

IWC/MAY18/CCPG/11 Rev1

Emerging or Existing Threats to Cetaceans: Understanding their Conservation Issues?

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INTERNATIONAL
WHALING COMMISSION

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Our idea for this agenda item was to review the major conservation issues that threaten both small and large cetaceans around the world and then discuss how existing, new or emerging issues would benefit from consideration by the Conservation Committee.

Conservation actions can focus on species, subspecies, populations that are in trouble or might be in trouble or the habitat that is critical to important life stages (e.g. breeding or feeding areas). In some cases, those most threatened are very clear, like the vaquita. However, in other cases the threats are also clear, but we (SC) may have yet to determine that they are in trouble. A good example of the latter, are the coastal bottlenose dolphins taken along with the vaquita in the upper Gulf of California, Mexico. This case was briefly discussed in the IWC/SC *Tursiops* Taxonomy review.

Here, we list examples of species, subspecies and populations that are in trouble and in some cases will become emerging issues as more information is collected.

The following information on the status of the 13 small cetaceans listed as Critically Endangered by IUCN is extracted from a paper by Brownell et al entitled “Gillnet Fisheries: A growing Global Crisis for Small Cetaceans”:

1. *Phocoena sinus* (species) Vaquita, Gulf of California, Mexico – population under 100, declining, bycatch
2. *Cephalorhynchus hectori maui* (subspecies) Maui’s dolphin, New Zealand – population under 100, declining, bycatch
3. *Neophocaena asiaeorientalis* (subspecies) Yangtze finless porpoise. China – population around 500, declining, bycatch
4. *Orcaella brevirostris* (subpopulation) Mekong River dolphin, Cambodia – population under 100, declining, bycatch
5. *Orcaella brevirostris* (subpopulation) Ayeyarwady River dolphin, Myanmar – population under 100, declining, bycatch
6. *Orcaella brevirostris* Pesut – (subpopulation) Mahakam River in East Kalimantan (Indonesia) – population under 100, declining, bycatch – population under 100, declining, bycatch

7. *Orcaella brevirostris* (subpopulation) Malampaya Sound dolphin – (subpopulation) Philippines – population under 100, declining, bycatch
8. *Orcaella brevirostris* (subpopulation) – Songkhla Lake, Thailand – population under 100, declining, bycatch
9. *Tursiops truncatus* Bottlenose dolphin (subpopulation) New Zealand – population around 200, declining, bycatch not a major issue
10. *Phocoena phocoena* (subpopulation) Baltic Sea – population around 500, declining, bycatch
11. *Delphinapterus leucas* (subpopulation) Cook Inlet beluga is found in Cook Inlet Alaska, USA – population around 300, declining, bycatch not a major issue
12. *Sousa chinensis* (subpopulation) eastern Taiwan Strait, Taiwan – population under 100, declining, bycatch
13. *Sousa teuszii* (species) Atlantic humpback dolphin found only in west African coastal waters from Western Sahara to Angola – total population size is unknown, but declining and bycatch is the major issue

All but two of these small cetaceans, (Baltic Sea harbor porpoise and the Atlantic humpback dolphin), occurs within the coastal waters/river of a single country. Seven of the 13 may have total populations around 100 or less individuals. Eleven of the 13 are threatened by bycatch. One species previously listed as critically endangered, the baiji was declared extinct in 2006, mainly due to bycatch. All 13-taxa have substantially declined since 1980. All of these 13 have been reviewed by the SC and some of them have been reviewed a number of time (vaquita) since the first meeting of the small cetacean subcommittee in 1975, suggesting reconsideration of priority conservation measures and innovative mitigation strategies are essential to curb further decline of these vulnerable populations. These species/populations are the highest priority for conservation action still. In most areas where these 13-taxa are taken as bycatch, laws exist to protect these animals but they are poorly enforced or have little/no mechanism to assess the effectiveness of mitigation measures.

Concerns have been expressed for many other populations of small cetaceans since the start of the small cetacean subcommittee, but in these cases data are lacking on the population size of the taxon or the magnitude of the threat. Considering the small population size and often restricted distribution, emerging threats (i.e. trophic cascades related to climate change or fishing pressure, cumulative impacts) will have further, negative impacts to the population status. As new data become

available the extent of these threats to both individual and population level health will undoubtedly become more evident. Often, data that helps inform the anthropogenic etiology of mortality and injury in cetaceans is the major challenge for conservation as it has socio-economic implications that could negatively affect local economies. In developing countries where fisheries is or the major industry, such information is counterproductive to economic gain is a further challenge to establishing effective conservation measures. Normally new data are slow in coming and sometimes by the time we understand the scope of the problem the population is already in crisis. A possible example of this scenario is the coastal bottlenose dolphins taken along with the vaquita in fishing gear.

Recently, Thomas, Reeves and Brownell (2015) reviewed the status of the world's baleen whales and some of their subpopulations. here we review the top 10 baleen whale species or populations which have less than 500 individuals remaining and are threatened by fisheries bycatch. Those listed below are the priority populations that require immediate conservation action. The following summary is from the Brownell and Mallette paper (SC/67b/HIM09) submitted to HIM Subcommittee this year in Bled.

1. *Gulf of Mexico whale* – The Gulf of Mexico (*Balaenoptera edeni* unnamed subspecies) (Rosel *et al.*, 2016) whale is currently considered to be a subpopulation of *B. edeni*, although is genetically distinct of this species (Rosel *et al.*, 2016; Corkeron and Kraus 2018). This subpopulation was recently listed as Critically Endangered on the IUCN Red List. The best estimate of abundance of this genetically distinct population (Rosel and Wilcox 2014) is 33 (CV=1.07) individuals while the minimum estimate is 16 individuals (Waring *et al.*, 2016). The cause of death of one of these whales which stranded near Wilmington, North Carolina (USA) was most likely a result of starvation attributed to the severe line entanglement Gear analysis suggested involvement in a pot related fishery (McLellan *et al.*, 2003). Due to the low genetic diversity, small population size and restricted geographic distribution the Gulf of Mexico whale is particularly susceptible to population level consequences from threats such as ship strikes, oil and gas development, and bycatch (Corkeron, Reeves, and Rosel 2017).

2. *Chile-Peru right whale*. The current subpopulation is thought to be under 50 individuals and is listed as Critically Endangered (Reilly *et al.*, 2008). In Chile, three whale deaths from human activities are known. In 1986, along the mid-southern coast of Chile a deceased calf exhibited both propeller and entanglement

injuries. In 2014, an alive whale was documented entangled with at least three ropes around the head and right pectoral flipper and could not be relocated for disentanglement or further documentation (Galletti Vernazzani *et al.*, 2014). In 2017, a whale in poor body condition was observed alive and later found dead with severe entanglement injuries that was deemed the likely cause of death (Galletti Vernazzani *et al.*, 2017). Injuries (abraded skin, affected hypodermis, lacerations and impressions from monofilament net, rope and likely multiple buoys) were documented. The main concerns for this subpopulation are entanglement in fishing gear and coastal development (Galletti Vernazzani *et al.*, 2014).

4. *Upper Gulf of Thailand Bryde's whale*. – The Bight of Bangkok Bryde's whale population has not been assessed by the IWC or on the IUCN Red List, but the population was estimated to be 63 ± 8 (S.E.) based upon photo-identification data collected between January 2010 and December 2013 (Cherdsukjai *et al.*, 2015). Mortalities attributed to interactions with fishing gear have been reported and in 1998, a 12 m long Bryde's whale was taken in a trawl in Chumphon Province. In September of 2009, a 4.5 m calf was severely entangled in a gill net targeting rays off the coast of Trang Province (Adulyanukosol *et al.*, 2012). Records of mortality and evidence of scars on the body attributed to fishery interactions (Adulyanukosol *et al.*, 2012) highlight the threat of bycatch on this small population and in potentially important feeding and nursing grounds (Thongsudee *et al.*, 2014).

5. *Arabian Sea humpback whale*. – This subpopulation is still poorly known, except that it was once more abundant off the western side of the Indian subcontinent. This subpopulation is listed as Endangered based on its geographic and genetic isolation (Pomilla *et al.*, 2014), and that it likely contains less than 100 individuals (Minton *et al.*, 2011). The major threat to these whales is bycatch and likely ship strikes to some unknown degree. However, live whales have been observed with severe entanglement scarring and live whales have been reported trapped in fishing gear since 1943 (Mathew 1948) but most entangled reports are from Oman starting in 1988 (R. Baldwin pers. comm.). Thirty to forty percent of whales documented in the Arabian Sea for which acceptable peduncle/fluke images were obtained exhibited evidence of previous entanglement (Minton *et al.*, 2011). Drift and gill net use is increasing in the Arabian Sea (FAO 2016) and poses further cause for concern.

6. *Western gray whale*. –The western Pacific gray whale subpopulation is classified as Critically Endangered on the IUCN Red List. Currently the best population estimate of the Western Breeding Stock less than 100 individuals (Cooke 2018). One significant threat to the western gray whale population involves

incidental catches in coastal net fisheries, particularly off Japan, within their migratory route (Weller *et al.*, 2008, 2014; Kato *et al.*, 2014; Nambu *et al.*, 2014). Burkanov *et al.*, (2017) characterized the risk of entanglement or entrapment of gray whales based upon fishery type, season, and region and identified trap nets (especially coastal salmon trap nets), Snurrewad and the demersal longline fishery, pot gear and bottom set gill nets as potential risks for entanglement. In 2005, three female western gray whales (one mother-calf pair and one yearling) died in fishing nets on the Pacific shore of Japan during their northward migration. In 2007, another young female western gray whale died in a trap net off the Pacific coast of Japan (Weller *et al.*, 2008, Kato *et al.*, 2013). In addition, an analysis of scarring on western gray whales found that 18.7% ($n = 28$) of 150 individuals identified between 1994 and 2005 were determined to have been previously entangled in fishing gear (Bradford *et al.*, 2009).

7. *Okhotsk Sea bowhead whale*. - This subpopulation is listed as Endangered on the IUCN Red List. and is considered genetically distinct and geographically isolated from the Bering-Chukchi Beaufort Sea bowheads (LeDuc *et al.*, 2005). Absence of sightings of bowhead whales during the Russian-Japanese systematic surveys between from 1989-2003 suggests a small population and restricted distribution within the Okhotsk Sea (Moore and Reeves 1993, Rice 1998). The most recent population estimate for this population is 218 (CV 0.22) whales in 2016 (Cooke *et al.*, 2016). Confirmed cases of mortality from entrapment in lines on deep water traps (Brownell 1999). In 2012, a mother and calf were bycaught in a salmon trap which lead to the mortality of the calf (Cooke *et al.*, 2017). Photo-ID records also show scars from injuries consistent with fishery interactions (Shap and Paramonov, 2018).

8. *Central American Humpback whale*. – The minimum population estimate for the Central American humpback whale Distinct Population Segment (DPS) is 411 individuals (CV=0.30; Wade *et al.*, 2017). This DPS appears to have a limited range within the summer feeding area off the U.S. west coast with higher numbers of individuals concentrated off the central and southern California coast (Steiger *et al.* 1991, Calambokidis *et al.*, 2001, Rasmussen *et al.*, 2011; Calambokidis *et al.*, 2009). Humpback whale entanglements on the U.S. west coast increased from 35 to 54 in 2015 and 2016, respectively (Saez *et al.*, 2013, NOAA 2017). The principal fishery type involved is Dungeness crab gear, with the highest number of confirmed humpback whale entanglements in 2015 ($n=9$) and 2016 ($n=19$), followed by entanglements in the gillnet fishery in 2015 ($n=3$) and 2016 ($n=2$; NOAA 2017). The Dungeness crab fishery poses a major threat to the conservation

of this already depleted DPS and pot and trap fisheries generally are the dominant cause of serious injury and mortality (Caretta *et al.*, 2013, 2015, 2016).

10. *Western North Pacific Right whale* - This population has two summer feeding areas. One in the southern Okhotsk Sea and northern Kuril Islands and the other in off southeast Kamchatka Peninsula north to around the Commander Islands. Hakamada and Matsuoka (2016) estimated the abundance at 1,147 whales based on sighting data collected from May to June in 2011 and 2012, and at 416 whales based on surveys conducted from July to August in 2008 off the southeastern Kamchatka Peninsula. However, these estimates have not been reviewed by the IWC Scientific Committee. In Japan, at least nine recorded animals were taken in fishing gear, mainly setnets between 1997 and 2018 or about 0.5 whales per year. The most recent estimate of whales removed from the eastern North Pacific by the Soviet whaling operations is 517 individuals (Ivashchenko *et al.*, 2017). In Japan, at least nine recorded animals were taken in fishing gear, mainly setnets between 1997 and 2018 or about 0.5 whales per year.

Of the ten baleen populations covered here, four, Gulf of Mexico Bryde's whales, western gray whales, eastern North Pacific right whales, and Chile-Peru right whales are on the IUCN Red List as Critically Endangered, and four others the Arabian Sea humpback whales, Okhotsk Sea bowhead whales, North Atlantic right whales and North Pacific right whales (western subpopulation) are listed as Endangered. Two populations reviewed here, Upper Gulf of Thailand Bryde's whales and Central American humpback whales are not listed as subpopulations on the IUCN Red List or as stocks in the IWC Schedule.

At the subspecies or subpopulation level there are five populations (Gulf of Mexico Bryde's whale, eastern North Pacific right whales, Chile-Peru right whales, Upper Gulf of Thailand Bryde's whales and Arabian Sea humpback whales) with less than 100 individuals and the remaining three populations (Central American humpback whales, North Atlantic right whales and western North Pacific right whales) have sizes between 400 and around 500+ whales. From a conservation stand point, we need to first consider and be concerned with bycatch that is known or appears to be directly threatening these populations.

Discussion

Over the past 30 years the situation for the small whales, dolphins and porpoises has worsened. One species has become extinct and 13 (species, subspecies, and subpopulations) others are on the IUCN Red List as Critically Endangered. The overall situation for the large whales has improved at the species level, except for the North Atlantic right whale. At the population level some of the most threatened, like the Antarctic blue whale, have also improved, but others, like ones discussed above, have declined. The status for some of the large whales listed above has already been recognized as critical by the Scientific Committee, and the Commission, especially those with estimated population sizes under 100 individuals. The same can be said for all the small cetacean populations with 100 or less individuals. Additional populations will emerge as in serious trouble as more data are collected on their status.

When do we start focusing on emerging conservation issues, when the population reaches a minimum of 500, 300 or 100 individuals? When does the potential need for emergency recommendations come from the CC? Clearly, if populations are going to be saved, actions will be required when they still number 400 to 500 individuals.

We have learned a lot from the decline of the vaquita in Mexico. Let's review the history of its decline. Previous estimates of abundance were 567 in 1997, but within ten years (2008) it dropped to 245, and then to 59 in 2015, and as of November 2016 only about 30 remained. Now, two more illegal totoaba fishing seasons have occurred and more vaquita deaths have been documented during that period. This coupled with the analysis of the 2017 acoustic monitoring program, data show that the decline has continued unabated. Consequently, the vaquita's extinction appears imminent.

What can the CC or the Commission do if anything to help save endangered species, subspecies or populations? At the SC meeting this year we again struggled with how to deal with the plight of the vaquita. By the time the Commission meets in 2020 the vaquita may be extinct.

For large whales, it is clear from all available sources, static fishing gear, especially lobster, shrimp and traps, setnets and gillnets are the major causes of

entanglement around the world. These entrapments and entanglements are seasonally dependent on the presence of baleen whales that coincide with their migration, feeding or breeding activities. In many parts of the world's oceans humpback whales, right whales, gray whales and bowheads in Arctic waters are the most prone to entanglements. In other areas, like Japanese and Korean waters minke whales, right whales and gray whales are most prone to bycatch in a variety of gear, but especially setnets.

In terms of their future existence, urgent attention must be given to all the baleen whales populations with fewer than 500 individuals which includes all ten of the populations we cover here in this review. In seven of these ten populations the number of countries with documented bycatch are less than four. However, few national or international programs exist to address this problem in a systematic way. A review of fishing gear across species is also needed to better understand common problems and gear types attributed to baleen whale bycatch.

We need to find ways to discover new/emerging issues at earlier stages than in the past so that we can work to reduce the threats before it is too late as it appears to be the case with the vaquita. As we have seen with the vaquita even when dealing with fishing effort in a single country, for numerous reasons solutions are complex and very difficult.

We call for dedicated a program to develop a suite of tools to address the bycatch threat to small cetaceans while improving the standard of living for the human communities that interact with these species. It will be critical to understand the human dimension of the problem as well as the technical aspects of reducing bycatch. In the case of baleen whales, a dedicated international program is needed to address trap fishing gear, especially lobster, shrimp and traps. It is not the traps or pots themselves, but all the lines associated with the lines used with this gear.

In this review, we have identified the small and large cetaceans that are of critical concern and in need of greater conservation efforts. However, further work is needed, and urgently, to develop a multidisciplinary team, including fishing gear experts, to prioritize innovative strategies and actions that might secure the future of these cetaceans. When considering bycatch issues, the CC and the Commission need to keep in mind two different aspects of the problem. First, the loss of biodiversity like the baiji in China and now the looming extinction of the vaquita in Mexico. Second, the more general aspect of reducing the bycatch of cetaceans and other megafauna.

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