



## Editorial

## Who eats sea meat? Expanding human consumption of marine mammals

## 1. The last great hunting ground

The oceans are the last great hunting ground, and supply the greatest diversity of protein for human consumption. About 1400 marine species have catches reported to FAO, comprising 72% fish, 10% crustaceans, 8% molluscs, 6% mammals, 2% plants, and 2% other invertebrates. Many more species are killed and consumed locally without being reported at the species level to FAO. In this issue, [Robards and Reeves \(2011\)](#) reported that the human consumption of marine mammals, including cetaceans (whales, dolphins and porpoises), pinnipeds (seals, sea lions, walrus) and sirenians (manatees, dugongs), has increased in recent decades. Although the hunting of large whales has decreased, in large part due to the international concern about the decline of these species and the 1986 moratorium on commercial whaling, the consumption of small cetaceans (all cetaceans except baleen and sperm whales) and other marine mammals has increased in some regions during the last two decades ([Robards and Reeves, 2011](#)). Considering the media attention given to stopping the hunting of whales (large cetaceans) for human consumption, it may come as a surprise that people are eating more marine mammal species than ever before. It may also be a surprise that this consumption includes people in many developed, as well as undeveloped, countries ([Fig. 1](#)). In fact, [Robards and Reeves \(2011\)](#) found that people in 98 countries have intentionally killed marine mammals for consumption. When the unintentional killing of marine mammals in the form of fisheries 'by-catch' is included, a total of 92 species of marine mammals have been eaten by humans in 125 countries. The minority of marine mammal species that have not been captured have escaped due to their rarity in coastal waters and absence from by-catch in oceanic fisheries.

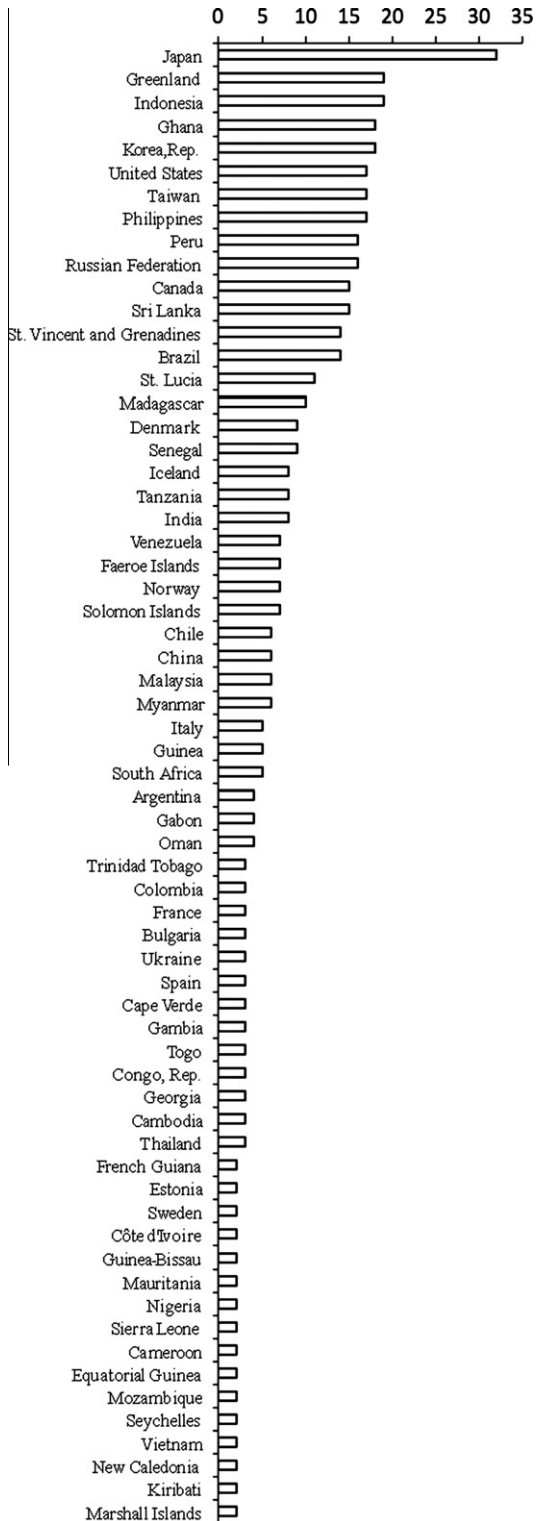
## 2. Conservation and management implications

The number and diversity of marine mammals being hunted for human consumption in areas of poverty and food insecurity seems destined to increase as traditional sources of protein continue to decline and access to the ocean improves. This pattern has many parallels with the expansion of 'bush meat' in African and Asian countries ([Brashares et al., 2004](#)). Species of marine mammals once considered only as 'by-catch' are now sold for human consumption, and this is likely to encourage a market based on direct hunting ([Clapham and Van Waerebeek, 2007](#)). People in many countries have no cultural or ethical prohibitions against eating marine mammals and are often unaware of the source of the butchered products. This raises specific management issues for marine

mammals and other marine megafauna (e.g., sea turtles, large fish and sharks); their large size makes them comparatively easy to hunt, but their slow rates of reproduction make them susceptible to over-exploitation. Many marine mammal populations are already depleted due to past hunting, incidental by-catch, and perhaps a reduction in prey due to fisheries. Thus, we are likely to witness more populations of marine mammals becoming of conservation concern due to hunting. We can also expect a range of arguments for and against such hunting, including ethical concerns, cultural differences, species conservation, ecosystem effects, and pragmatic needs of people for food. To date, however, these arguments have centered around the hunting of large whales and the role of the International Whaling Commission. The exploitation of other marine mammals, including dolphins and porpoises, is an international threat, but one that lacks an international management authority.

The conservation status of cetaceans, pinnipeds, and sirenians is reviewed by three specialist groups under the umbrella of the International Union for the Conservation of Nature (IUCN) but these groups have no regulatory authority. International trade in many marine mammal species is controlled by the Convention on International Trade in Endangered Species (CITES), but this convention has no regulatory authority over exploitation for domestic consumption. The IWC only manages the hunting of large cetaceans, the sperm whale and baleen whales. Although the IWC might seem a likely candidate for regulating the exploitation of small cetaceans, this proposition has been fiercely opposed by several member nations. The prospects for controlling international trade through CITES are only somewhat better, given the absence of market surveillance and source verification for most species in trade ([Baker, 2008](#)).

Without agreed international management authority, the prospects for banning or regulating the expanding exploitation of marine mammals for human consumption will fall to local, national or regional agencies. In less developed regions of the world, poverty and hunger are likely to be underlying causes of the increase in consumption of marine mammals. These conditions present formidable impediments to top-down solutions to the regulation of exploitation and the conservation of marine or terrestrial species. In more developed countries, governments or agencies that allow the hunting of marine mammals will need to develop scientific management procedures to set sustainable quotas, taking into account the life history features of marine mammals (e.g., slow rate of increase, social organization). An imperative should be to find a mechanism for identifying and banning the hunting of species threatened with extinction or populations in decline. Unfortu-



**Fig. 1.** The number of species of marine mammals with evidence that they are eaten; by country, between 1990 and 2009. Data from Robards and Reeves (2011). Countries with one or less species are excluded.

nately, the hunting and by-catch of marine mammals has been managed traditionally by fisheries agencies, which are often inexperienced or uninterested in conservation of these species. Countries that allow hunting are also likely to face accusations of cruelty, unless there is enforcement of agreed standards for humane killing, an issue that is particularly difficult for the larger cetaceans. Conversely, countries that prohibit hunting of marine mammals on cultural grounds (i.e., a society's unwillingness to eat whale meat) or on an ethical basis (e.g., that it is not possible to hunt and kill the whales humanely), are likely to face accusations of inconsistent standards, in relation to the methods of catching and killing fish for commercial and sport purposes. Considering that fish share the same physiological, hormonal and neurological systems as mammals, birds and turtles, there is an argument for developing more consistent standards for humane killing across all vertebrates.

Robards and Reeves (2011) have pointed us to a growing threat with daunting ethical, cultural and ecological implications. These difficulties should not be used as an excuse for inaction – it is time for national governments and the international community to recognize this threat and begin seeking solutions to both the drivers of demand and the circumstances leading to the unregulated supply of marine mammals for human consumption.

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