The IUCN Red List of Threatened Species™
ISSN 2307-8235 (online)
IUCN 2008: T120868935A120869697
Scope: Global
Language: English

Monachus monachus (Eastern Mediterranean subpopulation), Mediterranean Monk Seal Eastern Mediterranean Subpopulation

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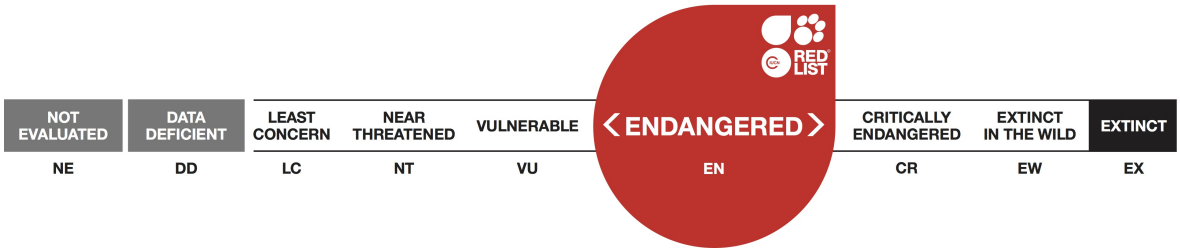

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Citation: Karamanlidis, A.A., Adamantopoulou, S., Tounta, E. & Dendrinos, P. 2019. *Monachus monachus (Eastern Mediterranean subpopulation)*. The IUCN Red List of Threatened Species 2019: e.T120868935A120869697. http://dx.doi.org/10.2305/IUCN.UK.2019-1.RLTS.T120868935A120869697.en

Taxonomy

Kingdom	Phylum	Class	Order	Family
Animalia	Chordata	Mammalia	Carnivora	Phocidae

Taxon Name: *Monachus monachus (Eastern Mediterranean subpopulation)* (Hermann, 1779)

Synonym(s):

- *Phoca monachus* Hermann, 1779

Parent Species: See *Monachus monachus*

Common Name(s):

- English: Mediterranean Monk Seal Eastern Mediterranean Subpopulation
- French: Phoque-moine Méditerranéen
- Spanish: Foca Monje

Taxonomic Source(s):

Scheel D.M., Slater G.J., Kolokotronis S-O., Potter C.W., Rotstein D.S., Tsangaras K., Greenwood, A.D. and Helgen, K.M. 2014. Biogeography and taxonomy of extinct and endangered monk seals illuminated by ancient DNA and skull morphology. *ZooKeys* 409: 1-33.

Taxonomic Notes:

The Mediterranean Monk Seal (*Monachus monachus*) is the sole representative of the genus *Monachus* (Scheel *et al.* 2014). Differences in skull morphology between Monk Seals from the Atlantic and the western Mediterranean, including differences in the occurrence of dental aberrations, have been suggested based on a limited sample size (van Bree 1979). Examination of mitochondrial DNA has also indicated genetic differences between Atlantic and eastern Mediterranean Monk Seals, only one haplotype was found in Monk Seals in Madeira and Cabo Blanco in the Atlantic in contrast to four different haplotypes found in Monk Seals in the eastern Mediterranean (Karamanlidis *et al.* 2016b). Furthermore, a comparison of 24 nuclear microsatellite loci in Atlantic and eastern Mediterranean Monk Seals showed that the first group had 14 unique alleles and the second had 18. Highly significant differences in allele frequencies between the two subpopulations were found for 14 out of 17 loci (Pastor *et al.* 2007). All of this genetic evidence suggests differentiation between subpopulations, but to date no taxonomic separation of this species has been suggested.

Based on the available genetic information and the distance between the existing Monk Seal group ranges (i.e., >1,500 km) three (or perhaps four) Mediterranean Monk Seal subpopulations are recognized: a) a subpopulation at the Cabo Blanco area, numbering approximately 240 adult and subadult individuals (CBD Habitat, P. Fernandez de Larrinoa pers. comm.); a subpopulation at the archipelago of Madeira that numbers approximately 23 seals (Parque Natural da Madeira, R. Pires pers. comm.); and a subpopulation in the eastern Mediterranean Sea, likely numbering fewer than 250 adult individuals (Karamanlidis *et al.* 2016a). Due to the absence of reliable monitoring data, the existence of a fourth subpopulation in the western Mediterranean Sea at the coast of Morocco cannot be substantiated.

http://dx.doi.org/10.2305/IUCN.UK.2019-1.RLTS.T120868935A120869697.en

Despite the prevalence of a unique haplotype in Monk Seals in the Ionian Sea in Greece (Karamanlidis *et al.* 2016b), there is currently no scientific evidence to support the further distinction of Aegean and Ionian Monk Seal subpopulations within the eastern Mediterranean Monk Seal subpopulation. Although haplotype 3 is prevalent in Monk Seals in the Ionian and has not been found elsewhere, haplotype 1, which is predominantly found in the Cyclades Islands in the Aegean Sea, has been found in animals in the Ionian Sea, in Cyprus, and as far as Croatia (Karamanlidis *et al.* 2016a, MOm/Hellenic Society for the Study and Protection of the Monk seal unpublished data), indicating genetic exchange between populations in the Aegean and Ionian Sea. Furthermore, the availability of suitable pupping habitat, the regular recording of pupping events in the contact zone between the two areas (i.e., the Peloponnese and the island of Kithira, MOm unpublished data) and the sparse information on monk seal movements in the region further support the assumption that Monk Seals in the Ionian and Aegean Seas are not genetically or demographically separated and therefore should not be considered as separate, discrete management units.

Assessment Information

Red List Category & Criteria: Endangered D ver 3.1

Year Published: 2019

Date Assessed: May 5, 2018

Justification:

The Mediterranean Monk Seal (*Monachus monachus*) is the most endangered pinniped species, and one of the most endangered Evolutionarily Distinct and Globally Endangered (EDGE) mammals on Earth (Isaac *et al.* 2007).

Historically, Mediterranean Monk Seal populations were reduced to small numbers as a consequence of commercial seal hunting and human persecution. This produced a severe bottleneck that significantly reduced genetic variability. For most of the twentieth century, numbers continued to decline mostly as a consequence of human invasion of habitat and adverse fishing interactions. This resulted in the fragmentation of the species into many subpopulations and the disappearance of several of them. At the species level the Mediterranean Monk Seal was listed on the IUCN Red List as Critically Endangered in 2008 (Aguilar and Lowry 2008). A re-assessment in 2015 listed the species as Endangered (EN) (Karamanlidis and Dendrinos 2015).

Monk Seals continue to be exposed to a number of substantial threats, including habitat loss and deterioration, displacement, and persecution and negative interactions with fisheries. Unpredictable threats from disease and toxic algal blooms (red tides) (Martínez-Jauregui *et al.* 2012) also pose a threat to the remaining small population. Such unpredictable threats could rapidly impact a part or all of the eastern Mediterranean Monk Seal subpopulation in the future.

There is evidence for a recent, small increase in Mediterranean Monk Seals in the eastern Mediterranean subpopulation, but their numbers remain very small. The number of adult individuals in the eastern Mediterranean may be fewer than 250. Because of the small population size the eastern Mediterranean Monk Seal subpopulation qualifies for EN under Red List Criterion D.

Geographic Range

Range Description:

Mediterranean Monk Seals were once widely and continuously distributed throughout the entire eastern Mediterranean and the Black Sea (Karamanlidis *et al.* 2016a). Today the distribution of the Mediterranean Monk Seal in the eastern Mediterranean is highly fragmented. The stronghold of the species is at islands in the Ionian and Aegean Seas (Adamantopoulou *et al.* 1999), and along the coasts of mainland Greece, Cyprus, and western and southern Turkey (Güçlüsoy and Savas 2004, Gücü *et al.* 2004, MOm 2007, Gücü *et al.* 2009a, H. Nikolaou pers. comm). In the Turkish Black Sea, Mediterranean Monk Seals are believed to be extinct since 1997 (Kiraç and Savas 1996, Kiraç 2011); some individuals still survive in the Sea of Marmara (Inanmaz *et al.* 2014). Several stragglers, most likely originating from the Monk Seal population in Greece have been sighted in Italy, Croatia, Egypt, Syria, and Libya (Alfaghi *et al.* 2013, Karamanlidis *et al.* 2016a).

Country Occurrence:

Native: Cyprus; Greece; Turkey

Possibly extinct: Albania; Croatia; Egypt; Israel; Italy (Italy (mainland), Sicilia); Lebanon; Libya; Tunisia

Regionally extinct: Bosnia and Herzegovina; Bulgaria; Georgia; Malta; Montenegro; Romania; Russian Federation; Slovenia; Ukraine

FAO Marine Fishing Areas:

Native: Mediterranean and Black Sea -

Population

The once abundant Mediterranean Monk Seal (*Monachus monachus*) has disappeared from most of its former range, with the majority of the decline in the global population occurring over the last century, i.e., more than three generations ago.

Conservation measures introduced over the last 30 years have helped to stem the decline, and there is now evidence of recent small increases in all known subpopulations. However, the Mediterranean Monk Seal population remains very small and still faces many threats (see the 'Threats' section). It is regarded as the most endangered pinniped species in the world, with an estimated total population size of fewer than 700 animals (Karamanlidis and Dendrinos 2015).

The population of the species has been fragmented into 3-4 subpopulations. The largest subpopulation is located in the eastern Mediterranean Sea and numbers 350-450 individuals (including adult and subadult individuals). It is estimated that 300-400 live in Greece (MOm 2007, 2008, 2009) and about 100 in Turkey (Güçlüsoy *et al.* 2004). Based on population parameters from the Monk Seal colony in Cabo Blanco (CBD Habitat, P. Fernandez de Larrinoa pers. comm.), and also from the closest extant relative of the Mediterranean Monk Seal, the Hawaiian Monk Seal (*Neomonachus schauinslandi*) (Littnan *et al.* 2015), the proportion of adult individuals in the population should be approximately 52-55%, therefore the number of adult animals in the eastern Mediterranean is likely 187-240. The other 2-3 subpopulations are located at the Archipelago of Madeira and the Cabo Blanco Peninsula; some individuals might survive along the Mediterranean coast of Morocco, but without any recent monitoring efforts it is hard to say if that subpopulation still exists.

The Mediterranean Monk Seal population at the island of Gyaros is the only large extant aggregation of the species in the eastern Mediterranean that still appears to preserve the structure of a colony (Karamanlidis *et al.* 2013); the other groups in the eastern Mediterranean are composed of loose aggregations of extremely reduced size (usually less than 20 individuals).

Current Population Trend: Unknown

Habitat and Ecology **(see Appendix for additional information)**

Mediterranean Monk Seals are medium-sized phocids that reach 2.3-2.8 m in length (Littnan *et al.* 2018). In the eastern Mediterranean, newborn pups average 102.6 cm in length (i.e., total length from the snout to the end of the hind flippers) and 15.5 kg in weight (Dendrinos 2011). Adults weigh from 240-300 kg (Littnan *et al.* 2018), with records of a male in the eastern Mediterranean weighing 400 kg and a pregnant female 302 kg (Sergeant *et al.* 1978).

Mediterranean Monk Seal pups in the eastern Mediterranean moult for the first time 19-57 days postpartum (Dendrinos 2011). Little information is available on the moulting process of adult seals in this region.

Mediterranean Monk Seals once hauled out on open beaches (Johnson and Lavigne 1999, Johnson 2004) but today they primarily use marine caves for hauling out, resting, and pupping throughout their range. In recent years in areas where conservation measures are in place and/or human activity is low, such as the island of Gyaros, Monk Seals have been observed to haul out on open beaches (Dendrinos *et*

al. 2008).

Most marine caves used by Mediterranean Monk Seals for resting and pupping possess a set of common geophysical characteristics, that include an entrance above or below water level, an entrance corridor, and a dry surface/area where the seals haul out (Dendrinos *et al.* 2007b). Seal preferences regarding cave selection and use (i.e., usage frequency and intensity) in the area are influenced by numerous parameters (Dendrinos *et al.* 1994). As a result, Monk Seals in the eastern Mediterranean use a high number of marine caves for resting and pupping (Gücü *et al.* 2004; MOm 2007, 2008, 2009). In a study that covered 250 km of coastline inhabited by Monk Seals in the Cilician Basin region of southern Turkey, 282 caves were searched. Of those, 39 showed evidence of Monk Seals, including three that were used for pupping and 16 that were actively being used at the time of the survey (Gücü *et al.* 2004). Similarly, in Greece more than 500 caves have been found to be occupied by the species and more than 100 to be used for pupping (MOm 2007, 2008, 2009). Monk Seal activity in the marine caves in the eastern Mediterranean is highest in autumn and winter and coincides with the pupping season of the species (Dendrinos *et al.* 1994, Gücü *et al.* 2004, Dendrinos 2011).

Monk Seal pupping in the eastern Mediterranean is synchronous, occurring mainly in the months of October and November. This has been the case for 11 pups born at Turkey's Cilician Basin and for more than 220 pups born in Greece from 1990 to 2014 (Dendrinos *et al.* 1994, 1999; Gücü *et al.* 2004, Dendrinos 2011).

Pups in the eastern Mediterranean are weaned when they are approximately four months old (Dendrinos 2011). During the lactation period, fostering and milk stealing are not uncommon (Karamanlidis *et al.* 2013). Pups enter the water and begin diving during their first week (Karamanlidis *et al.* 2010) and from that point onwards spend 55-74% of their time at sea (Dendrinos 2011).

Generation length for this species is estimated at 11.2 years (Pacifici *et al.* 2013). Female Mediterranean Monk Seals probably become sexually mature at 3-4 years of age and can give birth in successive years. In the eastern Mediterranean, and more specifically in Greece, annual pup survival appears to be higher than that recorded in the Cabo Blanco area (54-76%, depending on weather conditions; P. Fernandez de Larrinoa pers. comm., Dendrinos 2011), which is most likely due to the fact that lactating females and their pups have a higher number of suitable caves to choose from when seeking refuge from severe weather conditions.

Compared to most other pinnipeds, little is known about the diving capacities and behavior at sea of Monk Seals in the eastern Mediterranean. Maximum dive depths for a rehabilitated male and a juvenile female Monk Seal were 196 m (Dendrinos *et al.* 2007a) and 205 m (MOm unpublished data), respectively. In Turkey, adult Monk Seals have been observed to dive for an average of approximately 6.5 minutes and then rest at the surface for approximately one minute (Kiraç *et al.* 2002). However, in Greece, Monk Seals have been observed to also rest/sleep underwater (Karamanlidis *et al.* 2017). Monk seals in the eastern Mediterranean have been recorded to travel long distances, for example ~288 km in three months with a maximum straight distance traveled of ~78 km (Adamantopoulou *et al.* 2011).

Stomach content analysis of dead Monk Seals has revealed that they have a heterogeneous diet consisting of bony fishes, cephalopods, and crustaceans. In Greece, Monk Seals are known to eat more than 70 prey species (50% cephalopods, 48% fishes, 1.5% non-cephalopod mollusks, 0.4% crustaceans;

Pierce *et al.* 2011). The Common Octopus (Octopus vulgaris ~34%) and bony fish from the family Sparidae (~28%) were most frequently identified in Monk Seal stomachs (Pierce *et al.* 2011). Collectively, results from stomach content (Marchessaux 1989, Salman *et al.* 2001, Karamanlidis *et al.* 2011, Pierce *et al.* 2011, Tonay *et al.* 2016) and stable isotope analyses (Karamanlidis *et al.* 2014) studies suggest that Monk Seals in the eastern Mediterranean forage primarily on the continental shelf along the coast.

Systems: Terrestrial, Marine

Use and Trade

In the past, Mediterranean Monk Seals were hunted by humans for their fur, oil, meat, and for medicinal use. Evidence suggests that the subpopulation was severely depleted during the Roman era (Johnson and Lavigne 1999, Johnson 2004). Today there is no commercial exploitation of this subpopulation.

Threats **(see Appendix for additional information)**

Mediterranean Monk Seals have a long history of interaction with humans that includes exploitation for subsistence needs, commercial harvest, and persecution as a competitor for fisheries resources or because they caused actual and perceived damage to fishing gear (Johnson and Lavigne 1999, Stringer *et al.* 2008, González 2015). Once abundant, Monk Seals were written about and illustrated in the literature and depictions of classical antiquity (Johnson 2004).

Reasons for the population decline of Monk Seals in the eastern Mediterranean Sea in the 20th century include: increased human pressure displacing seals from their habitat; destruction/alteration of suitable habitat; continued mortality due to deliberate aggression by fishermen to eliminate a competitor, even in countries and areas where the species is legally protected; and fisheries bycatch (Karamanlidis *et al.* 2016a).

Habitat deterioration, destruction, and fragmentation have played a significant role in the plight of the Mediterranean Monk Seal in the eastern Mediterranean. Once an open beach dweller, the species has been persecuted by humans for centuries and forced to occupy increasingly marginal habitat. The gradual process from occupying open beaches to being displaced and forced into increasingly marginal habitat (i.e., smaller and more unsuitable marine caves) has been thoroughly documented (Johnson and Lavigne 1999). This threat is still in place today, particularly in the eastern Mediterranean (MOm 2007, Notarbartolo di Sciara *et al.* 2009, Kiraç *et al.* 2013). An alarming decline in pupping success has been recorded in the most important pupping location of the species in southern Turkey (where up to seven pup births have been recorded) due to increased human activity (i.e., industrial development, including the construction of a thermal and nuclear power plant and a marine terminal). Critical Monk Seal habitat has been affected by increased tourism activities throughout Turkey, even in protected areas such as the Olympos Beydagları National Park, and the Kas, Kekova Specially Protected Area. Tourists and SCUBA divers in these areas appear to frequently visit Monk Seal shelters. Although some resting activity by Mediterranean Monk Seals continues in these caves, no pupping has been recorded recently (Gücü *et al.* 2009b). With human populations and coastal activities increasing around the Mediterranean there are corresponding increases in threats to the species' habitat.

Interactions with fisheries are of great conservation concern throughout the eastern Mediterranean

(Güçlüsoy and Savaş 2003, Güçlüsoy 2008, Karamanlidis *et al.* 2008). Deliberate killing of Monk Seals mainly by fishermen was responsible for one-third of all mortalities of 79 stranded animals in Greece (1991-1995) and this is considered the single most important source of mortality for the species in the eastern Mediterranean (Androukaki *et al.* 1999). Deliberate killing, hunting, and capturing live animals for exhibition purposes were the main cause for the population reduction of the species in Turkey until 1980 (Kiraç *et al.* 2013).

Mediterranean Monk Seals have been entangled in a wide variety of fishing gear including set-nets, trawl nets, and long-lines (Johnson and Karamanlidis 2000) and entanglement remains a major source of mortality in the eastern Mediterranean Sea, especially for sub-adult animals (Karamanlidis *et al.* 2008, Kiraç *et al.* 2013).
Potentially, limited availability of food sources, genetic inbreeding, pollution, and the outbreak of an epizootic could constitute threats to the survival of the Monk Seal in the eastern Mediterranean. Currently, not enough information is available to fully evaluate the magnitude of these threats; however, there is no indication that they are significantly affecting the population at present.

In southern Turkey, an important monk seal colony almost disappeared in the 1990s when industrial-scale fishing in the area reduced the available fish sources and negative interactions of artisanal fishermen with Monk Seals (i.e., deliberate killings) increased. However, a series of regulations enforced to protect fish populations alleviated the problems and allowed the local Monk Seals to resume pupping in the area (Gücü *et al.* 2004).

Genetic analyses of mitochondrial and nuclear DNA (Pastor *et al.* 2007, Karamanlidis *et al.* 2016b) have shown that as a consequence of severe population bottlenecks and population/habitat fragmentation, Monk Seals in the eastern Mediterranean have suffered a dramatic decrease in genetic variability over the last few centuries. The genetic diversity of Mediterranean Monk Seals is among the lowest found in pinnipeds; it is comparable to Hawaiian Monk Seals and Northern Elephant Seals (*Mirounga angustirostris*). The potential consequences of the loss of genetic variability and genetic inbreeding are still hard to evaluate for the Mediterranean Monk Seal, however potential consequences of genetic inbreeding include congenital defects leading to stillborn pups, something that has been recorded in small Monk Seal populations in Greece (MOm unpublished data). Additionally, low fitness and increased susceptibility to disease may be an effect of genetic erosion that can compromise a population and lead to extinction.

Contaminant burdens have always been suspected to be a threat to the Mediterranean Monk Seal and thus monitoring pollutants has been considered a high priority (Boulva 1979, Reijnders *et al.* 1993). Research on organochlorine pollutants, which were analysed in the blubber of individuals collected during the 1990s from the Cabo Blanco and the eastern Mediterranean subpopulations, indicate that residue levels were very low in the former subpopulation and moderate to high in the latter (Yediler *et al.* 1993; Borrell *et al.* 1997, 2007). More recent research efforts indicate that trace elements do not constitute a major conservation threat for Monk Seals in Greece (Formigaro *et al.* 2016).

Mediterranean Monk Seals are at an unknown, but suspected high, level of risk from oil tanker and other ship accidents, spills, and groundings. This results from increased tanker traffic in the area, and a greater chance for accidents, disturbance, and collisions near important habitat. A case that vividly exemplifies this threat was the ship accident that occurred at Çavuş Island near Bodrum in southwest

Turkey in 1996 that directly affected Monk Seals and their habitat (Kiraç 1998). A clean-up operation that lasted until 1997 effectively restored the habitat to its original quality. In response to this accident regulatory measures have been taken in Turkey to reduce the threat from oil spills (Kiraç and Güçlüsoy 2007).

More recently, the arrival of Lessepsian fishes in the eastern Mediterranean Sea, such as the toxic Silver-cheeked Toadfish (*Lagocephalus sceleratus*), could have a negative impact on Monk Seals in the region. This fish has been implicated in the death of a Monk Seal at Cyprus (A. Gücü pers. comm). Additional risks to Mediterranean Monk Seals come from challenges of implementing effective conservation for a species in a complex multi-national environment, weak enforcement of agreements and international laws and the collapse of occupied pupping caves (Aguilar 1999).

Conservation Actions **(see Appendix for additional information)**

The Mediterranean Monk Seal in the eastern Mediterranean is legally protected throughout its range through numerous national laws and regional and international treaties, as well as European Union (EU) regulations. Legislative measures and research, management, and conservation actions to effectively protect important Mediterranean Monk Seal populations in Greece are currently in place in the following areas: the National Marine Park of Alonnisos, Northern Sporades Islands, the marine protected area in Northern Karpathos–Saria and the 3-mile no-take zone at the Island of Gyaros in Greece. In Turkey, similar actions are carried out in five coastal locations in the country: Foça, Karaburun, Alaçatı-Sigacik, the Bodrum Peninsula, and the Cilician coasts (Kiraç *et al.* 2013).

Additionally, the species is explicitly mentioned in more than 80 Natura 2000 sites within the countries of the EU in the region (i.e., Greece and Cyprus). According to the Council's Directive 92/43EEC "on the conservation of natural habitats of wild fauna and flora" the Mediterranean Monk Seal is considered as a species of community importance. Based on the above Directive, Natura 2000 sites are legally considered by EU member states as Protected Areas.

Throughout the range of the species, widespread action has been taken to sensitize the local human population towards Monk Seal conservation, to protect breeding caves, to restrict fishing gear and relocate the most adverse fishing practices, to develop monitoring programs and intervention protocols, and to increase on-site capability to rehabilitate sick and injured individuals, particularly pups. Numerous agreements, conventions, and treaties (on a regional, national, and international level) are in force to protect Monk Seals and many workshops and conferences have brought together scientists and managers to discuss Monk Seal conservation issues and problems. Furthermore, numerous international bodies and fora, including the Regional Activity Center for Specially Protected Areas and the General Fisheries Commission for the Mediterranean, have put forward initiatives and proposals in order to ameliorate existing threats and mitigate pressures from relevant sectors (i.e., fisheries, bycatch, etc.). Isräels (1992) summarized 30 years of this conservation history and provided details on accomplishments and failures to meet objectives. Currently, there is a United Nations Environmental Program Mediterranean Action Plan (first issued in 1978 and revised in 1988) in force for the conservation and management of Monk Seals in the Mediterranean; in Greece, the "National strategy and action plan for the conservation of the Mediterranean Monk Seal in Greece, 2009-2015" (Notarbartolo di Sciara *et al.* 2009) describes in detail actions that should have been carried out in the country by 2015 in order to safeguard the future of the species. Similarly, in Turkey the National Monk Seal Committee has drafted a "National Action Plan for the Conservation of Mediterranean Monk Seal

Monachus monachus in Turkey" that has been approved by the Turkish Ministry of Forest and Water Works (Kiraç *et al.* 2013).

Credits

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Citation

Karamanlidis, A.A., Adamantopoulou, S., Tounta, E. & Dendrinos, P. 2019. *Monachus monachus (Eastern Mediterranean subpopulation)*. The IUCN Red List of Threatened Species 2019: e.T120868935A120869697. http://dx.doi.org/10.2305/IUCN.UK.2019-1.RLTS.T120868935A120869697.en

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External Resources

For Images and External Links to Additional Information, please see the Red List website.

Appendix

Habitats

(http://www.iucnredlist.org/technical-documents/classification-schemes)

Habitat	Season	Suitability	Major Importance?
9. Marine Neritic -> 9.1. Marine Neritic - Pelagic	Resident	Suitable	Yes
10. Marine Oceanic -> 10.1. Marine Oceanic - Epipelagic (0-200m)	Resident	Suitable	Yes
12. Marine Intertidal -> 12.1. Marine Intertidal - Rocky Shoreline	Resident	Suitable	Yes
12. Marine Intertidal -> 12.2. Marine Intertidal - Sandy Shoreline and/or Beaches, Sand Bars, Spits, Etc	Resident	Suitable	Yes
13. Marine Coastal/Supratidal -> 13.1. Marine Coastal/Supratidal - Sea Cliffs and Rocky Offshore Islands	Resident	Suitable	Yes
13. Marine Coastal/Supratidal -> 13.2. Marine Coastal/supratidal - Coastal Caves/Karst	Resident	Suitable	Yes

Threats

(http://www.iucnredlist.org/technical-documents/classification-schemes)

Threat	Timing	Scope	Severity	Impact Score
1. Residential & commercial development -> 1.1. Housing & urban areas	Ongoing	Majority (50-90%)	Slow, significant declines	Medium impact: 6
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation		
1. Residential & commercial development -> 1.2. Commercial & industrial areas	Ongoing	Majority (50-90%)	Slow, significant declines	Medium impact: 6
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation		
1. Residential & commercial development -> 1.3. Tourism & recreation areas	Ongoing	Majority (50-90%)	Rapid declines	Medium impact: 7
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation		
11. Climate change & severe weather -> 11.1. Habitat shifting & alteration	Ongoing	Whole (>90%)	Unknown	Unknown
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation		
4. Transportation & service corridors -> 4.3. Shipping lanes	Ongoing	Majority (50-90%)	Slow, significant declines	Medium impact: 6
	Stresses:	2. Species Stresses -> 2.1. Species mortality		
5. Biological resource use -> 5.4. Fishing & harvesting aquatic resources -> 5.4.2. Intentional use: (large scale) [harvest]	Past, unlikely to return	-	-	-
	Stresses:	2. Species Stresses -> 2.1. Species mortality		

5. Biological resource use -> 5.4. Fishing & harvesting aquatic resources -> 5.4.4. Unintentional effects: (large scale) [harvest]	Ongoing	Majority (50-90%)	Rapid declines	Medium impact: 7
	Stresses:	1. Ecosystem stresses -> 1.2. Ecosystem degradation 2. Species Stresses -> 2.1. Species mortality 2. Species Stresses -> 2.2. Species disturbance		
5. Biological resource use -> 5.4. Fishing & harvesting aquatic resources -> 5.4.5. Persecution/control	Ongoing	Majority (50-90%)	Rapid declines	Medium impact: 7
	Stresses:	2. Species Stresses -> 2.1. Species mortality		
6. Human intrusions & disturbance -> 6.1. Recreational activities	Ongoing	Majority (50-90%)	Rapid declines	Medium impact: 7
	Stresses:	2. Species Stresses -> 2.2. Species disturbance		
6. Human intrusions & disturbance -> 6.2. War, civil unrest & military exercises	Ongoing	Minority (50%)	Negligible declines	Low impact: 4
	Stresses:	2. Species Stresses -> 2.2. Species disturbance		
7. Natural system modifications -> 7.3. Other ecosystem modifications	Unknown	-	-	-
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation		
8. Invasive and other problematic species, genes & diseases -> 8.1. Invasive non-native/alien species/diseases -> 8.1.2. Named species (Lagocephalus sceleratus)	Ongoing	Majority (50-90%)	Negligible declines	Low impact: 5
	Stresses:	2. Species Stresses -> 2.1. Species mortality		
8. Invasive and other problematic species, genes & diseases -> 8.6. Diseases of unknown cause	Ongoing	-	-	-
	Stresses:	2. Species Stresses -> 2.1. Species mortality		
9. Pollution -> 9.1. Domestic & urban waste water -> 9.1.3. Type Unknown/Unrecorded	Ongoing	Majority (50-90%)	Negligible declines	Low impact: 5
	Stresses:	1. Ecosystem stresses -> 1.2. Ecosystem degradation		
9. Pollution -> 9.2. Industrial & military effluents -> 9.2.1. Oil spills	Ongoing	Whole (>90%)	Negligible declines	Medium impact: 6
	Stresses:	2. Species Stresses -> 2.1. Species mortality		
9. Pollution -> 9.2. Industrial & military effluents -> 9.2.3. Type Unknown/Unrecorded	Ongoing	-	-	-
	Stresses:	1. Ecosystem stresses -> 1.2. Ecosystem degradation		
9. Pollution -> 9.3. Agricultural & forestry effluents -> 9.3.4. Type Unknown/Unrecorded	Ongoing	-	-	-
	Stresses:	1. Ecosystem stresses -> 1.2. Ecosystem degradation		

Conservation Actions in Place

(http://www.iucnredlist.org/technical-documents/classification-schemes)

Conservation Actions in Place
In-Place Research, Monitoring and Planning
Action Recovery plan: Yes

Conservation Actions in Place
Systematic monitoring scheme: Yes
In-Place Land/Water Protection and Management
Conservation sites identified: Yes, over part of range
Occur in at least one PA: Yes
Percentage of population protected by PAs (0-100): 41-50
Area based regional management plan: Yes
Invasive species control or prevention: No
In-Place Species Management
Harvest management plan: No
Successfully reintroduced or introduced beningly: No
Subject to ex-situ conservation: Yes
In-Place Education
Subject to recent education and awareness programmes: Yes
Included in international legislation: Yes
Subject to any international management/trade controls: Yes

Conservation Actions Needed

(http://www.iucnredlist.org/technical-documents/classification-schemes)

Conservation Actions Needed
1. Land/water protection -> 1.1. Site/area protection
1. Land/water protection -> 1.2. Resource & habitat protection
2. Land/water management -> 2.1. Site/area management
3. Species management -> 3.2. Species recovery
4. Education & awareness -> 4.1. Formal education
4. Education & awareness -> 4.2. Training
4. Education & awareness -> 4.3. Awareness & communications
5. Law & policy -> 5.2. Policies and regulations
5. Law & policy -> 5.4. Compliance and enforcement -> 5.4.2. National level

Research Needed

(http://www.iucnredlist.org/technical-documents/classification-schemes)

Research Needed
1. Research -> 1.1. Taxonomy
1. Research -> 1.2. Population size, distribution & trends
1. Research -> 1.3. Life history & ecology
1. Research -> 1.5. Threats
1. Research -> 1.6. Actions
2. Conservation Planning -> 2.1. Species Action/Recovery Plan
2. Conservation Planning -> 2.2. Area-based Management Plan
3. Monitoring -> 3.1. Population trends
3. Monitoring -> 3.4. Habitat trends

Additional Data Fields

Distribution
Continuing decline in area of occupancy (AOO): No
Extreme fluctuations in area of occupancy (AOO): No
Continuing decline in extent of occurrence (EOO): No
Extreme fluctuations in extent of occurrence (EOO): No
Number of Locations: 2-5
Continuing decline in number of locations: No
Extreme fluctuations in the number of locations: No
Lower elevation limit (m): 0
Upper elevation limit (m): 3
Lower depth limit (m): 205
Upper depth limit (m): 0
Population
Number of mature individuals: 187-240
Continuing decline of mature individuals: Unknown
Extreme fluctuations: No
Population severely fragmented: No
Continuing decline in subpopulations: No
Extreme fluctuations in subpopulations: No

Population
All individuals in one subpopulation: Yes
Habitats and Ecology
Continuing decline in area, extent and/or quality of habitat: Yes
Generation Length (years): 11.2
Movement patterns: Not a Migrant

The IUCN Red List Partnership

The IUCN Red List of Threatened Species™ is produced and managed by the IUCN Global Species Programme, the IUCN Species Survival Commission (SSC) and The IUCN Red List Partnership.

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