 2008) as well as cumulative (Figure 32, 33 and 34).

⁴⁰ Kaboğlu 2007

⁴¹ Ünal 2001

⁴² Güçlüsoy and Savaş 2004

4. Conservation studies on the Mediterranean monk seals and their habitats in Foça

Foça is a worldwide known town which undertakes a pioneer role in conservation activities for the endangered Mediterranean monk seals. From 1990⁴³ to 1998, non governmental organizations, fishermen and local authorities cooperated and developed important conservation studies which continued for 8 years. However, since 1999, the intensity of conservation and monitoring studies have shown a descent. After 1999, some gains were lost back although some permanent acquisitions were achieved in the region.

Implementation period:

- In 1991, upon the proposal of WWF International, the project was discussed by the National

Monk Seal Committee for a long time. Although the whole project was funded by WWF, the reason for the delay of the initiation of the project emanated from different views from METU-SAS/ AFAG and Ministry of Environment on the suitable project executant needed for the implementation of the Project in Foça.

- While the project was being discussed in National Monk Seal Committee in 1992, 4 tratra owners in Foça changed traditional fishery one of which to line fishing for tourists with their own will by taking the indemnity from Foça Municipality funds. Hence, a big step was taken even before



Figure 36. Orak Island pebble beach and Siren Rocks southern point (background) and ingiliz Cape (foreground). Photo: SAD-AFAG C.O.Kıraç

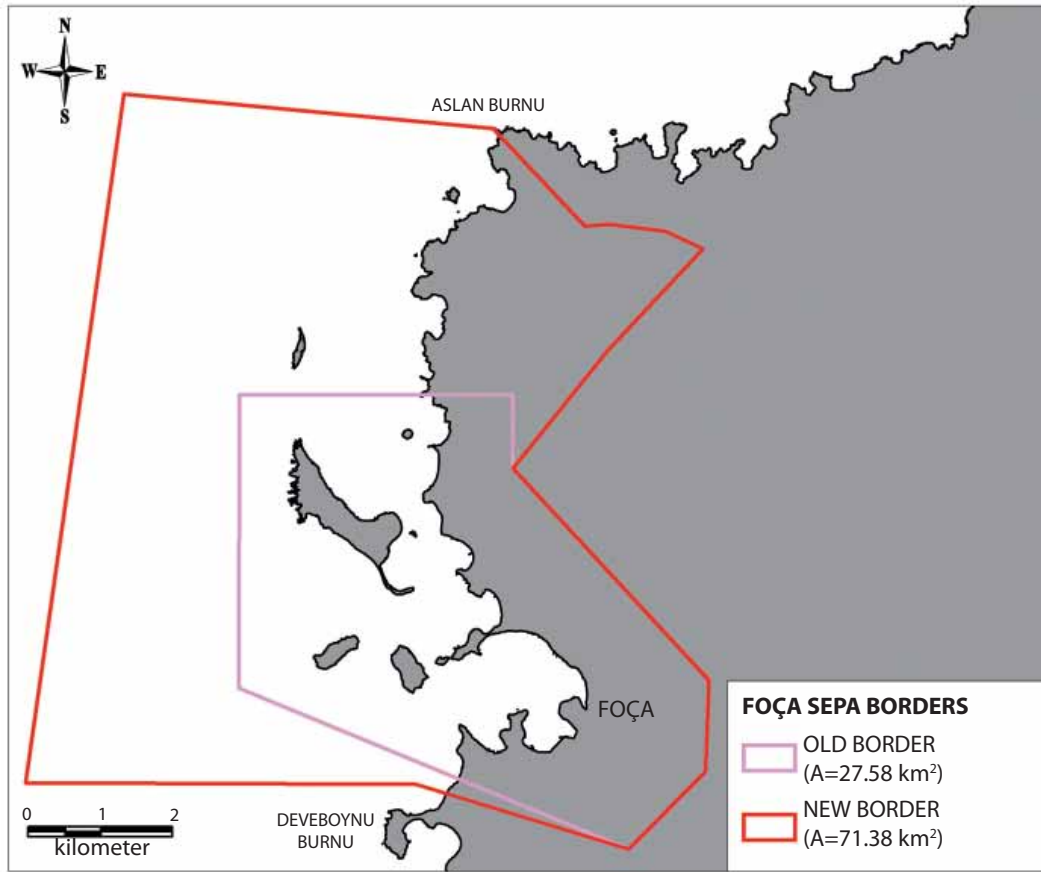


Figure 37. The borders of Foça Special Protected Area. The border identified in red line is extended with the Decree of the council of Ministers in 2007.

the project in terms of elimination of trawling without suffering from economic loss -a kind of coastal trawler which is very detrimental for the marine ecosystem- in the area. This is the first local trawling ban in Türkiye.

- Ministry of Environment allocated a patrol boat called "Çevre", 6,5 m. length overall, max. speed of 42 nautical mile/hour, fiber hull and powered by a diesel engine in 1992, which was designated for marine patrolling in Foça. Hence, apart from Coast Guard, the first marine & coastal patrol system was developed in Foça in the country. Marine conservation and patrol is successfully implemented except in certain periods during which some technical problems were faced. The Ministry of Environment signed a protocol with the Foça Municipality asking the municipality to meet the expenses of the maintenance and running expenses of the boat "Çevre". However, actually the municipality and SAD-AFAG met the maintenance and running expenses of the boat jointly between 1993 and 2004. A patrol system is initiated with a captain from Foça Aqua Products Cooperative and with the supervising contribution of SAD-AFAG. In March 1993, with the

election of the Project executant, Foça Pilot Project was started officially. Due to the technical limitation of the Coast Guard boats that cannot approach shallow coastal waters for patrolling purpose, this additional local patrolling system is considered as a complementary one and support Coast Guard reaching very remote shallow coastal waters with reefs thanks to the boat "Çevre" with relatively very small draught. Similar complementary marine patrolling systems are strongly recommended for other sensitive areas in Turkish coasts considering the effectiveness of the system for controlling the illegal activities when the boat was successfully operated at certain periods between 1993 and 2004.

- With the patrol boat "Çevre", the first effective patrol and auto-control system -among the fishermen- was implemented in Türkiye. Foça Aqua Products Cooperative whose members are generally coastal (artisanal) fishermen launch the patrol boat in coordination with the Municipality and Sub-Governorship of Foça. Thanks to the speed patrol boat, illegal fishery activities were monitored very closely and punctually



Figure 38. Foça Information Center in Foça Town Library Photo: SAD-AFAG C.O.Kıraç

while some other illegal fishery activities were reported to Coast Guard Command. Many illegal fishermen were caught as well as deterrence was created due to the random patrol program.

- The project was initiated in 1993, executed by Yalçın Savaş with the assistance of a second author. While the first author undertook relations with the government, dealing with the environment education & public awareness activities and some field surveys were supported by the volunteers from SAD-AFAG.
- In 1994, the second author from SAD-AFAG worked as the project executant together with Yalçın Savaş until the end of the project.
- During the breeding periods of 1993 and 1994, on Foça Islands, avifauna surveys were carried out by Sühendan Karauz and the first author from SAD. At the end of the field research, in addition to several species of marine birds and raptors living in Foça SEPA, Foça Islands were declared and registered as one of the Important Bird Areas (IBA) of Türkiye and Europe in 1997⁴⁴ due to breeding of lesser kestrel (*Falco naumanni*) and shag (*Phalacrocorax aristotelis desmarestii*) on the islands. The biodiversity in Foça was presented to the world with the help of national

and international publications on the avifauna in Foça.

- Although some of the Foça area falls into SEPA and SIT borders, dimension of the whole marine & coastal area which is worth protecting was not scientifically known. Therefore, the border of the area was identified with a quick survey in 1993. This area was described by SAD-AFAG as the coastline between Cape Deveboynu in the south and Cape Aslan in the north –total 5 n.miles- and 3 n.miles off shore from the coast which embraces all Foça islands.
- In 1995, an important habitat and breeding area on the western coasts of Orak Island (Siren Rocks) was declared as the core protected area against all the human activities, except for traditional artisanal fishery. Although the regulation was implemented in a relatively small area compared with the whole area of Foça SEPA, a very positive contribution was provided in terms of Mediterranean monk seal and the pressure on the species was decreased in the implementation areas. Before the implementation was proposed by SAD-AFAG, a great support was provided by the local authorities, fishermen and the tourists. With this support, SAD-AFAG proposed a regulation of marine & coastal areas manage-

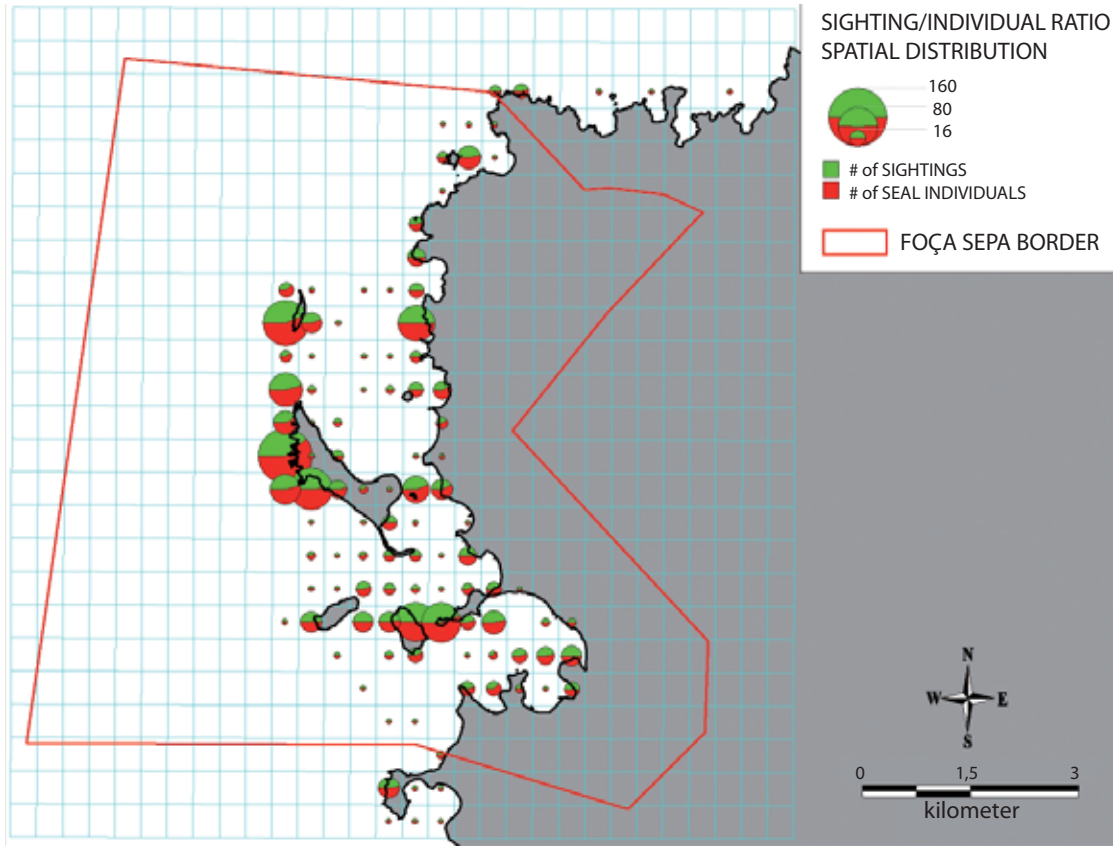


Figure 39. AFAG (2008) and Kaboğlu (2007); Seal sighting records between the years of 1993–2004

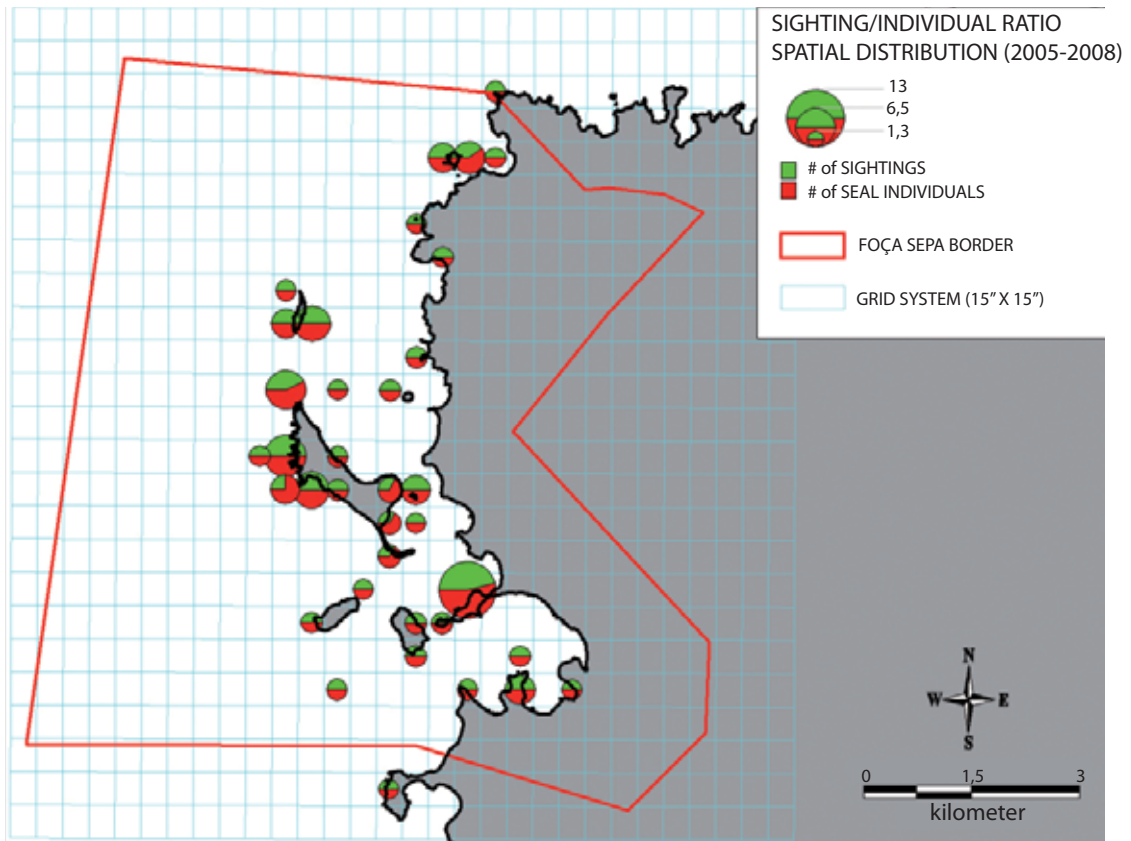


Figure 40. The Mediterranean monk seals usage of area between 2005 and 2008 in Foça SEPA

ment plan and this proposal was accepted and drafted without delay to the management plans by EPASA. A monk seal gave birth in Siren Rocks after the application was put into force.

- In 1998, WWF decided to stop funding the project. At the end of the 6 year process, marine conservation system in Foça was implemented in general and concrete results were obtained.
- In 1998 April, the concrete outputs of Foça Pilot Project and the success in the implementation was awarded in the competition of Henry Ford European Conservation Awards. The project came first among 200 projects in the country. Then, among the 33 European countries' champions, Türkiye was awarded with the first prize of Henry Ford ECA Grand Prix. The fund provided within this award was completely conveyed to Foça Pilot Project by SAD-AFAG. Thanks to this fund, the project continued for two years more.

Post project activities; monitoring and sustainable implementations

- In 1999, SAD-AFAG advanced a proposal with the written legal ground to the Undersecretariat for Maritime Affairs for a regulation on ships routing for cargo vessels about the risky routes and areas to be avoided in Foça, Ayvalık and Bodrum islands regions.
- In 2000, SAD-AFAG, applied for the sponsorship of "İş Bank Türkiye" for the sustainability of the project by underlining the importance and the success of the project. İş Bank Türkiye assessed the proposal deeply and accepted to provide its sponsorship for Foça Pilot Project. SAD-AFAG used this fund as a support of the studies of local authorities in Foça, Foça Aqua Products Co-operative for the continuation of Foça Pilot Project. A significant part of the fund was used for the field research and monitoring.
- In 2001, after having analyzed the proposal, Undersecretariat for Maritime Affairs agreed on the original proposal of SAD-AFAG and sorted out a regulation for the cargo vessels' sailing routes passing between Foça islands and continents. As a result of this, the sailing routes of the vessels larger than 300 GRT and all the vessels carrying dangerous cargo were diverted to sail around the open islands. Hence, the navigational risks were decreased permanently and contribution was achieved for the conservation of the marine environment against marine accidents. The regulation was then marked on the maps by Navigation, Hydrographic and Oceanography Office of Turkish Navy and was published in the journal of Notice to Mariners "Denizcilere İlanlar".
- In 2001, an official regulation was initiated for fishery; proposal of the nation-wide prohibition of trawling by SAD-AFAG was accepted by the Ministry of Agriculture & Rural Affairs and the marine ecosystem of Foça SEPA also benefited from this regulation for sure.
- In 2002, under the EU SMAP program, a project to support the coastal fishermen, to protect the coastal areas and the Mediterranean monk seals was started in Foça and Karaburun in İzmir and Aydıncık in Mersin by SAD-AFAG in cooperation with WWF MedPO. While the second author was executing the project with Yalçın Savaş, the first author dealt with the relations with the government.
- In 2002, Foça Pilot Project, in the occasion of "2002 Johannesburg World Environment Summit" Rio+10 was accepted as one of the best-implementation in nature protection projects among all the projects of the country by Turkish Ministry of Environment & Forest and promoted to the world in Johannesburg.
- Although the speed patrol boat "Çevre" allocated for Foça SEPA served for a long time, both its engine and hull completed their lives. To render continuation of the patrolling, SAD-AFAG brought the matter into agenda and discussed the issue in NMSC in 2005 December during which EPASA stated that a patrol boat could be purchased or rented for this purpose. SAD-AFAG actually considered shifting its speed patrol boat "DK01" purchased under the EU SMAP project to Foça by signing a new protocol in case EPASA had fails to buy a new boat for Foça.
- Within the Foça Pilot Project, public awareness activities were done; extensive environmental education on nature protection was given to students and teachers. Moreover, for the protection of the biodiversity, festivals were held for the target audience, i.e. artisanal fishermen. With a generally accepted concept that in management plans the target group should be involved and remedial measures and plans should be made for them, "Rastgele Fishery and Sea Festivals" were held to contribute to create pub-



Figure 41. Mother seal “Emine”. She gave birth in two successive years during the conservation project carried out by SAD-AFAG. Photo: SAD-AFAG C.O.Kıraç



Figure 42. Hayırsız island is one of the most important natural habitat in Foça SEPA. Photo: SAD-AFAG C.O.Kıraç

lic awareness in cooperation with SAD-AFAG, Documentary Film Union, Foça Municipality and Foça Aqua Products Cooperative in the years between 2002 and 2005. With these festivals, emphasis was specially placed on artisanal fishermen.

- In 2003, waste water treatment and off-shore discharge project were completed by Foça Municipality finding solutions to domestic sewage in Foça. All the domestic wastewater is discharged into the sea (after chemical and biological treatment) 2 km. off the coast and at 40 m depth.
- “Prohibition of Diving into seal cave” proposed by SAD-AFAG to National Seal Committee was officially accepted and in 1991 it was put into force in the circular of Aqua Products.
- Foça (1992) and Yalıkavak (1993) Local Seal Committees were established with the decision of NMSC.
- “Mediterranean Monk Seal and Marine Protection Areas” were identified and declared by NMSC in Foça (1992) and Yalıkavak (1994). Concerning the marine part of the defined areas, the prohibitions regarding fishery were put into force in the Aqua Products Circular.
- Foça Pilot Project pioneered another monk seal project funded by WWF in the western Mersin

Region (between Taşucu-Anamur) – Türkiye’s one of the Important Monk Seal Sites. Afterwards thanks to the studies executed by METU-IMS, some coasts were declared as the 1st grade SIT site.

- SAD-AFAG accelerated its studies on the extension of Foça SEPA borders in 2004. Both Ministry of Environment and Forest and EPASA were lobbied by SAD-AFAG for a long time. And finally these responsible organizations accepted the proposal as a result of the intense interviews and reports; then the borders of Foça SEPA were enlarged in 2007 by the decision of Board of Ministers as shown in the Figure 37⁴⁵. Hence, the area took a step forward in the direction of conserving the biodiversity of the whole marine & coastal ecosystems in a larger geographical area.
- In 2004, with the support of REC, Foça Municipality and SAD-AFAG cooperated to carry out a joint project on the protection of posidonia beds and the establishment of information center. The information center was successfully established in Town Library, in which historical, cultural and natural assets of Foça are nicely given in English and Turkish. (Figure 38)

5. The legal status about the conservation of the Merditerranean Monk Seals

The Mediterranean monk seals (*Monachus monachus*) was not officially under protection until recently. However, since 1977 Turkey has taken the Mediterranean monk seals under protection and the species has had an extended protection status with both the national legislation and the international Conventions. According to our national legislation and the international conventions ratified by Türkiye, the species, its habitat namely the natural and untouched coastal areas are committed to be protected.

5.1. National Legislation

National Legislation: According to the Act on Hunting No.3167 and related Decisions of Central Hunting Commission since 1977 and Act on Aquaproducts Fishing 1380, since 1978 and related Aquaproducts Circular hunting and killing of the endangered monk seal has been definitely prohibited. And in the event of such a case, the guilts are charged with heavy fines. It is also forbidden to enter into monk seal caves with any kind of gear and light so as to conserve monk seal's habitats according to the Aquaproducts Circular⁴⁶. Moreover, as per article 13 Area Prohibitions in the same circular, between Deveboynu Cape in Foça and Aslan Cape within the monk seal conservation areas, from 1992-93 season in Bodrum Peninsula "between Kızılyar and Karabakla Capes" from 1993-94 seasons all kinds of purse seining and dredging techniques are prohibited 2 miles off from the coast. In January

1991, with the participation of concerned bodies, experts, non governmental organisations and universities, National Monk Seal Committee was established and started its initial studies. The committee accepted "National Strategy for the Conservation of Mediterranean Monk Seal" which was originally developed and proposed by AFAG.

5.2. International Conventions

The conventions that Türkiye is ratified to for the conservation of the *Mediterranean monk seals and their habitats* and their approval dates are as follows:

- Conservation of Mediterranean against Pollution (Barcelona Convention, 1981)
- The Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean (Barcelona Convention, 2000)
- The Conservation of European Wildlife And Natural Habitats Convention (Bern, 1984)
- Protocol on Special Protection Areas and Biodiversity in the Mediterranean (2002)
- Convention on International Trade on Endangered Species of Wild Fauna and Flora. (Washington, 1996)
- Biodiversity Convention (1996)

6. Results and Conclusions

Within the frame of Foça SEPA the Mediterranean monk seals (*Monachus monachus*) Conservation and Monitoring Project executed in 2008, the literature and results of the research were compiled from 1991 until 2004 and the seal sighting records falling in the period between 2005 and 2008 were collected, the coastal caves were checked and also breeding and feeding areas and the threats to the species were analysed. The resultant data were conveyed to the maps through GIS, visual materials and works during the project were compiled, brochures about the project and monk seals were designed and printed and distributed, a book in English and Turkish was published in which a comprehensive information on the species, its biology and threats in global, national and local scale. Finally a joint press conference was held by SAD-AFAG and EPASA after the initial and interim reports were published.

The Mediterranean monk seals have still been using Foça SEPA which holds suitable habitats. Although 9 monk seals were identified during continuous monitoring in the early periods, now it can be said 3 monk seals still exist in area according to the data obtained 2005–2008. It is also possible to suggest that the population can be higher. For the last 15 years, the whole area has been used as the habitat of the monk seals, on the İngiliz Cape mainland, vicinity of Ayaini and Kartdere the islands mainly including Orak Islands & Siren Rocks and Hayırsız Island (have been mostly preferred by the monk seals (Figure 36)). In the previous periods of the project between 1993–2004, the annual average sighting of the monk seal and standard deviation were 69 ± 49 , while these numbers decreased to 14 ± 11 during the period of 2005–2008. Also the annual average cave usage rates were 44 while there were only 2 apparent tracks / signs in the caves reported in 2008 (covering only summer and autumn periods). It is considered that monk seal tracks and signs in the caves can be more indicative than the monk seal sightings when compared with the past. The reason for decreased monk seal sightings can be attributed to increased -and still increas-

ing- maritime traffic and human activities in coastal and marine areas of the region, and insufficient patrolling activities. All these increased maritime activities gradually created some pressure on the species and its habitat. It is an expected result that no breeding takes place under these conditions..

However, relative decrease of the monk seal sightings can not be the only measure of success of the conservation, monitoring and implementation studies after the Foça Pilot Project. Both positive and negative developments related to the the protection of marine and coastal areas of Foça are as follows:

Positive developments and results:

1. There has not been any construction in the pristine coasts and islands in Foça SEPA.
2. There has not been any deliberate monk seal killing. On the contrary, the pup “Derya”, born in Foça in 1995, entangled in a set net and rescued by an artisanal fisherman by cutting his own fishing net. Regarding the young monk seal found dead and stranded on Foça coasts in 1992 -before FPP- no precise proof exists about the death (See annex photos).
3. While the coasters were free to navigate between the islands and the mainland before 2001, the coasters are now sailing outside the islands without creating risks after the regulation on navigational routing in the narrow waterways and ecologic hot spots⁴⁷.
4. Marine birds have continued to breed as they did in the past. No loss of bird habitat has happened.
5. Hunting has had a strong tendency to decrease especially on the islands.
6. No fish farms have been established within Foça SEPA borders.
7. The relatively healthy posidonia beds have continued their existence and also an important fish biodiversity exists in Foça SEPA.

⁴⁷ Kırac and Güçlüsoy, 2007

8. In 1993, trata fishing (a type of coastal trawler) was abandoned by the trata fishermen with their own consent and the gears were removed. Three trata owners switched to artisanal fishery and one has been line fishing for tourists. Just after this, trawlers and purse seiners are banned between Aslan Cape and Deveboyunu Cape in accordance with the decision of Aquaproducts Circular.
9. Fishery management, area prohibitions and patrolling have created much more protection when compared with pre-1993 period, although Foça marine patrolling system has not been run with full efficiency in certain periods since 1993.
10. As a result of successful involvement of artisanal fishermen in Foça Fishery Cooperative thanks to their strong organizational skills, self-control marine patrol system, first in its kind in Türkiye, was developed and started to operate, despite being intermittent.

Negative developments and results:

1. The amount of sea traffic, especially the number of daily boat excursions, professional and amateur small scale (artisanal) fishermen, private boats, yachts and motor boats and spearfishermen have increased a lot.. While there were approx. 110 boats of 5 to 8 m. long (artisanal fishermen, amateur artisanal fishermen and daily tour boats) in 1993, in 2008, 347 boats of 5 to 8 m. long were counted. In 2008 August, 542 boats in all sizes were counted in the Foça port area (the marine area in the east of the virtual line between İngiliz Cape and Fener Cape) and the same period approx. 700 boats were estimated in all around Foça SEPA. This interprets the increase in 215% only in 5-8 m. size boats in 2008 compared to 15 years. In other words, 5 to 8 m. long sized boats using Foça and vicinity increased more than three times in 15 years. As a result of this increased human activity along the coasts and marine areas, the monk seals living along the untouched coasts were and probably for this reason no breeding occurred on the islands of Foça after 1996.
2. Despite being performed legally, a relatively serious increase has been observed in artisanal fishery activities and the number of the artisanal fisherman in Foça. The majority of them are semi-professional or amateur local people Foça whose main revenue is obtained from other jobs, in other words, they perform artisanal fishery for an additional income.
3. A serious increase in illegal fishery has been observed since 2002. Both the trawlers and the purse-seiners fish illegally entering the borders of



Figure 43. There has been a considerable increase in the number of boats especially in the size range up to 13 meters in Foça SEPA. Photo: SAD-AFAG C.O.Kıraç

Foça SEPA. As a result, all the artisanal fishermen and Mediterranean monk seals in the area are effected negatively due to the pressure on the fish stocks.

4. Born in 1996 October in Foça, the pup “Bahtiye” drowned by entangling in the nets of an artisanal fisherman in February 1997⁴⁸.
5. Marine patrol system against illegal fishery based on different models and facilities couldn’t be managed with full efficiency and effectiveness by the Municipality and the Sub-Governorship. The patrol system was very effective from time to time, however, it was not permanent as it had been desired.

If scrutinized carefully, the above mentioned negative factors are not permanent and not irreversible problems. If these problems are analyzed well using scientific methods and applicable solutions are suggested and implemented carefully, the above mentioned negative factors will be removed. If afore mentioned problems on increased maritime traffic & human activities and also illegal fishery are completely solved or overwhelmingly remedied, then it will not be wrong to state that the Mediterranean monk seals will use the area as they did in the past and breed and even can reach better conditions. The most vital element in terms of conservation of wildlife is the protection of natural habitats without any deterioration for the Mediterranean monk seals and the other flora & fauna in the area. Namely, to protect coastal zones from construction and the monk seal caves away from urban development and road constructions. If the habitat is deteriorated by construction in Foça, it would be an irreversible process and impossible to find solutions to bring back the habitat! The concrete measures taken to protect environment in Foça have formed acquisitions so far and these will

⁴⁸ However, when compared with the other regions in Türkiye, Foça is the place where the least death cases have been observed.



Figure 44. High speed patrol boat allocated to Foça by EPASA at the end of 2007. Photo: SAD-AFAG Archive

contribute to Foça's sustainable integrated coastal and marine zones management planning in the long run.

The effort to collect data in the last 4 years within the project and the effort for the next 10 years process during Foça Pilot Project, which is daily effort, are not the same. And this situation makes the comparison difficult. During the cave checks in 2008, breeding was not observed and cave usage rate of the monk seals decreased back to the levels in 1990s, which was the starting point of monk seal conservation studies⁴⁹.

The quantity and quality of habitat of Mediterranean monk seal within the border of Foça SEPA have been prevailing as before. The sharp decrease in monk seal sightings and having no breeding in the period 2005-2008 compared to the period 1993-2004 may be attributed to the following basic reasons

1. Deterioration of the quality of habitats,
2. Serious decline in fish stocks,
3. Disturbance of the monk seals in their habitats by increased marine traffic and human activities.

However, it is not possible to state that the first factor has occurred in Foça. The coasts of Foça SEPA have been preserving its natural characteristics so far, as it was the case in the period 1991-2004. No building or road constructions and touristic facilities were performed on the islands. Furthermore, the coastal

mainland was conserved to a great extent. Hence, it is believed that the other two basic reasons (2nd and 3rd) have played an important role in the decrease of monk seal population and seal sightings in Foça SEPA.

The possibility of the serious diminution in fish stocks might have been caused by combined effect of over-fishing and illegal fishing by trawlers, purse-seiners and the two patrol boats, allocated by the Ministry of Environment and EPASA in 1993 and 2007 respectively, have not efficiently and effectively been operated in the full period.

The reason why the monk seals use Foça SEPA marine and coastal areas much less than they did in the past is attributed to the increased sea traffic including artisanal fishery and daily tours.

Recommendations:

Relying on the data, experience and observations obtained by SAD-AFAG during the whole period between 1991-2008, the following area management planning components are recommended to be assessed and implemented by the relevant stakeholders, especially by the decision making and planning bodies:

1. Regular and close monitoring of the Mediterranean monk seals, their habitats and threats,
2. Making the marine patrol system functional. Analyzing the existing problems on the efficiency of marine patrol system, taking the necessary cor-

⁴⁹ Güçlüsoy and Savaş 2003

- rective measures and rendering marine patrol system fully and effectively functional,
3. Prohibiting spearfishing in Foça SEPA –as may be applied to all other SEPAs in the country, as hunting is currently prohibited in all SEPAs; and adding this decision the management plans of Foça SEPA,
 4. Designation of “no fishing zones” within the marine areas to be defined later on Hayırsız island and Orak island-Siren rocks as well as Ayaini on the mainland so as to support fish stocks. Such areas must be marked with buoys. Also bringing a regulation in which anchoring of all types of boats are prohibited regardless of depth around Hayırsız island and Orak island-Siren rocks,
 5. Closing Hayırsız island, Fener island, Kartdere island and Orak island-Siren rocks and Ayaini on the mainland to all human activities on land and adjacent marine area, except for scientific research activities,
 6. Continuation of the use of İngiliz Cape for daily tourism activities only; not allowing construction of new road(s) regardless of its size and purpose; not asphaltting the existing road,
 7. Avoiding to approach closer than 25 meters to the coast of all islands in Foça SEPA except İncir island and Metalik island by any marine vessels except artisanal fishermen between 1st December and 1st May, which is the breeding period of Mediterranean sub species of shag (*Phalacrocorax aristotelis desmarestii*) breeding on the cliffs,
 8. Use of photo-traps especially in the caves on Hayırsız island and Orak island to find out the cave usage by seals and to identify of seal individuals,
 9. Design and production of information boards to declare of the conservation regulations, management planning components and biology of endangered species and threats to be located in the harbours and the town entrance of Foça,
 10. Design and production of brochures and posters to promote the conservation regulations in Foça SEPA and the biology of endangered species in the area,
 11. All the maintenance and repairing expenses of “Foça Mediterranean Monk Seal Rehabilitation Center” being the first and unique in its kind in Türkiye as well as costs of probable rehabilitation events in the future to be met regularly allocating an annual budget every year by the responsible organization(s),
 12. Strengthening the Foça Information Center serving to introduce the ecological, cultural and natural assets of Foça –jointly designed by SAD-AFAG and Foça Municipality- in Foça Town Library, enhancement of the center with extra information and boards and facilities, assigning a full-time staff to make use of the center more effectively,
 13. Preparing short promotion films on natural, cultural, historical, fishery, maritime, agricultural and architectural assets of Foça and making necessary arrangements to display them in the Foça Information Center,
 14. Establishment of an assembly or council in Foça to develop and implement Foça Integrated Marine & Coastal Areas Management planning,
 15. Making detailed biological and ecological studies within Foça SEPA especially on the stocks of demersal fish species and avifauna; EPASA to adopt such research programs,
 16. Except for high speed patrol boat, a marine police boat and some other boats to be designated by the governmental agencies, all the marine vessels and marine sports and recreational boats must be prohibited to navigate over the speed of 10 nautical miles / hour in the whole Foça SEPA,
 17. Establishment of local Vessel Traffic Management and Information System (VTMIS) in order to manage and monitor all the local maritime traffic in Foça SEPA in cooperation with the concerned bodies so as to take precautions to provide navigational safety and protect marine environment and eliminate all kinds of illegal marine activities closely and reduce pressure on the marine and coastal biodiversity and habitats in Foça SEPA. This pilot study can be put into practice in the other Special Environment Protected Areas which have coasts to sea after implementing in Foça SEPA.
- Before above mentioned remedial actions mentioned above and area management planning components are not aimed to protect a species -the Mediterranean monk seals- but refer to protection of its natural habitat, or with a wider view, to contribute for the protection of whole marine and coastal ecosystem.
- The Mediterranean monk seal, which is a critically endangered species show distribution range not only on the coasts of Foça SEPA but also in Datça-Bozburun, Fethiye-Göcek, Gökova and Kaş-Kekova and in the other SEPAs⁵⁰. It is believed that the current status and monitoring of the species in each SEPA must be started by EPASA. Also new management plans on the protection of natural habitats and the species in each SEPA must be designed under the coordination of EPASA after research.

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Observed on the coasts of Karaburun, individually identified, adult Mediterranean monk seal “Koca Yusuf”. Some of the seals individually identified in the previous field research were determined that they were commuting between Foça and Karaburun with the distance of 11 nautical miles. Photo: SAD-AFAG C.O.Kıraç



After she was found on the coasts of Didim in December 2006, young monk seal Badem rehabilitated and nursed in Foça Monk Seal Rehabilitation Center and released to her natural habitat in April 2007. Photo: SAD-AFAG C.O.Kıraç



Foça, a coastal town that has always become a symbol for the Mediterranean monk seals, which still keeps its cultural and natural assets. Photo: Şevki Avcı



The endangered Mediterranean monk seals are the key species for Foça Islands marine and coastal areas to be a SEPA Region. Photo: SAD-AFAG C.O.Kıraç



A young Mediterranean monk seal stranded and found dead along the northern coasts of Foça in 1992 (before FPP) and the reason of death could not be understood. Photo: SAD-AFAG İlksen D. Baş



Mediterranean monk seal needs pristine and untouched coasts to breed and continue its survival. Such coasts including caves have utmost importance for the survival of the species. However, increasing marine traffic and uncontrolled human activities disturb this shy marine animal in the heart of its habitats. (Near Ölüdeniz, SW coasts of Türkiye). Photo: SAD-AFAG C.O.Kıraç

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"It is assumed that every country has three types of richness; economical, cultural and biological. We recognize the first two very well as these are the main issues in our daily lives. However, biological diversity is underestimated. It is such a grave and strategic mistake that we shall increasingly regret from this mistake as time passes by"

Edward O. Wilson



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