MEDITERRANEAN MONK SEAL BYCATCH ALONG TURKISH COASTS

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This report has been prepared utilizing experience, knowledge and field study results carried out by SAD-AFAG between 1987 and 2020 and the published data given in the related literature on the research & conservation of Mediterranean monk seal along Turkish coasts to be submitted to Republic of Turkey The Ministry of Agriculture & Forest - DG Fishery and Aqua Products.

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Authors : Cem Orkun Kıraç, Nesimi Ozan Veryeri, Yalçın Savaş
Contributed by : Şevki Avcı, Soner Çınar, Ceyhun Ekinci,
Dr. İbrahim Sivrikaya, Alican Abacı, Dr. Meltem Ok

Contact : Akıncılar Sokak 10/1, Maltepe, Çankaya, Ankara
Tel : +90 312 230 3520
E-mail : sad@sad.org.tr
afag@sad.org.tr

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by
Cem Orkun Kıraç, Nesimi Ozan Veryeri and Yalçın Savaş
SAD-AFAG

Introduction

The Mediterranean monk seal *Monachus monachus* (Hermann 1779) has a population of around 600−700 individuals in the world and currently the species is under Endangered (EN) category based on the recent global assessment by the IUCN (Karamanlidis & Dendrinos 2015). The Mediterranean subpopulation is considered Critically Endangered (Aguilar & Lowry 2010) and is restricted to the eastern Mediterranean basin, with 300–400 in Greece (Karamanlidis & Dendrinos 2015) and minimum 100 in Turkey (Güçlüsoy et al. 2004), including 37 seals on the south coast of Turkey, with an additional 5 seals identified in Northern Cyprus (Gucu et al. 2009a and 2009b). Mediterranean monk seals are also rarely observed in Albania, Croatia, Italy and Lebanon (di Sciara et al. 2019). Throughout its global distribution range (which, outside the Mediterranean, includes a population on the west coast of Africa in Mauritania), Turkish coasts are among the last strongholds of this elusive and very rare marine mammal (Karamanlidis et al. 2016).

In Turkey, threats against the species can be given under 5 major categories;

- Coastal habitat deterioration
- Disturbance in breeding or resting caves
- Deaths caused by deliberate killing or bycatch
- Maritime traffic and increase of human activities
- Marine pollution

On the other hand, the threats issue is rather complicated and not homogeneous throughout Turkish coasts and it won't be an effective approach to prioritize a single threat for the whole country. In other words, remedial actions based on a general risk & threat priority model cannot be utilized for whole coasts. This is due to the various socio-economic structures with different distribution patterns and weights in each sub region within the country. Hence, threat analysis studies should be made on a sub regional basis in which threat priorities be established exclusively (Kıraç and Savaş 2019).

SAD-AFAG is a dedicated NGO working for the conservation of Mediterranean monk seal and its pristine habitats uninterruptedly since 1987 all along Turkish coasts littoral to the Black Sea, the Sea of Marmara, the Aegean Sea and the Levant Sea, on a nationwide scale.

Mediterranean monk seal bycatch along Turkish coasts

12 cases of monk seal bycatch have been recorded by SAD-AFAG in the field researches as well as through the information obtained by fishermen and local people from fishery communities limited to İzmir, Antalya and Mersin provinces for the period between 1994 and 2018. These are given in the Table below.

	Location	**Date**	**ID**	**Age**	**Sex**	**Gear**	**Result**
1	Mersin / Aydıncık	2.1994	Aydıncık x	juvenile	n/a	set net	died
2	İzmir / Foça	1.1996	Derya	pup	male	set net	rescued and survived
3	İzmir / Foça	2.1997	Bahtiye	pup	male	set net	died
4	Antalya / Çıralı	3.1998	Çıralı x	juvenile	female	set net	died
5	İzmir / Foça	4.1998	Dişi Korsan	adult	female	set net	survived and later died
6	İzmir / Karaburun	11.1999	Çevik	pup	male	set net	died
7	Mersin / Bozyazı	11.2000	Bozyazı x	pup	n/a	set net	died
8	İzmir / Karaburun	2.2001	Melih	pup	male	set net	died
9	İzmir / Çeşme	11.2002	Çeşme x	pup	female	set net	died
10	Mersin / Akkuyu	7.2007	Akkuyu x	adult	female	set net	rescued and survived
11	İzmir / Foça	3.2017	Foça x	pup	male	dynamite?	died
12	Mersin / Aydıncık	4.2018	Aydıncık x	juvenile	n/a	set net	rescued and survived

Table: The cases in which monk seals have experienced fishery related bycatch in Turkish coasts as determined by SAD-AFAG (Veryeri et al 2001, Güçlüsoy et al 2004; Kıraç and Güçlüsoy 2008, Kıraç and Veryeri 2009, Kıraç and Ok 2019)

Fig.1a (top) and Fig. 1b (above) Mediterranean monk seal pup *Monachus monachus* died as a result of bycatch. Foça, İzmir February 1997 Photos © SAD-AFAG

In this report, monk seal bycatch cases related to industrial fisheries including purse seiners and bottom trawlers and also aquaculture facilities are not included. The age classification of the monk seals in question was made for verification or determination according to Samaranch & Gonzales (2000).

As shown in the Table, 10 bycatch cases belong to pups or juveniles (83,3 %) and remaining 2 cases belong to adult monk seals (16,7 %) out of 12 bycatch cases in total.

8 pups or juveniles have died due to drowning as a result of bycatch (80,0 %) while 2 pups could not free themselves from the nets but have been rescued by local fishermen from the set nets short after they were caught (20,0 %) out of total 10 pup/juvenile monk seal bycatch cases. If not rescued from set nets by local artisanal fishermen, the fate of 2 rescued pups could have been death by drowning.

On the other hand, 2 adult monk seals could free themselves from the nets or ropes after entanglement as a result of bycatch and survived (100 %) out of total 2 adult monk seal bycatch cases. Although the adult monk seals given in the Table had some problems post bycatch, they were observed alive by SAD-AFAG researchers or AFBİKA members in later periods.

Fig. 2 An artisanal fisherman leaving set net to the sea in Karaburun, İzmir. © C.O. Kıraç SAD-AFAG

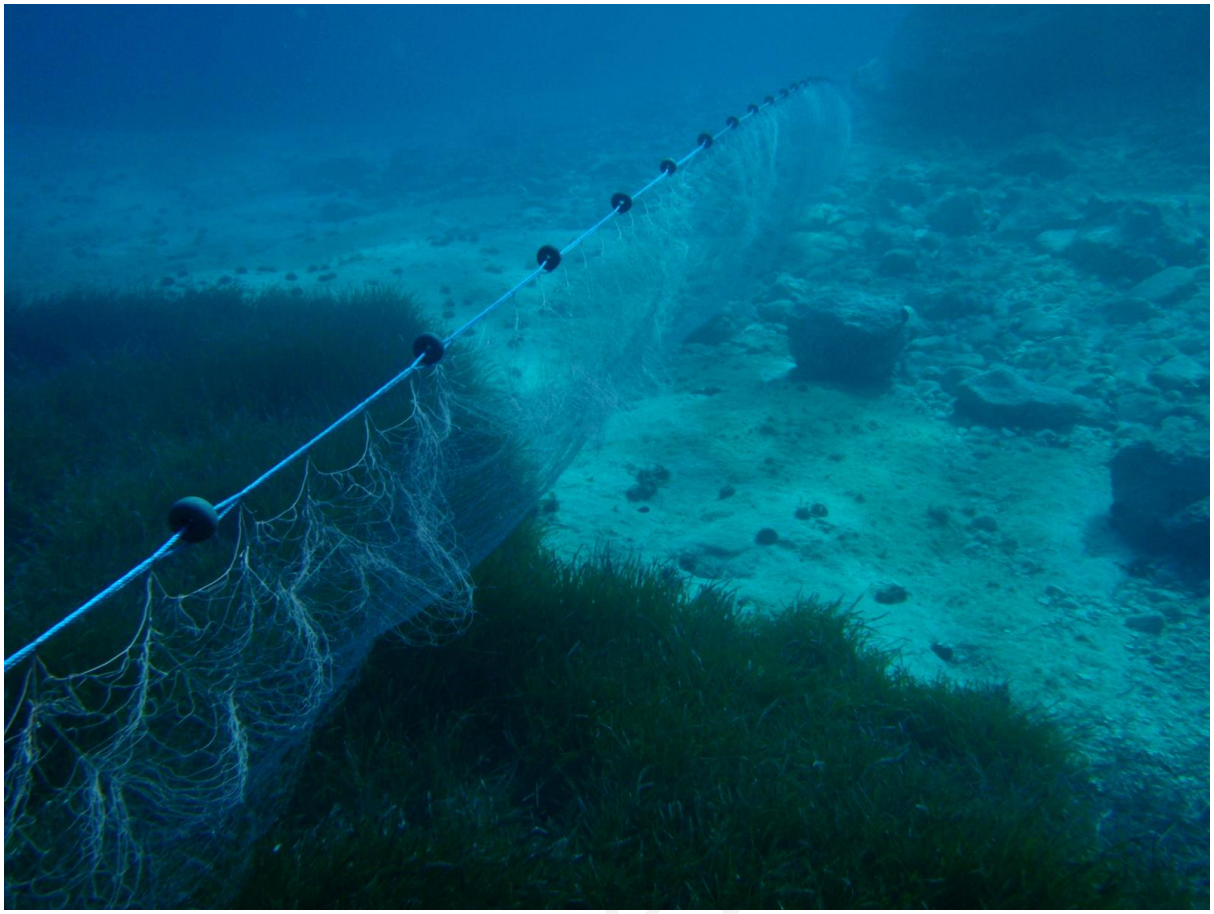

Fig. 3 View of a set net as seen on the sea bottom in Karaburun, İzmir. © N.O. Veryeri SAD-AFAG

These results clearly indicate that adult monk seals are strong enough to get rid of entanglement and to free themselves from set nets. On the other hand, all entanglement cases relevant to pups and juveniles prove that, monk seals younger than at least one year old certainly are not able to free themselves or can not tear the nets because of their relatively weak and less powerful bodies and jaws/teeths compared to capacity of adult monk seals. After a probable entanglement, any monk seal may be drowned underwater after 6 to 8 minutes on average based on the diving periods of free ranging monk seals along Turkish coasts (Kıraç et al 2002). All the entanglements in the Table are related to set nets as fishing gears used by artisanal fishermen with an uncertainty for female adult seal *Dişi Korsan* who lived more than 3 years in Foça SEPA and later found dead in 1998 in Foça due to illness, not directly as a result of bycatch. Origin of the deep wound due to tightened rope around the head of *Dişi Korsan* could not be determined, weather it was from an artisanal or an industrial fishing gear. It is also not known at what stage of her life this animal was caught on a net and freed herself back with a piece of the gear it had been entangled with.

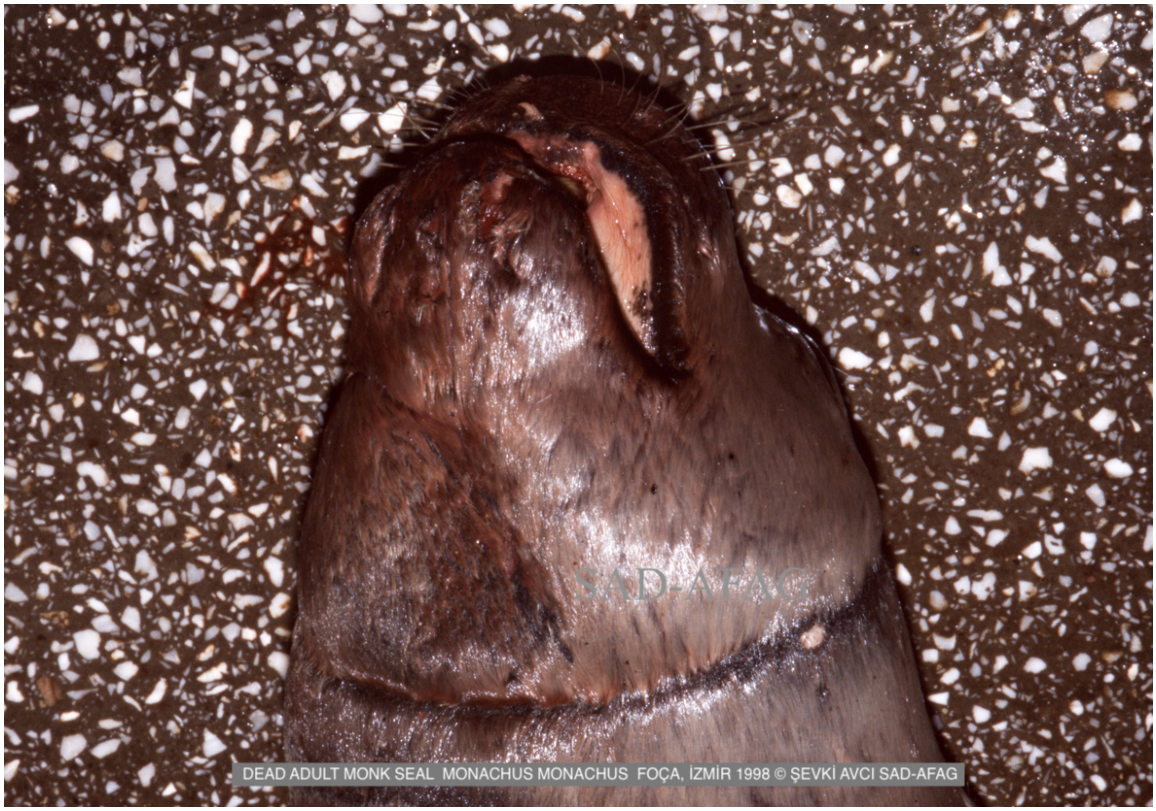

Fig. 4a (top) Adult monk seal *Dişi Korsan* lived in Foça more than 3 years and Fig. 4b (above) died in Foça due to sickness. The apparent rope trace seen in both photos is the sign of bycatch she had experienced in the past. Photos © N.O. Veryeri (top) and Şevki Avcı (above)

Also, although not listed in the Table, other monk seal bycatch data obtained through interviews with local artisanal fishermen or amateur fishermen including underwater speargun fishermen since 1987, have indicated that pup or juvenile monk seals under a year old are easily entangled to fishing gears and get drowned.

In İzmir Bay, the monk seal population has been studied in Foça SEPA and Karaburun Peninsula regions in detail. Therefore, it is quite difficult to provide a population figure for monk seals in the whole İzmir Bay. Furthermore, monk seal populations are dynamic and may differ greatly as was observed in Foça and Karaburun regions from 1992 up to date by SAD-AFAG. However, there are reliable data on the monk seal individuals determined in Foça and Karaburun regions based on the field studies conducted in the previous years by SAD-AFAG. In wider Foça and Karaburun Peninsula regions, a total of 27 monk seals including adults and pups/juveniles have been determined in between 1992 and 2018. Among total of 27 animals, 10 individuals have been found dead in the same period (Veryeri et al 2001; Güçlüsoy and Savaş 1998; Kıraç and Güçlüsoy 2008; Kıraç and Veryeri 2009). It is not possible to figure out a population in Foça and Karaburun Peninsula areas with the above data which, on the other hand, can give us merely a rough idea about the abundance of monk seals.

Discussion and conclusion

The adult Mediterranean monk seals are less likely to be victims of fishery related bycatch processes along Turkish coasts. They have enough power and strength to cope with fishing gears to tear and free themselves in case of entanglements. There are only a few examples of adult monk seal-fishery interactions in Turkey, which are non-fatal. However, pups and juveniles under one year old are much more susceptible against bycatch in fishery practices based on the evaluation of the long term data available by SAD-AFAG. Bycatch of pup or juvenile monk seals are fatal to a great extent in Turkey. The risk is greater for the seal pups born in a fishery hot spot region especially for weaned pups (approximately older than 4-5 months) when the pups start to discover a wider vicinity of the breeding caves.

Although not any clear evidence/indication addressing the entanglement to a fishing gear was found during the physical examination and necropsy, there are cases in which the reason of young monk seals deaths is due to trauma on heads or inner organs. It is believed that such trauma signs would possibly indicate a deliberate human action towards the monk seals found entangled or captured in a fishing gear during fishing activities.

The most risky fishing gear for the monk seals appears to be set nets that are set mainly on coastal shallow waters. These nets are commonly set to sea bottom starting from the near shore to deeper water by artisanal fishermen. Seal pups caught to the net near shore rather than the deeper waters have a much higher chance to survive since they can rise much easily to the sea surface to breath. 6 to 8 minutes of period after entanglement of monk seals underwater is the critical limit for the survival of monk seals coinciding to their average dive times (Kıraç et al

2002). Therefore, rescue operations aiming any monk seal entangled remaining underwater must be completed in 6 to 8 minutes on average or 10 to 11 minutes towards their longer dive time limits to save animal in question. On the other hand, in case a monk seal entangled to any fishing gear achieves to float on the sea surface together with fishing gear and breath easily, then it is capable of surviving for hours, which will allow potential rescuers to take action in a much longer time period.

Although the reason of death cannot directly be attributed to bycatch, deliberate killing of monk seals is known to happen at a certain level in Aegean Sea and Mediterranean coastlines of Turkey (Veryeri et al 2001). Therefore, this can be assessed as an indirect effect on monk seals due to fishery-monk seal interaction.

Interaction of monk seal and fishery with special reference to set nets is observed most intensely in İzmir Bay according to the data available in SAD-AFAG.

In general, fishermen are reluctant to share data on monk seal entanglement cases. Besides, there are a few certain signs or indications on monk seals related to bycatch when they are stranded ashore or found at sea. Therefore, monk seal bycatch issue requires specialist involvement to produce reliable data and assess them properly.

Monk seals do interact with set gears to find and sustain prey for themselves. Monk seals and fishing gear interactions are observed steadily in coastal waters of Turkey (Mursaloğlu 1984; Veryeri et al 2001; Salman et al 2001; Tonay et al 2016; Kıraç and Ok 2019). Interaction of mammals with fishing gears cause two different types of risk for survival; one is passive direct effect called *bycatch* and the other is active indirect effect called *deliberate killing*. Both are evaluated to have a negative impact on monk seals. As SAD-AFAG, we believe that research studies, conservation and mitigation measures targeting marine mammals should be enhanced and diversified to decrease the unwanted consequences of interactions between fishing gear and marine mammals.

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