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PRESENT STATUS OF THE MEDITERRANEAN MONK SEAL, Monachus monachus (Hermann, 1779) ON THE COASTS OF FOÇA IN THE BAY OF IZMIR (AEGEAN SEA)

AKDENİZ FOKU Monachus monachus(Herman,1779)'UN FOÇA (EGE DENİZİ)BÖLGESİNDEKİ MEVCUT DURUMU

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Key words: Mediterranean monk seal, habitat, distribution, Aegean Sea, Foça, Fisheries.

Abstract

The areas which bear habitat features for *Monachus monachus* (Hermann, 1779) were searched in Foça, as a pilot region for the project of Mediterranean monk seal. Seven caves and seven shelters were found. Interviews with the local fishermen revealed that seals were observed 29 times (max.) in 1991, 14 times in 1992 and five times in 1993. Besides, according to these fishermen, three different seals were defined in Foça and they were mostly seen around the Orak and İncir Islands. Direct observations have been made to find seals in Foça region but without success. The areas between Foça-Karaburun and Foça-Mordoğan were also searched. Compared with Foça, more seal observations were made by the fishermen in Karaburun and Mordoğan in 1992.

Investigations were carried out in Foça on fishing details such as the fishing grounds, the species caught, the fishing gears and the size of the damage in the nets. The area was influenced by the fishing made with purse-seine, trawl and trammel nets. Out of 87 damaged trammel nets examined during the study, only 20 included the damages due to seals. Some human activities like fishing and tourism were noted to cause stress for seals in the area near the potential seal habitat.

Introduction

The Mediterranean monk seal *Monachus monachus* (Hermann, 1779), the name of which comes from "Phoca" meaning robust animal in old Greek, is a mammal facing the danger of extinction, represented by about 300 individuals in the world of which less than

50 live on the Turkish coastline (Öztürk, 1992 and 1995). This number was given for Turkey as 150-300 by Berkes *et al.* (1979) and as 50-150 by Sergeant *et al.* (1978), and Marchessaux (1987). The Mediterranean monk seal is one of the endangered 12 mammal species on the red list of IUCN (1978). Mediterranean monk seals are scattered in Turkey in the Western Black Sea, Kapıdağ Peninsula, Marmara Islands, Karabiga-Çanakkale, Gökçeada, Çeşme-Kuşadası coasts, Dilek Peninsula, Güllük Bay, Bodrum Peninsula, Gökova Bay, Marmaris-Fethiye coasts, Kaş, Finike and coastline from Antalya to Silifke (Berkes *et al.*, 1979; Mursaloğlu, 1991; Öztürk, 1992; and Öztürk *et al.*, 1990 and 1991).

The Mediterranean monk seal faces the danger of extinction as a result of deliberate killing by fishermen and drowning in the net; degradation of the coastal ecosystem and the loss of habitat due to increased the coastal population, urbanisation and industrialization; tourism activities (daily tours to seal habitats, cave diving etc.); food shortage due to decrease in the fish stocks on the coastal area as a result of overfishing and the fishing by dynamite. Today the Mediterranean seal is rarely seen on Turkish coastline, Greek islands, Maderia island and the African coast in the North Atlantic Ocean.

In Turkey, a national strategy for protection of the Mediterranean monk seal was established by the coordination of Ministry of Environment in January 1991, the National Monk Seal Committee was formed and Foça was declared as a pilot area with the aim of detecting suitable protection strategies on the Turkish coasts. Meanwhile, a committee for seals was formed locally by some people sensitive to the natural wealth of Foça, led by Municipality of Foça. The borders of the pilot area extended 2 miles from Aslan Cape in the north, and the Deveboynu region in the south of Foça (further extended to 3 miles in 1993) (Figure 1). Foça, situated on the north of İzmir Bay, is effected small and big scale fisheries and fast becoming a touristic region with its natural and historical attractions. Therefore, Foça has suitable conditions for the examination of interaction between seals and fishery, and seals and tourism.

Few scientific publications exist about the distribution of Mediterranean monk seals around Foça. Marchessaux (1987) indicated that in Foça area including Ayvalık the estimated number of seal individuals is three to five. Öztürk *et al.* (1991) examined the general distribution of Mediterranean monk seals in the Turkish coasts and stated that there were suitable caves for them in the area between Foça and Bodrum. Öztürk (1992) examined the distribution of Mediterranean monk seal in Turkey and indicated the reasons for their decrease in number and protection declarations. He also explained the observations and habitats of the Mediterranean monk seal in Foça. Akı (1992) stated the distribution of seal observations in Foça area but the date of these observations was not given. Öztürk (1995) indicated that the monk seal population is five in the area between Karaburun and Foça.

This work aimed to examine the interaction between the fishing effort and monk seal by confirming the number of individuals living in and around the area and their breeding-sheltering locations, in order to form the data sources useful for the protection of monk seals in Foça and Turkey. The relation between the problems caused by tourism in this area and the monk seal was also a subject of this research.

Materials and methods

Investigations in the Foça area took place periodically between March 1992 and July 1994. Covering primarily the Orak Island, İncir Island and Hayırsız Island in Foça as well as the coastline from Aslan Cape in the north of Foça (38^0 44' 30" N, 26^0 44' 30" E) to Eskifener cape in the south of Foça (38^0 36' 15" N, 26^0 45' 30" E). Beside Foça, Karaburun, Mordoğan and Uzunada coasts were also studied (Figure 1).

The study took place under two categories such as direct field surveys and questionnaires to fishermen and interviews with local people. Direct observations were made from the land and the sea, both in daytime (06:00-20:00) and at night. The observations from the sea were usually made by going out to fishing with fishermen, whereas those from the land were made from the islands. In the questionnaire studies, the small scale fishermen who fished with trammel nets and longlines were preferred as they had a close interaction with monk seals for they shared the same coastline.

The questionnaire suggested by Öztürk (1992) with two sections, one for monk seal (seal sightings and features of seals observed) and the other for fishing (fishing equipment, damages in the nets and fish species caught) was used in this study.

To examine the damage in the nets, skin and scuba dives were often made for detecting the shape of damages, the underwater position of nets, and the seafloor features. Likewise, skin and scuba dives were made for detecting the possible breeding and feeding areas of the monk seal.

Results

Questionnaires;
Questionnaires were applied to 40 fishermen who used gill nets in the area. Four of them had never seen a seal. Interviews were also carried out with 50 people in the area. According to the result of the questionnaires and the interviews, the number of observations in 1991-1993 is shown in Table 1.

Table 1. The number of seal observations in Foça in 1991-1993.

Year	Number of observation
1991	29
1992	14
1993	5

In the investigation at the end of 1992, the fishermen stated that no seals had been seen from the spring of 1992 till June of 1993. In the investigation made in July 1994, the fishermen stated that only three seals were seen in the area between January and July, 1994. All these data showed that the seal observations in Foça have decreased since 1991. The geographical distribution of seal observations according to the data from the questionnaires are shown in Table 2.

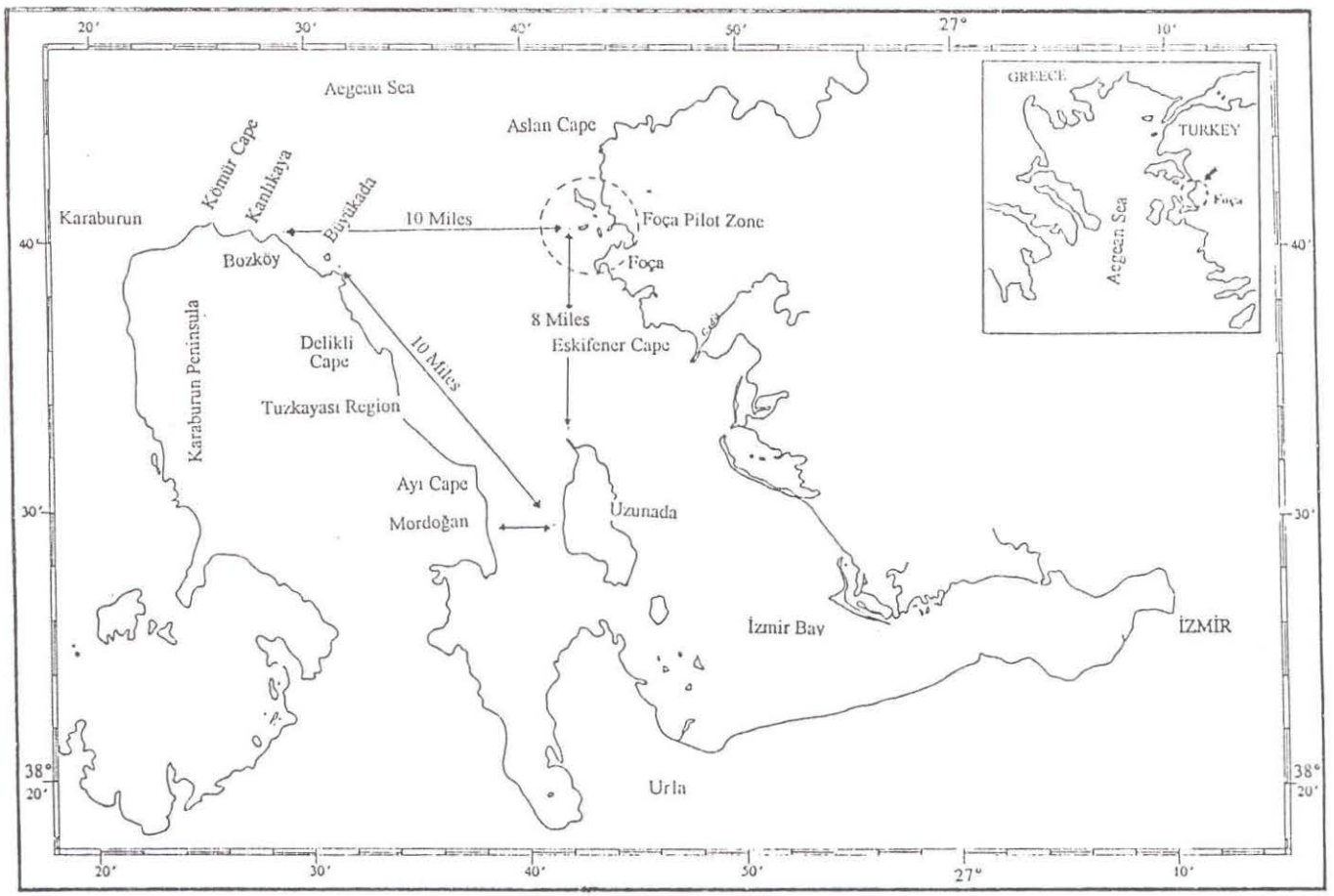

Figure 1. Izmir Bay and Foça Pilot Zone

Table 2. The distribution of seal observations in the area in 1991-1993.

Place	Number of observation	% of the total
Orak Island	17	35.4
Hayırsız Island	7	14.5
Kartdere region	3	6.25
Deveboynu Cape	3	6.25
İngiliz Cape	4	8.3
İncir Island	8	16.6
Fener Island	2	4.1
Port of Foça	4	8.3
Total	48	100

Three different seals were confirmed according to the information from the fishermen in Foça. The first animal was light brown and approximately 2.5 m; the second one was gray, with a white patch on the belly and approximately 2-2.5 m; and the third one was gray and approximately 2 m. However, these individuals in Foça cannot be observed all the time, usually their actual habitats may be outside Foça.

Beside Foça, questionnaires were filled in Karaburun (with 16 fishermen) and Mordoğan (with 13 fishermen). The distance between these localities is 8 miles. It is possible that an individual seen in Foça may be using a cave in Karaburun for sheltering and breeding. According to the questionnaires filled in Karaburun, the areas where seals were seen included; Kanlıkaya region, Kömür Cape, Büyükada, Delikli Cape, Tuzkayası region and Bozköy. Twenty-seven seal observations were made in the area in the summer of 1992 and 19 of these in Kanlıkaya region. The areas where seals have been seen around Mordoğan were; Ayı Cape, Kütlücek region and Uzunada Island. The local fishermen stated that they had seen seals in these areas often. The fishermen from Karaburun and Mordoğan stated that they had seen two pups in this area in October and November of 1992. The total number of seal observations in Mordoğan was 16 in 1992.

Field Studies

We tried to observe monk seals in the areas where seals were previously seen according to the information from the questionnaires. Almost all observations took place at daytime and few at night, but no seal was observed.

The possible feeding areas shown in Figure 2 were the places where fish were found most abundant. These areas coincided with the areas where the fishermen saw the monk seals feeding.

Search for suitable caves and feeding areas for the monk seals in the area took place on the islands and on the coastline from Aslan Cape to Eskifener Cape. No cave with the entrance above the sea surface was found on the coastline between Aslan Cape and Eskifener Cape. In this area, there are suitable flat rocky places for the monk seal only near Sığınak Cape. One cave at the İncir Island and six caves at the Orak Island were

determined. The cave at the İncir Island (No. 7) was not deep, more like a shelter (has a small stony beach with an entrance accessible to man and visible to boat traffic). On the other hand, seven shelters in total were found, three at the Fener Island, one at the İncir Island, one at the Hayırsız Island and two at the Orak Island. All the caves at the Orak Island were in Siren Rocks and three of them (No 1, 2, 3) next to each other (Figure 2).

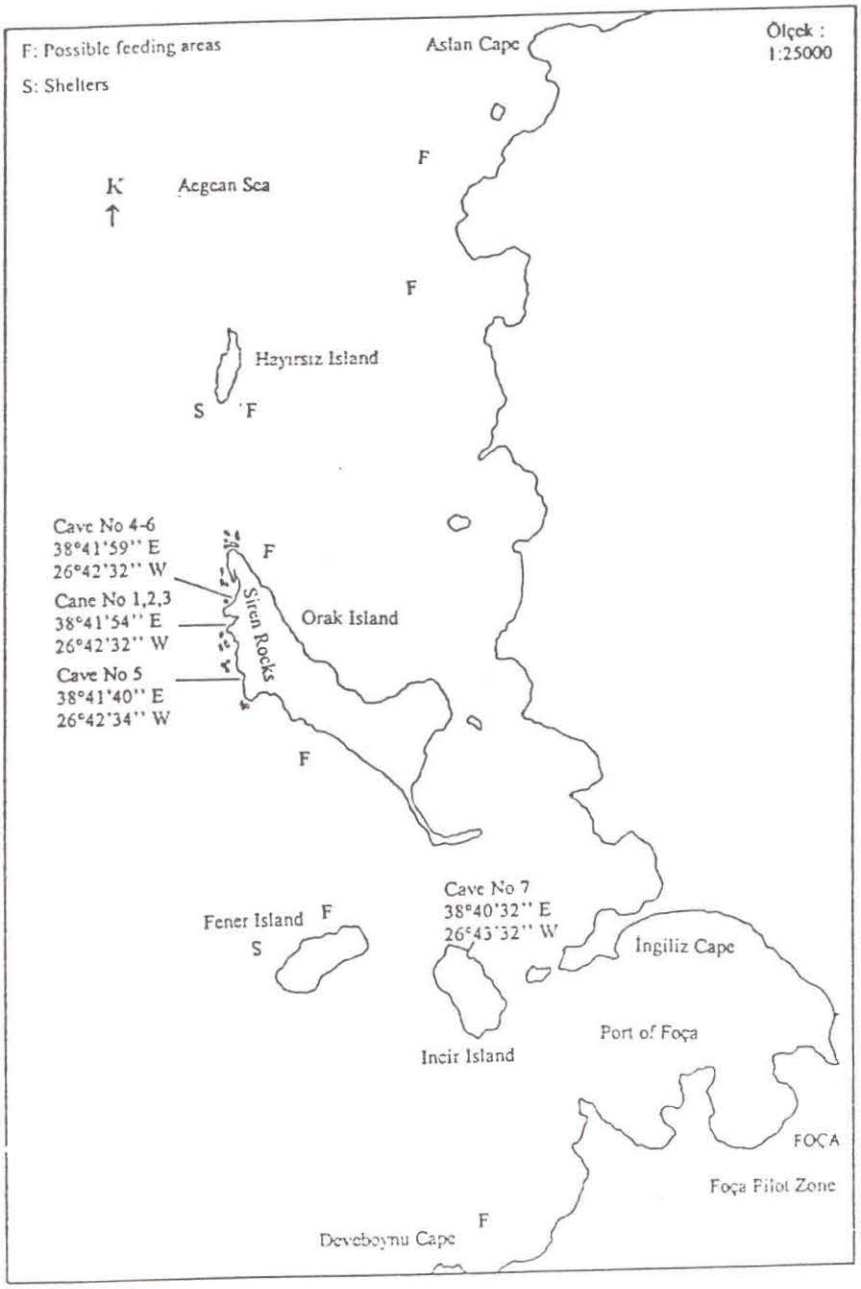

Figure 2. The seal caves and feeding areas in Foça

There was not enough space for a seal in caves no 1 and 5 ,therefore these caves are not used by monk seal (Figure 3a and 3b).

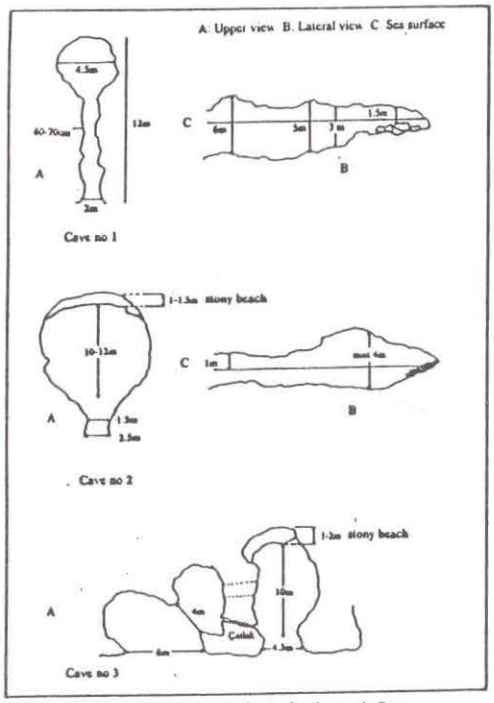

Figure 3a. Upper and lateral views of seal caves in Foça.

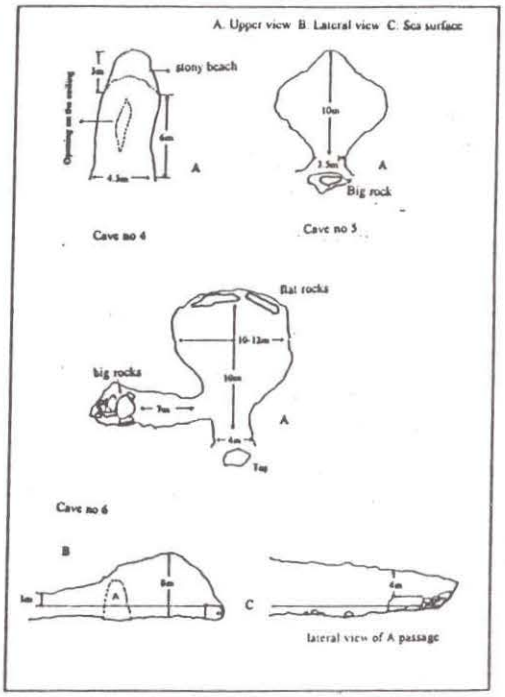

Figure 3b. Upper and lateral views of seal caves in Foça.

Cave No. 2: The cave had an entrance from the surface. The entrance, 2.5 m wide, narrowed approximately to 1.5 m and there was a circular opening at the end. This opening continued for 10-12 m inwards. At the end of the cave, there was a 1-2 m wide stony beach. This beach might be useful for the seals as a resting place, but not as a breeding area because of its small size beach (Figure 3a).

Cave No. 3: There was an entrance from the surface, 4.5 m wide. It continued 8-10 m inwards and ended at a stony beach of 120 cm in width. The ceiling above the beach was 75 cm. This cave might also be suitable for seal as a resting place (Figure 3a).

Cave No. 4: This cave, that had an entrance from the surface, 4-5 m wide, bore an opening on its ceiling in the shape of a crack , of 3 m wide. The length of the cave was 10 m and ended at a 3-4 m long stony beach. This cave could be used for breeding and inhabiting by seals (Figure 3b).

Cave No. 6: This was the largest cave with an entrance from the surface 4 m wide. A second passage (6-7 m) started on the left just beyond the entrance and at the end of the passage there was 10 m^2 area of rocks. The largest one among these rocks had a flat surface exposed above the water. The rest of the cave was circular and 10-12 m long. The bottom of the cave was covered with sand and gray-white stones. The ceiling was rather high ranging between 3-7 m The cave could be a useful area for seals (Figure 3b).

Fishing

Investigation was carried out on the fishing gears, yields and fishing areas. There were 32 trammel nets (small scale fishery), 28 trawl nets and 5 small trawl vessels present , all of them being members of the Foça Fishery Cooperative without small scale fishermen. The main catches of Foça were; *Boops boops, Mugil* spp., *Mullus barbatus, Sparus aurata, Dicentrarchus labrax, Dentex dentex, Diplodus sargos, Diplodus vulgaris, Pomatomus saltator, Solea vulgaris, Octopus vulgaris, Sephia officinialis, Loligo vulgaris, Sarpa salpa,* and *Sparus aurata.*

During the study, different fishing areas used by fishermen such as coasts of the Hayırsız, İncir and Fener Islands, Siren Rocks and East coast of the Orak İsland, and Deveboynu region were determined. Also, some fishing activities made in front of the caves during night using light disturb the Mediterranean monk seals in their environment were observed.

Damages in the nets

Various sizes and types of damages were determined on the nets left overnight and collected in the morning. Close investigations showed that the damage occured was not only done by Meditteranean monk seals. Of the 87 nets examined during the study, only 20 had round tears which are typical features of damage by a seal. The various causes of the damage noticed on the nets are listed as follows; dolphin attacks, shark (*Squalus* sp.) attacks, eel (*Conger conger*) attacks, turtle (*Caretta caretta, Chelonia mydas*) attacks, Meditteranean monk seal attacks, rough sea conditions and strong currents.

Dolphin attacks are identified by the large irregular shaped tears stretching from top to bottom of the vertical length of the net. If a torn part of the net is twisted like a wick, it can be identified as a dolphin damage. A head or piece of fish can generally be found at the end of such a wick. Shark damages are similar but also involve single holes and torn off pieces of the net.

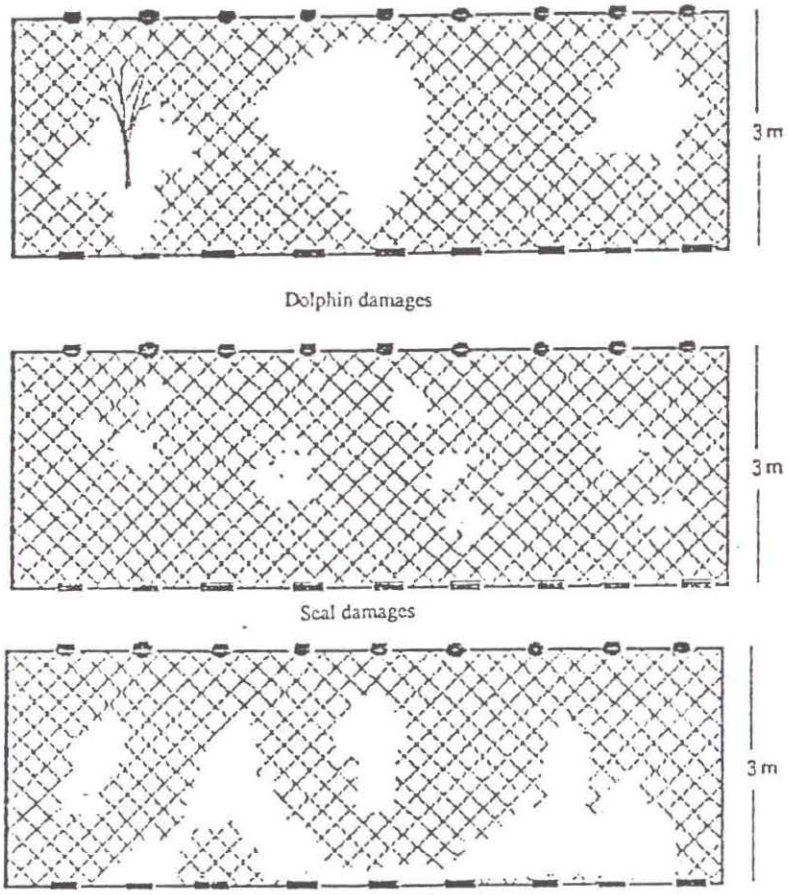

Figure 4. Damages on the trammel nets.

Eel attacks can generally be recognised by the folding up of a part of net and parts of fish being stuck in this fold. The reason for this effect is that when the eel cannot take its prey from the net, it begins to spin itself around while holding the fish in its mouth.

Marine turtle and seal attacks resemble each other. The damage they cause can be identified by three holes. The damage caused by Meditteranean monk seals generally involves three holes (Ronald and Healey, 1974; Öztürk 1992). It is further noted that seal damage can also involve only one hole. This damage generally takes the form of 20-30 cm, wide round holes (Berkes *et al.* 1979; Panou *et al.*1993).

Nets can also be torn and ripped apart when caught on rocks on the seafloor in rough sea conditions and strong currents. When the nets are collected, large tears occur and the lead weights are often ripped off. Figure 5 shows the schematic example of the net damages caused by various reasons.

During the investigation one Mediterranean monk seal was drowned by being entangled to the gill net on 14 July 1992 . It was a juvenile of 155 cm in length.

Touristic activities

According to the information from *in situ* researches and other interviews , the boat traffic was increased around seal habitats, i.e. the Orak Island in Foça , in summer . People took touristic daily tours in and around Foça islands. The distance between these islands is less than 1 mile. In summer scuba and skin divers are often observed around the islands. In addition , there is increased human movement due to touristic activities in small bays of Foça coastline.

Discussion

Foça area is a potential seal habitat with its clean rocky shores and caves. However, these shores are under pressure of overfishing and increaseed tourism increased in summer. For that reason, the species is rarely seen in this area. The questionnaires and field researches proved that more observations were made in summer than in winter. The reason being that monk seals prefer mostly *Boops boops, Dentex dentex* and *Mullus barbatus* for which hunting increases in the area in summer months. Also, fishing activity is low in winter, that is, the fishermen go to the sea less than in summer, therefore they had less seal sightings in winter.

It is considered that the seals observed in Foça were the ones living in Karaburun and Mordoğan as mentioned in (Öztürk, 1992). This also supported the fact that Mediterranean monk seals could travel further distances (Sergeant et al., 1978). In a study made in Turkey, it was found that the seals travelled 36 km in 24 hours (Mursaloğlu, 1984). According to Berkes (1978), the seals used an area for about 40 km^2 in Bodrum Peninsula as an inhabiting area. In Mordoğan and Karaburun, 8-10 miles west of Foça, it was determined that these shores were much calmer than Foça. Furthermore, according to the information gathered from the fishermen, in 1992, there were 16 seal observations in Mordoğan and 27 in Karaburun. In October and November 1992, two pups were observed. Compared to Foça, the seal sighting rate was higher in these two areas.

Although there were four to six seal individuals in the Sardine Island in Italy in 1970's, they disappeared in 1980's as a result of the tourism pressure. It is claimed that there are not any Mediterranean monk seals on the coasts of Italy. (Boitani, 1991). In Foça similarly a touristic town, precautions must be taken against the tourism activities near the seal habitats. On the other hand, many of the bays, which can be used by seals are already occupied by frequently human beings.

In Turkey, Akı (1992) claimed that the Mediterranean monk seals are mostly seen in Foça and there are less seals in the other shores. Since he did not include the number of observations according to the years, comparison could not be made . However, in the Turkish coasts for instance, three to six seals were indicated between Kokar-Çeşme, two to six seals in Bodrum Peninsula; six seals between Gazipaşa-Anamur (Öztürk, 1992). In Gelidonya Cape it was determined that five seal individuals were observed altogether (Berkes, 1982). However, in Foça region including Ayvalık, the estimated number of the seals is three to five individuals (Marchessaux, 1987). The observations by different people at different times, proved that the seals were observed even though they were rare, in this area. Consequently, in Foça, it is considered that the rate of the seal observation at a certain time is not more than it is in the other areas mentioned above.

The Orak Island is the area in Foça where the seal observations are the most frequent, because most of the potential seal habitats are in the Orak island and the island surroundings make a suitable feeding area for the seals. In the Incir and Hayırsız Islands, there are sheltering fields with beaches suitable for the Mediterranean monk seals. In Foça some fishing activities in front of the caves at night using light disturb the Mediterranean monk seal in their environment and especially during their breeding periods this can cause miscarriages or they can leave the habitats. A similar event happened in Sardine, Italy (Bareham-Furredo, 1975). Therefore, at least near the potential habitats of the Mediterranean monk seals, some prohibitions have to be made to stop such harmfull activities, as well as the touristic activities. Consequently, the areas where Mediterranean monk seals live should be protected as National Parks or special protected areas. Furthermore, some programs of training the people, especially the fishermen ought to be prepared to create public awareness in protecting the seals.

Fishing gears like trawl and dragging trammel net, can finish the fish stock in this area when they are used in 10-30 m deep. It was determined in Foça that , purse-seine nets are used for fishing in the shallow coastal waters as well as dragging nets. As a result, the fishing capacity in the coastal area increased and the Mediterranean monk seals faced the food shortage losing the competition with men over fish resources. The small scaled fishermen who fishing with trammel nets and have direct relations with seals in terms of the depth and areas where they are fishing. As these fishermen set their nets in 10-30 m depth in the shores which is also a habitat of seals. Mediterranean monk seals are shallow water feeders (Boulva, 1979). Thus, the decrease of the fish stocks makes the seals steal fish from the nets and then the risk of being drowned in the nets or shot by the fishermen increases. Also, some damage in the nets can be caused by the seals, although all the damages seen in the nets were not made only by the seals. Beside the damages of round holes, there are many damages which can be caused by entangling to the seafloor or the damages that we could characterize as made by the dolphins. For, between the spring months of 1992 and June of 1993 no seal observation was declared by the fishermen even though there were damages in the nets reported.

For the protection of Mediterranean monk seals in Foça and whole Turkey, the more investigations about distribution, and long and short term migration of the monk seals are necessary. Special protection zones must be established and controlled, and all seal caves in use should be protected in these areas. Public awareness program will also support the

protection of these areas. If such cautions are effectively implemented, the monk seal may have a chance to survive or even increase in Turkish waters including Foça.

Özet

Bu araştırmada, Akdeniz Foku Projesinde pilot bölge olan Foça'da Akdeniz Foku *Monachus monachus* (Hermann, 1779) için habitat özelliği taşıyan alanlar incelenmiş 7 mağara ve 7 kovuk tesbit edilmiştir. Bölge balıkçıları ile görüşmeler yapılarak, 1991 yılında 29 kez (max.), 1992 yılında 14 kez ve 1993 yılında 5 kez fok gözlendiği belirlenmiştir. Ayrıca, bu görüşmelerde Foça'da 3 ayrı fok bireyinin bulunduğu ve bunların en çok görüldüğü bölgelerin Orak adası ve İncir adası olduğu belirtilmiştir. Bununla birlikte bölgede fok bireyi tesbit etmek amacı ile doğrudan gözlemler yapılmış fakat araştırma yapılan tarihlerde fok gözlemlenememiştir. Foça-Karaburun ve Foça-Mordoğan arasındaki bölge de incelenerek Karaburun ve Mordoğan bölgesinde 1992 yılında Foça'ya oranla daha çok fok gözlemi belirlenmiştir.

Balıkçılık gücü üzerinde yapılan incelemelerde bölgedeki balıkçılık yöntemleri, avlanan su ürünleri, avlanma bölgeleri ve kullanılan av araçları tesbit edilerek, ağlarda görülen hasarlar ve boyutları araştırılmıştır. Bölgenin gırgır, trol ve uzatma ağları ile yapılan avcılığın etkisi altında olduğu görülmüştür. Araştırma süresince belirlenen hasara uğramış 87 uzatma ağından sadece 20'sinde fok yırtıkları tesbit edilmiştir. Yine, potansiyel fok habitatlarının yakınında Akdeniz fokları için stres nedeni olabilecek faaliyetler (balıkçılık, turizm) tesbit edilmiştir.

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