Global Journal of
Archaeology & Anthropology
ISSN: 2575-8608

Juniper Publishers
key to the Researchers

Short Communication
Volume 13 Issue 4 - February 2024
DOI: 10.19080/GJAA.2024.13.555869

Glob J Arch & Anthropol

Threats on Marine Mammals: an Anthropological Perspective

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Submission: February 7, 2024**; Published:** February 20, 2024

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Abstract

Many species of marine mammals are threatened and their populations decline worldwide due to the increase of anthropogenic activities such as fishing, shipping, pollution and climate change. Our understanding of marine mammal behavior/ecology remains poor and under-documented since studies of the species are extremely challenging in practice and theory. Applied anthropology can help provide effective strategies based on cultural compatibility. Marine biology has already validated that biodiversity is beneficial to the ecosystem and so should anthropology promote the significance of mutualism in society.

Keywords: Marine Mammals; Threats; Marine Environment; Anthropogenic Activities

Overview

Marine mammal strandings are a constant and have been recorded all around the eastern Mediterranean Sea. Although such incidents are considered to be relatively common and therefore quasi-normalized, a case of mass beaked whales stranding that took place in Cyprus last February drew special attention. Gross and histological findings indicate that this atypical Cuvier's beaked whales' mass stranding event was due to acoustic related disturbance most probably associated temporally and spatially with mid-frequency sonar activities [1]. Species stranding records were also reported two years ago in a bay close to Athens in January 2022 and in Rhodes Island (south-eastern Greece) in May 2022 [2]. However, the analysis of these cases resulted in different data as to the cause of death. Respectively, in the first case due acoustic related disturbance, in the second purely due to pathological causes (as in fact, presence of a large number of parasites in the kidneys), while in the third due to ingestion of a large amount of plastics [1,2].

Therefore, this species -like most marine mammals- is vulnerable to a number of environmental pressures and threats, such as interaction with fishing, marine pollution, shipping, marine noise, and sometimes the nuisance of tourist activities. The beaked-whale, Ziphius cavirostris belongs to the odontocetes marine mammals, which due to the presence of teeth and an internal system in the skull (melon) have developed an evolutionary mechanism known as echolocation (see review in [3]). Such an evolutionary advantage helps them search for food deep in the sea (below 2000 meters) where they mainly feed on deep-living molluscs (e.g. squid) and fish [4,5]. They also present racial separation, the female reaching a larger size (about 8 meters) with dark coloring that is often combined with the characteristic white hackles (scratches) [6]. Although the particular kind of 'sonar' may be seen as an adaptive advantage it also renders this species susceptible to disorientation and eventual stranding on the beach due to daily human activities and interference. Moreover, 'ghost nets' are an invisible threat often described as deadly weapons for the species [7,8]. According to the red list (IUCN), where the species has been evaluated as "Data Deficient" in the red list (IUCN) since little is known about their biology and ethology. Recording the sea routes of such cetaceans is

important in assessing their interaction with shipping and further analyzing which are the effects of such encounters especially during the breeding season. Finally, it has been proven that, due to its special topography, the Mediterranean Sea is one of the most polluted areas of the planet primarily due to plastic residues; plastic waste is found throughout the sea column water [9,10]. Thus, these stranding data provide useful information on species population dynamics, the impact on the marine environment and crucial scientific evidence for overall ocean health.

Threats and Marine Mammals

Many species of marine mammals are threatened and their populations decline worldwide due to the increase of anthropogenic activities such as fishing, shipping, pollution and climate change [11-17]. Bycatch has the most important effect on marine mammal populations since it results in the death of the animal trapped in the net [18]. The most shocking example is the case of the porpoise in the Gulf of Mexico, namely the vaquita (Phocoena sinus), with its population declining dramatically in recent years due to bycatch now counting for less than 10 individuals worldwide [19]. Abandoned nets (aka ghost nets) pose another asymmetric threat since they become mobile minefields for marine mammals [20]. Globally, efforts to confine interaction between fisheries and marine mammals involve technological interventions in fishing gear, as for example changes in hook design, and/or interventions in animal behavior as the use of acoustic pingers [21,22]. Neither has produced the desired results, but has it also often been observed that the aforementioned interventions may have a negative impact such as the dinner bell effect in the latter case [21].

Another threat to marine mammals is marine noise pollution usually caused by shipping. Ship noise peaking at low frequencies interrupts communication among large baleen whales [23,24]. Likely, higher frequencies produced by ships' emissions have a significant effect on odontocetes, usually resulting in grounding and/or splashing because of disorientation [25]. Marine mammals are also affected directly by shipping through collisions and other related forms of pollution, such as oil spills and chemical waste [26].

A threat that has less to do with marine activity is climate change. Climatic as well as oceanographic changes are widespread and escalating throughout the world's oceans appearing to be more pronounced at higher latitudes near the poles [27]. The prospect of the global ocean warming is particularly negative for marine mammals such as polar bears [28], walruses [29] and many seal species [30,31], which occur at high latitudes and depend on sea ice for feeding, breeding and/or resting.

Finally, plastic pollution is known to affect marine mammals through entanglement, ingestion and habitat degradation resulting in recorded population declines or even local marine mammal species extinction due to unsuitable marine habitat. An area of particular concern is the exposure of marine mammals to microplastics mainly via plastic ingestion [32]. These small (<5 mm) diffusible synthetic particles are bioavailable to marine organisms through direct ingestion and/or trophic transport [33]. Research has revealed a possible link between the cause of death and the abundance of microplastics in an animal's body, indicating that animals which died due to infectious diseases had slightly higher numbers of particles than those that died from trauma and/or other factors [34-36].

Conservation Implications and Anthropology

Our understanding of marine mammal behavior/ecology remains poor and under-documented since studies of the kind are extremely challenging in practice and theory [37]. Thus, the conservation status of about 40% of marine mammals has not been categorized despite the annually update of the IUCN red book (i.e., "Data Deficient" species). Many more species are likely to become threatened in the near future due to the increasing human impact on the oceans, [38]. It is therefore important to search for a new ecological balance by approaching marine mammal and human interaction as a relationship within a rapidly declining ecosystem due to human activity. In this effort just improving the tools of research will not suffice if not accompanied by a change of perspective.

Applied anthropology can help provide effective strategies based on cultural compatibility (Nahm and Rinker, 2016). However, beyond dealing with ethical dilemmas on an ecologically sensitive development plan [39], research will also have to address conservation into a climate of poly crisis (Henig and Knight, 2023), when many issues articulated as pressing and interrelated cannot be easily prioritized. If mutualism -or the benefit of all species in coexistence- is the aim then strategies will have to take into account the given economic conditions and how these shape responses toward animals [40]. Peaceful coexistence is possible even if resource-limited loci are shared [41], as cooperation toward conservation may also be when solutions are culturally compatible [42]. Though, mutualism requires transformations that will allow a different perception of the world we inhabit. Outside the Western anthropocentric perspective that is heavily based on profit through the (mis)management of resources that are seen as things in the service of humanity, the Amerindian perspectivism offers an alternative by transforming objects into subjects within social relations [43,44]. If we agree that we all share personhood it may become easier to grasp that conservation is for mutual benefit. As parts of a wider system, we can survive only if we manage to ingrain the idea that it is important to live well together [45-47]. Marine biology has already validated that biodiversity is beneficial to the ecosystem and so should anthropology promote the significance of mutualism in society.

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How to cite this article: Pardalis S, Exadactylos E, Komnenou A, Drougas A, Akritopoulou E, et al.. Threats on Marine Mammals: an Anthropological Perspective. Glob J Arch & Anthropol. 2024; 13(4): 555869. DOI:10.19080/GJAA.2024.13.555869

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