MEDITERRANEAN MONK SEAL *and* COASTAL HABITAT MONITORING *and* THREATS AGAINST ITS EXISTENCE *in* İZMİR, MUĞLA & ANTALYA, TÜRKİYE

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The Mediterranean monk seal *Monachus monachus* (MMS) is a marine mammal that uses both terrestrial and marine habitats. Life cycles such as maternity, breastfeeding, pup rearing, and sleeping all take place on remote untouched coasts' dry parts, supratidal zones. This fact interprets the MMS's strong need to pristine coastal habitats. The distribution of this rare marine mammal ranges in two main regions worldwide; the Eastern Mediterranean and the Eastern Atlantic. It is a threatened species according to IUCN and the world population is approximately 800-900. In Türkiye, based on independent evaluations as of end 2022 by SAD-AFAG and ODTÜ-DBE, monk seal is represented by approximately 120 adult individuals (Kıraç and Ok, *personal communication*). The four countries that bear conservation responsibilities having the main breeding populations; Türkiye, Greece, Portugal and Mauritania have been conducting research, conservation and awareness-raising projects at different scales. In addition to the main populations, the species can also be seen in smaller numbers or occasionally sighted in other areas in the Eastern Mediterranean.

Between 2019 and 2022, SAD-AFAG focused on conservation of MMS in İzmir, Muğla and Antalya having coastal length of 796 km, 1480 km and 640 km respectively, where suitable monk seal habitats exist relatively more concentrated, initiated five distinct research and conservation projects. The first one being a cave monitoring study that began in İzmir and Muğla provincial coasts in 2019 was completed in 2020, in cooperation with the IUCN Med Office and supported by the MAVA Foundation. The other four projects were initiated in 2021 and are still ongoing along the coasts of İzmir, Muğla and Antalya. Two of them, supported by the Monk Seal Alliance (MSA), focus on habitat identification, monitoring of seal caves, public awareness and environmental education, collecting marine litter/solid waste items from the caves and identifying threats towards MMS, one of which also in cooperation the IUCN Med Office. Another project has been carried out in collaboration with the Ministry of Agriculture and Forestry DKMP 4th Regional Directorate and covers various research, awareness/education, and conservation activities within the *Muğla Province Seal Species Action Plan Monitoring and Implementation* program, which is planned to be conducted for a period of 5 years on all coastal areas of Muğla Province. Finally, *Fethiye and Babadağ Pilot Coastal Zoning and Management Planning* supported by UNDP GEF-SGP includes habitat determination and classification, analyzing human activity densities, threats and seascape mapping.

The methods applied in monitoring and threat identification studies specific to Mediterranean monk seal habitats are as follows: *identification of Mediterranean monk seal habitats that will ensure the continuation of the species through coastal surveys and dives, mapping of identified rocky coastal habitat segments, monitoring of suitable caves and caverns with infrared cameras, identification and analysis of the pressure/threats caused by socio-economic human activities in Mediterranean monk seal coastal habitat segments, and intervention to human activities if necessary.*

Between July 2019 and December 2022, recent studies conducted along the coasts of Izmir, Muğla and Antalya in Türkiye have shown that MMS live, breed and forage along the pristine coasts in these provinces as documented through first-hand and reliable seal sightings data as well as infrared camera traps deployed in 6 caves along the Izmir coast, 12 caves along the Muğla coast and 6 caves along the Antalya coast. Natural coasts in all three provinces, excluding settlements, tourism zones, and coastal facilities such as ports and piers, still provide suitable coastal habitats for the Mediterranean seal to survive. The number of adult seals identified by SAD-AFAG are 24 in Muğla and 17 in Antalya based on our data obtained through past and recent studies combined. The population of seals is, in fact, greater than the identified individuals. Between 2021 (all year) and 2022 (excluding December), a total of 554 first-hand and reliable seal sighting data were entered into the SAD-AFAG seal database through the "Mediterranean Seal Information and Rescue Network" (AFBIKA) program. Breakdown consists of 149, 296 and 109 seal sightings in İzmir, Muğla and Antalya provincial coasts respectively. About half of these records are supported by the photos and video footages. Of the six distinct threats against this rare marine mammal, two are prominent: *1) coastal habitat fragmentation and loss due to the opening of new roads and construction resulting from coastal development,* and *2) disturbance of breeding and resting caves by human activity, causing seals to flee from their caves and abandon the coastal area.* Intentional killing, entanglement in fishing nets and marine pollution follow these two major factors. It has been clearly identified, both from the research team's long-term observations and from the photo-trap monitoring of caves (including in-cave and outer cave cameras), that monk seals are under significant pressure due to several human interactions in their caves in İzmir, Muğla and Antalya. Some of the infringements observed during the cave checks and field studies have been intervened via awareness and informing intruders and successfully been stopped by the SAD-AFAG teams.

Coastal caves, caverns and crevices are important parts of remote and pristine rocky coastal segments which constitute the main habitat of MMS as their last refuge. Considering that Mediterranean seals use these caves as hiding and pup delivery & nursing places, any additional human pressure to caves, whether breeding occurs or not, reduces reproductive success of this extremely shy species, which gives birth to a single pup per year and survival rate of the newborn pups.

Some of the marine sports & entertainment socio-economic stakeholders involved in the projects performed awareness activities within themselves, showing positive attitudes towards conservation and created auto-control mechanism to a certain extent. Although there are regulations in the national legislation that prohibit entering, diving and waiting in front of seal caves, some representatives of relevant stakeholders create pressure, deliberately or unknowingly, on the natural coastal habitats that the species depends.

While this pressure is directly created by penetrating into the caves, transit passages by boats in front of caves and open water diving on coasts are not disturbing pressures if these are not realized too close to shores. In this context, the key marine stakeholder groups that need to be informed and let them aware in order to contribute to solve problem number (2); *daily excursion boats, diving schools and boats, hotels' speed water sports boats,* and *kano and paddle surfing (sup) tour operators*.

The subregions where human pressures are most observed in monk seal caves, natural coasts, and islands are as follows: Foça (Foça Islands, Siren Rocks[1]), Karaburun (Mordoğan, Ardıç), and Çeşme coasts in İzmir; Bodrum, Milas, Menteşe, Marmaris, Datça Peninsula (southern coasts), Ortaca (Sarıgerme and Aşı Bay), Dalaman and Fethiye (all islands in the bay and Kıdrak, Uzunyurt, Kabak and Yediburunlar) coasts in Muğla; Kaş (Kalkan, Kaputaş, mainland and islands between Kaş and Kekova), Demre (mainland and islands between Kekova and Demre), Kumluca (between Karaöz and Adrasan, Gelidonya, Beşadalar islands and Suluada island), Kemer (Sazak Cove, Porto Ceneviz, Çıralı, Tekirova, and Üçadalar islands), Konyaaltı (Akyarlar Cliffs), Muratpaşa (along West and East Falezler Cliffs) and Alanya (Alanya Castle Peninsula) rocky coasts in Antalya.

It is assessed that one-on-one awareness-raising meetings, distribution of printed awareness materials and seminars targeting stakeholders of sea sports & entertainment organizations have been useful. On the other hand, it is clear that there is a need for communication with the professional chambers, federations and cooperatives of these stakeholders by the competent state departments through official channels conveying the vital problem of human pressure to coastal caves, in which corrective actions should be informed on disturbance of monk seals based on the legislative background. Since, the majority of these stakeholders do not have basic knowledge and awareness on the strong relation between "monk seal & coastal habitats" and the regulations that prevent pressure on MMS in their habitats and coastal caves.

Keywords: *Mediterranean monk seal, Monachus monachus, Habitat monitoring, Habitat protection, İzmir, Muğla and Antalya coasts, Threat analysis*

[1] The zones that are well known and famous in terms of anthropogenic disturbances to monk seal caves

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