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Mediterranean Monk Seal (*Monachus monachus*) Sightings in Italy (1998-2010) and Implications for Conservation

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Abstract

Although for over two decades resident populations of Mediterranean monk seals (*Monachus monachus*) have disappeared from Italian locations, sightings of seals have occasionally been reported. The present paper illustrates the methodology used to validate monk seal sightings recorded by third-party observers from 1998 to 2010 and the main results of the validation procedure. The collected monk seal sighting information amounts to 81 observations of which 48 are validated observations corresponding to 35 distinctive sighting events. Over the course of the entire 12-y period, sightings were reported in a somewhat repetitive manner, mostly in the lesser western islands of Sicily and northern Sardinia. The repeated observations over the years in the said areas would suggest that these individuals are not observed incidentally and that there may be a regular use of selected stretches of coast over time. More recently (2009-2010), sightings have also been recorded in the proximity of selected locations of the central-western and northwestern Italian coasts, two of which are characterised by islands. Information on the size class category of the sighted animals, as inferred from the estimated length, suggests that most observed individuals are likely to be juvenile animals, while a smaller amount of seals are likely to be subadult and adult-sized individuals. Information from the collected reports indicates that monk seal sightings in Italy, although not frequent, occur steadily and on a repeated basis. Further studies are needed to determine the number of individual monk seals present and their spatial and temporal usage of the coastal areas where they are observed, while awareness activities should be conducted to raise attention to behavioural and reporting procedures to be followed in case of sightings to the benefit of a more thorough monitoring of sightings in the country.

Key Words: Mediterranean monk seal, *Monachus monachus*, sightings, western Mediterranean, Italy

Introduction

The Mediterranean monk seal (*Monachus monachus*) used to be present in all of continental Italy, Sicily, Sardinia, and the lesser islands, but resident populations disappeared from the mainland during the middle of the last century and from Sicily, Sardinia, and the other Italian lesser islands between the mid-1970s and early 1990s (Aguilar, 1999). Nevertheless, ever since then, single-individual sightings have been occasionally reported from the most insular and remote locations and have been attributed to vagrant individuals that do not belong to any resident population (RAC/SPA, 1998, 2005). The sightings occurring from 1998 forward are recorded and archived in a database housed at ISPRA (Istituto Superiore per la Protezione e la Ricerca Ambientale) within the framework of the institute's activities concerning marine protected species (formerly ICRAM [Istituto Centrale per la Ricerca Applicata al Mare], Rome, Italy). The sightings are witnessed by third-party observers who are usually seafarers such as boaters, divers, fishermen, etc. Sighting events are reported to ISPRA on a voluntary basis because of a specific collaboration, consolidated through time and over almost the entire national territory, between ISPRA and institutional groups operating in peripheral locations throughout the coast (i.e., Italian Coast Guard personnel, Environmental Police, the management bodies and scientific staff of Italian Marine Protected Areas, etc.), as well as other private entities (i.e., local committees and NGOs), which often act as an initial primary interface between the sighters and ISPRA (Mo et al., 2007).

Since the individuals directly involved in the sighting event usually do not have specific scientific background, and because the sightings are rarely accompanied by photographic documentation which can verify the correct identification of the species, each reported sighting event is followed up by a specific interview questionnaire with set questions to confirm species and other details. This interview information is subsequently

processed in order to validate the sighting based on a procedure already described by Mo et al. (2007). The sighting information collated by ISPRA from 1998 to 2010 represents a founding database from which analyses can be conducted to increase our understanding of monk seal sighting events in Italy. The results of each sighting validation between 1998 and 2010 is reported in this paper and represents an update to Mo et al.'s 2007 paper regarding monk seal sightings along Italy's coastline.

Materials and Methods

Details on Mediterranean monk seal observations reported by sighters are recorded through verbal interviews conducted either by telephone or, whenever possible, through visual confrontation with the interviewee. The observer is first asked to verbally describe the sighting event using as many details of the account as he or she can recount from memory. The entire verbal description is transcribed as accurately as possible by the interviewer into a datasheet so that the collected firsthand descriptive information can be stored and eventually retrieved for future consultation without having to contact the sighter again. Quantitative information is then recorded on the following technical details of the sighting event: name and last name of sighter and contact information, date, hour and location in which the sighting occurred, weather conditions, position of the sighter during the observation, activity being conducted by the interviewee during the sighting (i.e., diving, fishing activity, sailing, boating, etc.), estimated distance from the coast and from the sighted animal, and number of sighted animals. Further information is then collected on specific aspects of the sighted animal, taking care not to provide the interviewee with any technical hints on the species' characteristics. This entails asking the interviewee to provide information on the following aspects: estimated length of the observed animal(s), pelage colour and pattern observed throughout the body, physical characteristics such as shape and size of the different observed body parts (head, snout, trunk, tail, flippers), swimming characteristics (position of the body and its parts during swimming, type of movement, etc.), general observed behaviour, and availability of photographic/video documentation.

Each recorded observation is then validated by giving a score of 1 to each of the following phocid physical/behavioural characteristics (Bonner, 1989) reported by the observer: (1) rotund head, held out of water during surface swimming; (2) large ocular orbits; (3) presence of vibrissae on the snout and over eyes and/or presence of fur on the body; (4) compressed wide snout and/or presence of nasal slits; (5) hind-flipper edge observed trailing along water surface during surface swimming; (6) lateral oscillations of posterior body trunk observed with alternating movements of hind flippers during swimming; (7) round head smaller than streamlined spindle-shape of body; and (8) shape and position of flippers with respect to body (i.e., hind flippers project caudally beyond surface of body, most caudal part of each hind flipper appears longer on the outer edges and concave on the internal part, and/or hind flippers have a webbed-digit appearance creating a fan-like extension during hind-flipper strokes).

The total score was tallied for each observation, and those scoring 4 or more, for situations in which the observer was out of the water, were considered validated observations. Observations conducted under water were considered validated if they scored a total of 3 because observations on physical components such as vibrissae and nasal slits are possibly not seen due to reduced visibility under water. Sightings having acceptable photographic documentation were automatically considered validated. One or more validated observations occurring in the same location and time were considered as a single seal sighting. Selected features of the validated observations were analysed so as to identify the typology of sighters, the duration and the distance from which seals were observed and reported with highest details, and the estimated length of the observed seals.

Results

The collected monk seal sighting information occurring in Italian waters between 1998 and 2010 amounts to 81 observations of which 48 are validated observations corresponding to 35 distinctive sighting events. The location of occurrence of the validated sighting events, the year, and the number of times in which they occurred (in case of repeated events in a year) is illustrated in Figure 1. The highest number of validated observations was reported by professional and recreational fishers (25 and 19%, respectively), followed by scuba divers (17%), boaters (15%), free-breathing spear fishermen (12%), and locals (12%). Most of the seals were observed from a boat (60%), 19% of seals were observed under water by divers, and the remaining 21% of events were observed while the sighters were on land. The validated observations occurred mostly (70%) at less than 20 m distance, while another 25% occurred within a distance of 20 to 50 m from the seal. Sighting duration was generally short: 54% of sightings lasted less than 5 min, and 38% lasted less than 1 min.

The majority of observed seals were described as having a uniform grey or dark brown-black dorsal colour with a lighter colour on the entire

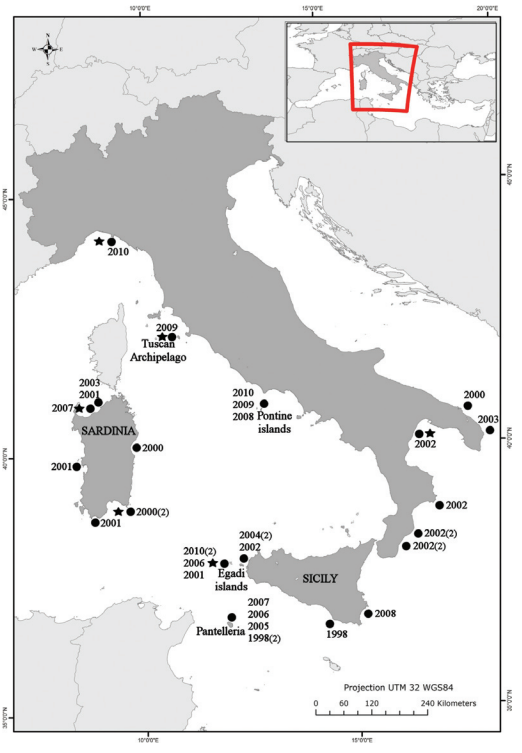

Figure 1. Distribution and dates of occurrence of validated monk seal sightings from 1998 through 2010 (black dots indicate locations, stars indicate the presence of photographic documentation, and numbers in parenthesis indicate the number of times an event was recorded in a year)

ventral side of the body. Most seals were estimated as being either 1.0 to 1.5 m (54%) or 1.5 to 2.0 m in length (35%). However, half of the seals in the latter length category were also described as having lighter coloured markings or spots on the dorsal part of the body. Photographic/video documentation is available for six observations, but not all the material has sufficient detail (i.e., photographs portraying all segments of the body) to allow estimation of the age class category based on pelage morphology and other physical characteristics. The information reported by the sighters (estimated length and pelage colour and markings) coupled with the morphological details of the pelage observed on the photographs (see Figures 2 through 4) taken during sightings documented in 2002 (southern continental Italy: Policoro, Gulf of Taranto), 2009 (central-western Italy: Giglio Island, Tuscan Archipelago), and 2010 (northwestern continental Italy: Portofino, Ligurian coast) suggest that these sightings involved, respectively, one seal in the "juvenile" class category and two seals in the "medium grey" class category (Mediterranean monk seal

Figure 2. A juvenile monk seal observed in southern Italy (Policoro) in May 2002 (Photo courtesy of G. Cancelliere/A. Colucci)

Figure 3. A monk seal observed in central-western Italy (Giglio Island) in June 2009 (Photo courtesy of M. Prete)

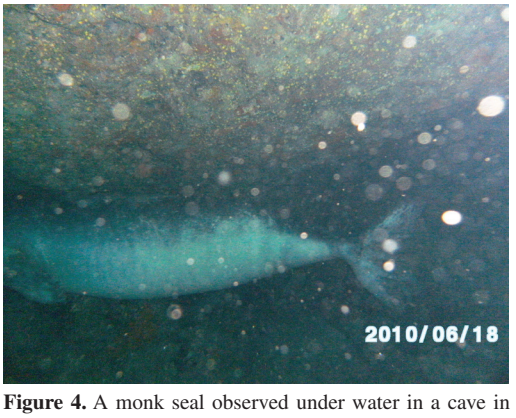

Figure 4. A monk seal observed under water in a cave in northwestern Italy (Portofino) in June 2010 (Photo courtesy of I. Lanaro/V. Minghini)

morphological class category *sensu*; Samaranch & González, 2010).

Discussion

The results of the present analysis confirm that sighting events reported by third-party observers,

recorded throughout the long term and subjected to a standardised validation procedure, can provide useful insight on the trends and implications of monk seal sighting events in countries that have apparently lost what used to be a stable resident monk seal population. Validating sighting information with a consistent methodological approach that filters out sighting reports with poor descriptions from those which have details of specific seal physical and behavioural characteristics allows for stronger argumentation on the actual likelihood of monk seal observations in Italian waters. Though the sighting information considered in the present work is collected on a voluntary basis and cannot be considered exhaustive of all the sighting events occurring in Italian waters, the results indicate that monk seals have been observed since 1998 in some Italian locations despite the fact that no reproductive activity has been recorded during the last decades.

The distribution of these sightings in the initial part of the period 1998 to 2010 seems to occur in southern continental Italian, western Sicilian, and Sardinian locations. Over the course of the entire 12-y period, however, sightings have been reported in a somewhat repetitive manner, mostly in the lesser western islands of Sicily (Egadi and Pantelleria Islands) and northern Sardinia. The repeated observations over the years in these areas would suggest that these individuals are not observed incidentally and that there may be a regular use of selected stretches of coast over time. However, since sighting reports are collected fortuitously and may be biased by the degree of human coastal usage of the marine environment, it cannot be excluded that more sightings and seal occurrence have taken place in other remote locations of the country. More recently (2009-2010), sightings have also been recorded in proximity of selected locations of the central-western and northwestern Italian coasts, two of which are characterised by islands (Tuscan Archipelago in 2009 and Pontine Islands in 2009 and 2010). These latter two locations, despite their proximity to the highly encroached mainland, may provide suitable coastal habitat for seals because their geographic isolation contributes to a lower human disturbance to the coastal areas during most of the year.

Information on the size class category of the sighted animals as inferred from the estimated length suggests that most observed individuals are likely to be young or juvenile animals, though it must be remembered that such measurements are not only subjective but that sighting duration was generally very short and that the entire length of the seal's body may not always have been thoroughly observed to allow for realistic size estimates. Reports of lighter markings and spots, some of which were on the lower mid-dorsum, and the estimated longer body length of some sighted seals suggest that some sighted individuals could also be immature male or young mature female seals as described in the morphological characteristics reported by Samaranch & González (2010) for this species. Lighter markings and spots on the dorsum are also confirmed in two of the sightings accompanied by photographic documentation.

The contextual explanation of the factors that contribute to monk seal sighting events observed along the coastlines of Italy remains purely hypothetical. The arguments as to the colony of origin of the individuals and why they are observed in a repetitive manner could be articulated as follows:

- The monk seal sighting events recorded during the last decades along the Italian coastline could be interpreted as involving individuals originating from nearby foreign colonies; these individuals might use the waters around Italy to forage or move about but spend more time at locations outside of Italy. In particular, the repetitive sightings occurring in the Italian locations most proximate to the north African and Greek waters would tend to support this interpretation. In this case, the sighted individuals would transit to Italian waters for unknown reasons, times, and distances. The potential motivations behind their movement could be interpreted as being related to an errant behaviour of specific vagrant individuals (Aguilar, 1999), a spillover effect from their colony of origin that is a factor attributed to seal displacement in other parts of the Mediterranean (Gücü et al., 2009), or, perhaps, more recent and yet unidentified factors (i.e., specific disturbance) that might influence the animals to move away from their area of origin and disperse into wider geographical areas than those which they would use under normal circumstances.

- The sighted individuals are remnants of colonies that were resident in Italian locations and which, surviving in low numbers, are occasionally observed by seafarers.

- Regardless of the geographic origin of the observed seals and their degree of site fidelity or displacement away from the sighting locations, the repeated observations recorded from 1998 onwards in some areas and the recent observations of seals in the central and northwestern Italian seas, indicate that seals continue surviving and using different areas of Italian coasts despite the intensive pressures of the past which reduced the population to such low numbers. This survival trend may be reflective of

a societal change in attitude towards seals and marine mammals in general. If, unlike in the past, this change in attitude has brought about a decreased hostility by humans towards seals, this would imply a higher survival chance for the remnant individuals and a decreased wary attitude on behalf of the seals which could account for the observed sighting events. This factor has important conservation implications for monk seal recolonisation since a reduced hostility towards the species could allow the enactment of management measures to the benefit of monk seal survival, recolonisation, and potential recovery.

Although the information reported here should not be mistaken for an analysis on the presence of the species and its habitat use in Italian waters, information from the collected reports indicates that monk seal sightings in Italy, although not frequent, occur steadily and on a repeated basis. Detailed, systematic studies are needed to determine the number of individual monk seals present along Italy's coasts and their spatial and temporal usage of the coastal areas in which they are observed. Considering the wide geographical area in which these sightings have been recorded, such studies could be designed according to geographical priorities (areas with higher sighting frequency and low human disturbance) and the presence of specific coastal habitat features. At the same time, effort should be placed into awareness activities directed at categories of seafarers that are most likely to encounter monk seals (professional and recreational fishers, divers, boaters, etc.) that can raise attention on behavioural and reporting procedures to be followed in case of sightings to the benefit of a more thorough monitoring of sightings in the country. In this context, the relevant Marine Protected Areas distributed throughout the national territory can provide a sound structural support for the conduction of monitoring, research, and local awareness activities to the benefit of understanding and protecting the species. Furthermore, such studies should be envisaged as building blocks that can subsequently be enlarged to encompass the wider geographic species' areal repartitioning of the nearby foreign countries.

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