

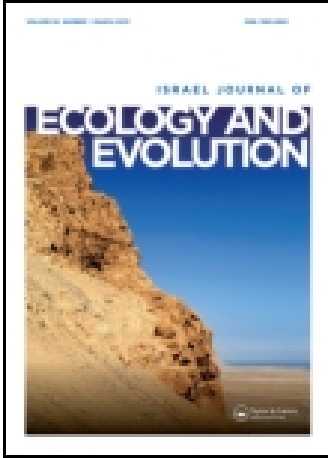
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Note A Survey of the critically endangered Mediterranean monk seal, *Monachus monachus* (Hermann, 1779) along the coast of Northern Cyprus

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NOTE

**A SURVEY OF THE CRITICALLY ENDANGERED MEDITERRANEAN MONK SEAL,
MONACHUS MONACHUS (HERMANN, 1779) ALONG THE COAST OF
NORTHERN CYPRUS**

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The Mediterranean monk seal has been listed as critically endangered, on the verge of extinction, since 1996 (IUCN, 2007). It is generally accepted that the species has two isolated populations. The Atlantic population is confined to two major locations (Western Sahara and Madeira) and has been monitored since 1992 (González et al., 1997). However, the Mediterranean population is fragmented into small, and often isolated colonies, predominantly in the eastern Mediterranean Sea. Only a few of these colonies are continuously studied. This renders the assessment of the size of the Mediterranean population difficult. Therefore today the numbers given in the literature for the Mediterranean population are not based on scientific surveys (RAC/SPA, 2005). Moreover, the current status of the colonies in countries such as Libya, Algeria, and Albania is not known. The accuracy of the estimated number of monk seals surviving today may get better as small and fragmented colonies, such as those in Cyprus, are studied.

The only comprehensive study addressing the status of the seals in the Levant Sea was carried out on the Turkish coast (Gucu et al., 2004). In this study, a colony composed of several subgroups was identified on the Cilician coast of southern Turkey. It has been observed that in each subgroup, an adult male exhibited territorial behavior over a particular area. The authors suggested that the number of suitable breeding caves that remained intact might be an important factor limiting the reproduction of the colony. Attempts to evaluate the risk of extinction in this region revealed that even small changes in the colony size may drastically alter the future of the seals in the area (Gucu and Ok, 2006; Ok et al., 2006). Lately, the size of the colony has increased as critical habitats have been set aside for protection. Some of the individuals belonging to the Cilician colony were sighted outside their respective areas in places that had not been used in the last 15 years (Gucu, 2004; Gucu and Ok, 2004), probably in search of new breeding sites. Furthermore, a newborn pup found on the Turkish/Syrian border, 175 km east of the Cilician coast, indicated that the seals of the Levant Sea have spread over a wider range (Gucu et al., 2007). We investigated if this expansive behavior of individuals is possibly a spill-over effect of the conservation measures applied on the Cilician coast.

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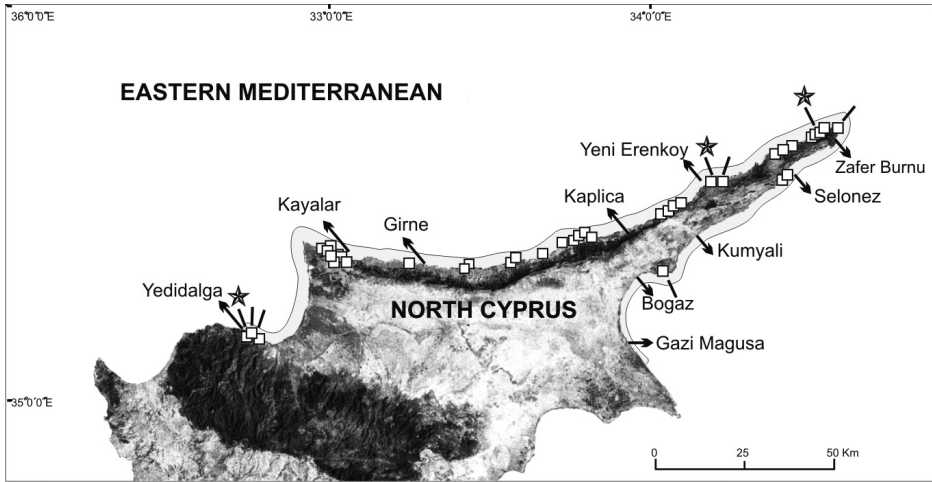


Fig. 1. Map showing the position of the main fishing ports (arrows); sightings recorded by the research team (★); the position of all discovered caves (□), monitored caves (I), as well as the survey tracks (gray line over the coast).

The few existing studies (Gucu et al., 1995; Dendrinis and Demetropoulos, 2000) covering the northern and southern regions of the island had very similar results; despite the habitat suitability, there have been few and irregular sightings and no evidence of whelping. In this work, we studied the recent status of the monk seal on northern Cyprus. A comprehensive survey was conducted along the northern Cyprus coast during 5 July–5 August 2006 in addition to two complementary surveys during 4–12 October 2006 and 24–29 January 2007. The task of the team was to sail along the entire coast of northern Cyprus (Fig. 1) in search of seals, to explore possible seal habitats, and to document and classify caves according to their suitability. Once the caves were classified, infrared phototrap were deployed to monitor seal movements in the caves. Photoidentification allowed us to record individuals and thus estimate the minimum colony size of the study area. The identified seals were also compared with those identified on the Turkish coast to assess mobility of the individuals. We used boats to survey the coast of the island shown on the map (Fig. 1) in search of caves that may be used by seals. Caves corresponding to monk seal habitat descriptions (Gucu et al., 2004; Karamanlidis et al., 2004) were recorded and photographed. In addition to the caves with open access from the sea, the shoreline, down to a depth of 30 meters, was checked for additional caves with underwater entrances. When a cave entrance was found, a team member dived, entered the cave, and checked whether an air chamber existed inside.

In addition, local fishermen were interviewed during the survey to document (i) if there were seals within their respective fishing grounds; (ii) when and where the sightings were within the last year; and (iii) whether the number of seals was decreasing or not, compared with the last 10 years. Apart from the fishermen of Girne (the major coastal town with extensive coastal developments), all the other fishermen that we met in

the area were aware of the Mediterranean monk seal. Although they knew that the seals were seen in their respective fishing grounds, firsthand sightings were very few. Eleven fishermen sighted a seal within the last year (Fig. 1). In general, the fishermen pointed out the same 6 regions; Yesilirmak (1), Lefke (Kayalar) (1), Kaplica (Balalan) (3), Yeni Erenkoy (4), Zafer Burnu (1), and Kumyali (1). The sighting rhythm is not continuous and shows a similar pattern: an individual enters an area and disappears shortly after. None of the fishermen spoke about a decline in the number of seals, yet many of them believe that the seals only recently came to their coast.

Of 39 caves explored during the survey, only 6 could be classified as active in which one or more seals were sighted or there was evidence of seal use (e.g., tracks, body depressions, scat, and odor). Eight of the caves possess appropriate morphology for breeding and were selected for monitoring, and 10 infrared monitors were installed.

The caves determined in the first survey were checked during two complementary surveys for any evidence of whelping, and the data accumulated on the phototraps were retrieved. A newborn pup remains close to the cave until weaning, which can last up to five months (Mursaloglu, 1984; Gazo and Aguilar, 2005). Therefore, it is assumed that if whelping occurred between two successive visits the pup would be sighted in or around the cave. Though no pup could be found, the results were fruitful, with the monitors capturing a total of 106 seal images.

Upon completion of the field surveys, the data and the images were analyzed for photo identification of the seals sighted in the region. Basic procedure before the analysis is as follows:

- (i) The photographed seals were grouped according to their sex and maturity stage based on Samaranch and González (2000) and Dendrinis et al. (1999).
- (ii) The photographs were sorted by date and time so that seals photographed at the same time at two different caves were marked as distinct individuals.
- (iii) The morphological features (mostly dorsal scars) were mapped.

The results indicate that a small group of seals inhabits Cyprus. With Lincoln-Petersen mark-recapture index (2 sample closed-population model) and Chapman modification (Lancia et al., 1994), it is estimated that there are 5 (95% confidence interval: 3–17) seals in the surveyed area. The colony is composed of an adult male (M1), two adult females (F1, F2), and two young seals, one of which could be identified as a female younger than 1 year. The male was one of the seals identified earlier by Gucu et al. (2004), which has frequently been sighted on the opposite Turkish coast, where he seemed to have formed a harem. The last sighting of this seal on the Turkish coast was when he was mating in December 2005. It is clear from the findings that he remained on the island throughout the study period (July 2006–January 2007). This period, which covers the mating season of the eastern Mediterranean colony (Gucu et al., 2004), is the most critical time for a male. This situation may be explained by three alternative possibilities: (i) the harem of the male on the Turkish coast is larger than what is known before and may extend down to Cyprus; (ii) the male abandoned the Turkish coast and settled a new harem in Cyprus; (iii) he alternatively uses both coasts. The second

seems more reasonable because another adult male has been recently photographed in the same area on the Turkish coast (Gucu, unpublished data). Agonistic interactions of various kinds, including fights, are known to occur in phocids and may result in either the displacement of the original occupant by the intruder or the movement of the intruder to another, presumably less favorable, spot (Sullivan, 1982; Krieber and Barrette, 1984). Moreover M1 displayed symptoms of “seal pox”, which may weaken him (Cihan et al., 2007). Therefore it is likely that, weakened by the disease, he abandoned his territory to his competitor.

One of the seals found in the study still retained part of the white ventral birthmark, proving her to be no older than 1 year (Badosa et al., 1998; Dendrinis et al., 1999; Gucu et al., 2004). The whelping season in the northeastern Mediterranean is confined to autumn and early winter (Gucu et al., 2004). Therefore it is quite possible that she was born during the winter of 2005/2006. Although it was shown otherwise by a rehabilitated juvenile monitored with satellite tracking (Dendrinis et al., 2007), newly weaned youngsters and juveniles observed in the northeastern Mediterranean, especially those less than a year old, usually remain within a range not exceeding a couple of kilometers from the natal site (Gucu et al., 2004). Since the distance between Cyprus and the nearest mainland is 70 kilometers, it is quite likely that she was born on the island and that there is a resident reproductive monk seal colony on the Cyprus coast.

None of the fishermen interviewed spoke about a decline in the number of seals, yet almost all of them believe that they recently came to their coast. If what they observe is true, which is essentially proved by the existence of M1 on the island, this may be a consequence of the spillover effect of the Marine Protected Area (MPA) on the Turkish coast; a more protected monk seal population along the south coast of Turkey may have some bearing on the fate of the species around the island of Cyprus, with individual seals crossing back and forth between coasts.

The northeastern Mediterranean coast of Turkey hosts the largest colony, and 25 individuals had been identified on the coast from Antalya–Gazipasa to Mersin–Erdemli in 2000 (Gucu et al., 2004). This figure increased to 30 individuals by the end of 2005 as a consequence of the protection measures enforced in the area (Gucu and Ok, 2006). Additionally, a small group composed of 4 individuals was identified on the east coast of Turkey near the Syrian border (Gucu and Ok, 2006). With the new individuals identified on the Cyprus coast, one may estimate that the total number of seals inhabiting the northeastern Mediterranean Sea is 38, which is strikingly high when compared to the number of seals estimated by RAC/SPA (2005).

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