



# SMALL CETACEANS, BIG PROBLEMS

*A global review of the impacts of hunting on small whales, dolphins and porpoises*



A report by Sandra Altherr and Nicola Hodgins  
Edited by Sue Fisher, Kate O'Connell, D.J. Schubert, and Dave Tilford

# SMALL CETACEANS, BIG PROBLEMS

*A global review of the impacts of hunting on small whales, dolphins and porpoises*

A report by Sandra Altherr and Nicola Hodgins  
Edited by Sue Fisher, Kate O'Connell, D.J. Schubert, and Dave Tilford

## ACKNOWLEDGEMENTS

The authors would like to thank the following people and institutions for providing helpful input, information and photos: Stefan Austermühle and his organisation Mundo Azul, Conservation India, The Dolphin Project, Astrid Fuchs, Dr. Lindsay Porter, Vivian Romano, and Koen Van Waerebeek. Special thanks also to Ava Rinehart and Alexandra Alberg of the Animal Welfare Institute for the design and layout of this report.

## GLOSSARY

### AAWP

Abidjan Aquatic Wildlife Partnership

### ACCOBAMS

Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area

### AQUATIC WILD MEAT

The products derived from aquatic mammals and sea turtles that are used for subsistence food and traditional uses, including shells, bones and organs, as well as bait for fisheries

### ASCOBANS

Agreement on the Conservation of Small Cetaceans of the Baltic, North East Atlantic, Irish and North Seas

### AWBC

Alaska Beluga Whale Commission

### CBD

Convention on Biological Diversity

### CDNP

Conkovati-Douli National Park

### CITES

Convention on International Trade in Endangered Species of Wild Fauna and Flora

### CMS

Convention on the Conservation of Migratory Species of Wild Animals

### COSWIC

Commission on the Status of Endangered Wildlife in Canada

### CPW

Collaborative Partnership on Sustainable Wildlife Management

### DFO

Federal Department of Fisheries & Oceans Ministry (Canada)

### DWC

Department of Wildlife Conservation

### ECS

Eastern Chukchi Sea

### EBS

Eastern Bering Sea

### EHB

East Hudson Bay

### EU

European Union

### ICRW

International Convention for the Regulation of Whaling

### IMARPE

Instituto Del Mar Del Peru

### IUU

Illegal, Unreported and Unregulated Fishing

### IUCN

International Union for Conservation of Nature

### IWC

International Whaling Commission

### JCNB

Greenlandic-Canadian Joint Commission for Narwhal and Beluga

### MEA

Multilateral Environmental Agreements

### MMC

Marine Mammal Commission

### MOU

Memoranda of Understanding

### NAMMCO

North Atlantic Marine Mammal Commission

### NDF

Non-Detriment Finding

### NMFS

National Marine Fisheries Service

### NOAA

National Oceanic and Atmospheric Administration

### SC

Scientific Committee (International Whaling Commission)

### SMALL CETACEANS

Small and large cetaceans is neither a biological, nor political classification, but has evolved becoming a widely used semantic term. For the purpose of this report, small cetacean refers to all toothed whales except sperm whales.

### UNEP

United Nations Environmental Programme

### UNESCO

United Nations Educational, Scientific and Cultural Organization



# TABLE OF CONTENTS

SEC. 1	EXECUTIVE SUMMARY .....	2	3.5.6	MYANMAR .....	33
SEC. 2	INTRODUCTION .....	3	3.5.7	PAKISTAN .....	33
SEC. 3	SMALL CETACEAN HUNTING – A GLOBAL PROBLEM .....	5	3.5.8	PHILIPPINES .....	34
3.1	ARCTIC REGION .....	5	3.5.9	SRI LANKA .....	35
3.1.1	ALASKA/USA .....	5	3.5.10	TAIWAN, PROVINCE OF CHINA .....	36
3.1.2	CANADA .....	6	3.5.11	VIETNAM .....	37
3.1.3	GREENLAND .....	8	3.6	OCEANIA .....	38
3.1.4	RUSSIAN FEDERATION .....	9	3.6.1	KIRIBATI .....	38
3.2	EUROPE .....	10	3.6.2	SOLOMON ISLANDS .....	39
3.2.1	FAROE ISLANDS.....	11	SEC. 4	SMALL CETACEANS IN INTERNATIONAL CONVENTIONS .....	40
3.2.2	ITALY .....	13	4.1	INTERNATIONAL CONVENTION ON THE REGULATION OF WHALING .....	40
3.2.3	TURKEY.....	13	4.2	CONVENTION ON THE CONSERVATION OF MIGRATORY SPECIES OF WILD ANIMALS .....	40
3.3	LATIN AMERICA AND THE CARIBBEAN.....	14	4.3	CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES OF WILD FAUNA AND FLORA .....	41
3.3.1	BRAZIL .....	14	4.4	CONVENTION ON BIOLOGICAL DIVERSITY .....	42
3.3.2	COLOMBIA .....	16	4.5	BERN CONVENTION .....	43
3.3.3	GUATEMALA.....	16	4.6	ABIDJAN CONVENTION/ABIDJAN AQUATIC WILDLIFE PARTNERSHIP .....	43
3.3.4	PERU .....	17	SEC. 5	SMALL CETACEANS AND FOOD SECURITY .....	44
3.3.5	VENEZUELA .....	18	5.1	CONTAMINATION BURDEN IN SMALL CETACEANS AND HUMAN HEALTH ISSUES .....	44
3.3.6	WIDER CARIBBEAN REGION.....	19	5.2	SMALL CETACEAN HUNTS DRIVEN BY INDUSTRIAL FISHING .....	47
3.4	AFRICA .....	20	SEC. 6	ECOLOGICAL AND WELFARE IMPACTS OF THE HUNTS .....	48
3.4.1	CAMEROON.....	21	6.1	SMALL CETACEAN HUNTS WORLDWIDE .....	48
3.4.2	GAMBIA, THE.....	21	6.2	SUSTAINABILITY OF THE HUNT .....	52
3.4.3	GHANA .....	22	6.3	WELFARE CONCERNS FOR SMALL CETACEAN HUNTS .....	55
3.4.4	GUINEA-BISSAU .....	22	SEC. 7	CONCLUSIONS AND RECOMMENDATIONS .....	56
3.4.5	MADAGASCAR .....	23	7.1	CONCLUSIONS .....	56
3.4.6	MAURITANIA .....	23	7.2	RECOMMENDATIONS TO RANGE STATES .....	57
3.4.7	MOZAMBIQUE .....	24	7.3	RECOMMENDATIONS TO THE IWC .....	58
3.4.8	NIGERIA .....	24	7.4	RECOMMENDATIONS TO THE CMS .....	58
3.4.9	REPUBLIC OF CONGO .....	25	7.5	RECOMMENDATIONS TO CITES .....	59
3.4.10	SENEGAL .....	25	7.6	RECOMMENDATIONS TO THE CBD .....	59
3.4.11	TANZANIA .....	26	SEC. 8	REFERENCES .....	60
3.4.12	TOGO .....	26			
3.5	ASIA .....	27			
3.5.1	INDIA .....	28			
3.5.2	INDONESIA .....	29			
3.5.3	JAPAN .....	30			
3.5.4	KOREA, REPUBLIC OF .....	31			
3.5.5	MALAYSIA .....	32			

# SECTION 1 // EXECUTIVE SUMMARY

The hunting of small cetaceans (i.e., all toothed whales, except the sperm whale) for food or fishing bait is far more widespread than most people realise. While in recent years public attention has focused on hunts in Japan (specifically in Taiji) and the Danish Faroe Islands, small cetaceans are deliberately killed at similar or even higher levels in several other regions. Overall, approximately 100,000 small whales, dolphins, and porpoises are intentionally killed each year worldwide. In most cases, these are unregulated, or even illegal, hunts. Typically, they are unsustainable and poorly documented and their impact on populations is unknown. Where legislation is in place, appropriate control and rigorous enforcement measures are often lacking. This report aims to give a global overview of the scale of small cetacean hunts, the number of individuals and species targeted, and their ecological impact.

By far, the world's largest kill of small cetaceans is in Peru, where up to 15,000 dolphins are killed annually to be used as bait in shark fisheries. Other countries (see Section 3) where direct takes of more than 1,000 individuals annually occur are Brazil, Canada, Greenland,<sup>1</sup> Ghana, Guatemala, India, Indonesia, Japan, Madagascar, Malaysia, Nigeria, Republic of Korea, Solomon Islands, Sri Lanka, Venezuela, and Taiwan, Province of China/Chinese Taipei (henceforth Taiwan (PRC)). Up to several hundred small cetaceans are hunted each year in the United States (Alaska), Cameroon, Colombia, Faroe Islands,<sup>2</sup> Guinea Bissau, Kiribati, Myanmar, Pakistan, Philippines, Papua New Guinea, Senegal, St. Lucia, St. Vincent and the Grenadines, Vietnam, and Tanzania.

While the deliberate hunting of small cetaceans is declining in some areas, in most regions the killing of small cetaceans has dramatically increased over the last two decades both in terms of number of individuals and range of species targeted. In 2004, a report for the Convention on the Conservation of Migratory Species of Wild Animals (CMS) listed 45 small cetacean species as threatened by directed catches (Culik 2004) while this report identifies 56 species that are actively hunted. Moreover, many recent studies report an increase in the number of animals killed in small cetacean hunts with regard to numbers of individuals taken (e.g., da Silva *et al.* 2018; Cunha *et al.* 2015; Salinas *et al.* 2014; Van Waerebeek

*et al.* 2014; Debrah *et al.* 2010). Mintzer *et al.* (2018) warn that dolphin hunts may expand even further in some regions.

The reasons for killing small cetaceans differ from country to country; some species have been hunted by indigenous people in a number of places around the world for millennia. In other regions, especially in parts of West Africa, Asia, and in other areas where industrialised and often illegal, unreported, and unregulated (IUU) fishing is overexploiting fish resources, small cetaceans are increasingly hunted as aquatic wild meat<sup>3</sup> to meet the protein demands of a growing human population.

An increasingly common trend is the evolution from opportunistic use of dolphins entangled in fishing nets ('bycatch'), to the growth of a market for their meat as food or fishing bait and the development of a targeted hunt to meet the ensuing demand. Some species are killed because they are perceived as competitors for commercial fish species. In many areas, small cetacean hunting is unselective—no specific species, size, or sex is targeted; instead, the most easily accessible—individuals are hunted, making river and coastal dolphins especially vulnerable to over-exploitation.

Given the high levels of contaminants that accumulate in the tissues of small cetaceans, the precarious conservation status of many populations, and their slow rate of reproduction, they are not a safe and sustainable choice to provide food security (see Sections 5 and 6). However, as fish stocks decline globally due to commercial over-exploitation, small cetacean hunts are likely to further increase unless concerted international and domestic efforts are taken to protect both cetacean and fish stocks. To facilitate such efforts, we include recommendations (see Section 7) to range states and relevant international organisations, such as the International Whaling Commission (IWC), on how to stop the escalation of small cetacean hunts.

<sup>1</sup> A self-governing overseas administrative division of the Kingdom of Denmark.

<sup>2</sup> A self-governing overseas administrative division of the Kingdom of Denmark.

<sup>3</sup> While the terms 'marine bushmeat' or 'aquatic wild meat' can be used interchangeably, this report will use the term aquatic wild meat as appropriate. This is the term used by the CMS.

## SECTION 2 // INTRODUCTION

While the meat of wild animals, including aquatic species, has long been a part of the diet of many indigenous and other coastal communities around the world, modern pressures and a growing human population has changed the balance from sustainable local use to overexploitation (Prideaux 2016). In the 19<sup>th</sup> and early 20<sup>th</sup> centuries, small cetaceans, like their larger cousins the ‘great whales’, were killed not just for their meat, but also for their blubber and other body parts, to produce lamp oil, pharmaceuticals, cosmetics, fish meal, poultry feed, fertiliser, and glue (Birkun 2002). But global conservation efforts, including the international ban on commercial whaling implemented by the International Whaling Commission (IWC) in 1986, did not address hunting of small cetaceans. Similarly, small cetaceans were ignored in early efforts to address the poaching of terrestrial wildlife for protein, known as the ‘bushmeat crisis’ (mainly in the Central Amazon, West Africa, and Asia) (Chaves *et al.* 2018; Ripple *et al.* 2016; Altherr 2007; Fa *et al.* 2002). Only in the last decade have conservation concerns been raised regarding aquatic wild meat (e.g., CMS 2017; Cosentino & Fisher 2016; Van Waerebeek *et al.* 2014; Robarbs & Reeves 2011; Sathivasam 2004).

Today, small cetaceans are mainly hunted for their meat, for human consumption (e.g., in the Arctic region, Cameroon, Japan, and the Republic of Korea) and use as bait for fisheries (e.g., in Brazil, Peru, Sri Lanka, and the Philippines). Mintzer *et al.* (2018) found that 42 species of aquatic mammals, including many small cetacean species, have been killed for bait in at least 33 countries since 1970, with at least one fishery in 21 of those countries using aquatic mammals as bait between 2000 and 2017. The killing of aquatic mammals for use as bait is most common in Latin American and Asian countries (Mintzer *et al.* 2018). Cetacean meat and blubber is considered ideal as bait due to its durability in the water, allowing it to remain attached to hooks even after extended periods of soaking, and due to its quality as an attractant due to its high blood and fat content (Mangel *et al.* 2010; Dayaratne & Joseph 1993).

Some species, including rare river dolphins, are also still targeted specifically for their oil and body parts. Their organs are used for medicinal purposes (e.g., in Colombia, Senegal, and St. Vincent and the Grenadines), their oil (derived from blubber) is

used as water-proofing for boats (e.g., in Pakistan, Tanzania, and India), and their teeth are used as a traditional currency (e.g., in the Solomon Islands). In addition to hunts for meat, bait, and other body parts and products, small cetaceans are targeted to various extents (e.g., by shooting, poisoning, spearing, and drowning) as alleged competitors for fish in, for example, Italy (Squires 2017), Turkey (Doğan News Agency 2015), the United States (Mosbergen 2014; NOAA 2012), Australia (Ross 2006), Brazil (Barrionuevo 2011; Loch *et al.* 2009), Peru (Fruet *et al.* 2018), and Taiwan (PRC) (Sui 2014).

Precise hunting statistics for small cetaceans do not exist, but Avila *et al.* (2018) identified 89 species of marine mammals that were targeted in directed hunts. A comprehensive review by Robards and Reeves (2011) found that 87 species of marine mammals (including seals and dugongs) were consumed in at least 54 countries. They predicted an escalation in the utilisation of small cetaceans caught in conjunction with fishing operations as human demand for protein increases and, indeed, the transition from accidental or opportunistic kills by fishers to directed hunts (including by assisted/targeted bycatch) is now well documented and predictable. Other key drivers of small cetacean hunts include the displacement of local human communities caused by changing land use, such as industrialised agriculture or mining, and by overfishing, particularly by distant water fleets (foreign fleets fishing in international waters or in waters under the jurisdiction of another country) and illegal, unreported, and unregulated (IUU) fishing activities (Prideaux 2016).

From the 1990s onwards, deliberations at IWC meetings and in other fora about directed hunting of small cetaceans led to legislation prohibiting hunts in many countries in Asia, Latin America, and Europe. However, while the adoption of hunting bans in combination with heightened public awareness was effective in some countries (e.g., in Argentina, Chile, and Tanzania (Zanzibar), in others the illegal landing and sale of dolphin products went unenforced or continued ‘underground’ in a black market, making detection and documentation of such use much more difficult (Porter & Lai 2017; Garcia-Godos & Cardich 2010; Acebes 2009). This report identifies at least 56 small cetacean species subject to direct hunting (see Table 5).

While habitat loss and bycatch are often identified as the primary threats to small cetaceans (IWC 2018a; Clapham & Van Waerebeek 2007; Read *et al.* 2006), directed hunts may be or become a comparable threat, both in terms of numbers taken and potential for escalation as human populations expand and demand for marine protein grows (CMS 2017; Porter & Lai 2017; Perveen *et al.* 2011; Perrin 2002), adding to the cumulative pressure many of the targeted populations are exposed to. As such, there are intrinsic links between aquatic wild meat and issues of poverty, food security, and human health, making hunts of small cetaceans not only a threat to conservation and animal welfare but also an issue which has crucial relevance in the context of the United Nation's 2030 Agenda for Sustainable Development and its 17 Sustainable Development Goals (SDGs) (OceanCare 2017a).

This report aims to give an overview of the most recent available data on small cetacean hunts worldwide, including species targeted, number of animals, known drivers of hunts, type of utilisation, capture/killing methods, and any legislative measures in place to regulate such use. It concludes that, while the deliberate hunting of small cetaceans is declining in some areas, the escalation of killing for aquatic wild meat and for use as bait in fisheries is cause for serious concern. Finally, it needs to be recalled that while the present report provides an overview about data available, we call for caution, as the scope of the problem might be even larger and hunts may be occurring in regions not discussed here.



# SECTION 3 // SMALL CETACEAN HUNTING – A GLOBAL PROBLEM

## 3.1 ARCTIC REGION

Small cetaceans have been hunted in the Arctic for millennia; however, the numbers taken in subsistence hunts by indigenous peoples has expanded in recent decades in several regions—for example, in the Canadian Arctic (Hurtubise 2016) or parts of West Greenland (Sejersen 2001). This is attributed to human population growth, which increases demand, and the introduction of modern techniques (e.g., rifles and motorised vessels), which increases both the hunters' range and effectiveness (Hurtubise 2016). Consumption of small cetacean products has also increased due to the influx of contractors working in the natural resource extraction industry (e.g., mining)—for example, in Greenland (Mahoney & Shelden 2000). In addition, changing sea ice conditions related to climate change have facilitated easier access to small cetaceans, as documented for narwhals in Smith Sound in North Greenland (Nielsen 2009).

Management measures for small cetacean hunts vary significantly between Arctic countries and even between management units within countries. Hunting of narwhals is under a quota system in all Arctic regions (Meehan *et al.* 2017), but hunting is currently limited to Greenland and Canada (Shadbolt *et al.* 2015). While Greenland and Russia have harvest quotas for belugas, hunting quotas are lacking for several beluga populations in Alaska and Canada (Meehan *et al.* 2017). Furthermore, catch limits are frequently exceeded and the actual number of animals killed is often even higher because of the large number of animals struck with a weapon but not landed (struck and lost) (Environmental Investigation Agency 2014; Mahoney & Shelden 2000).

### 3.1.1 ALASKA/USA

**Targeted species:**

beluga (*Delphinapterus leucas*)

**Numbers killed:**

around 300 individuals a year

**Type of hunt:**

directed hunt (harpoons, rifles, nets)

All Alaskan beluga populations can be hunted for noncommercial purposes but the only population subject to catch quotas is the critically endangered Cook Inlet stock (Meehan *et al.* 2017). According to the National Oceanic and Atmospheric Administration (NOAA), hunting of the Cook Inlet stock has been regulated since 1999, with the last hunt in 2005.<sup>4</sup> Apart from that stock, the only restriction for Alaskan beluga hunting is that it must not be wasteful (Hovelsrud *et al.* 2008).

The Alaska Beluga Whale Committee (AWBC), established in 1988, collects statewide hunting data

(Frost & Suydam 2010) and co-manages the stock with the National Marine Fisheries Service (NMFS).

From 2007 to 2016, the average take (not including struck and lost) of belugas was 190 in the Eastern Bering Sea (EBS), 57 in the Eastern Chukchi Sea (ECS), and 23 in Bristol Bay (NAMMCO 2018). The report listed both the EBS and ECS stocks as being of moderate conservation concern and the Bristol Bay stock as being of low concern.

Hunting methods by Alaskan first nations include harpooning, either from a boat or the ice edge, netting, and driving the animals into shallow waters, where they are killed (Hovelsrud *et al.* 2008).

Serious concerns regarding the sustainability of the hunt remain, mainly for the ECS and EBS. In the ECS, subsistence takes during 2005–2009 were 27 per cent higher than the recommended hunting limit of 74 individuals (Allen & Angliss 2010). In some years

(e.g., 2007, when the number of animals killed peaked at 270), annual kill rates have been up to 3.6 times the recommended level (Environmental Investigation Agency 2014, Allen & Angliss 2010). In the EBS, the number of whales killed in subsistence hunts has risen since the 1990s from an average of 130 during 1994–1998 to 193 during 2005–2009 (Environmental Investigation Agency 2014). The US Marine Mammal Commission (MMC) has raised concerns over the recent failure of the US to include struck and lost data for subsistence hunts in Alaska (MMC 2018).



Beluga blubber drying at Point Lay, Alaska

The beluga population in the Cook Inlet has fallen to critically low levels. The stock is classified as Critically Endangered by the IUCN and listed as endangered under the US Endangered Species Act (since 2008). Despite these protections, the population does not show any sign of recovery (Lowry *et al.* 2012): Although commercial hunting on this population ended in 1972, subsistence hunting increased sharply in the 1980s and 1990s (Mahoney & Sheldon 2000). On average, 20 per cent of Cook Inlet’s belugas were killed each year in those decades, resulting in a population decline of more than 50 per cent within the period 1994–1999 (NMFS 2003; Hobbs *et al.* 2000). The Alaska Native community suspended its hunts in 1999 and 2000, but a limited hunt resumed and five belugas were killed from 2001 through 2005 (NAMMCO 2017). In 2007, local hunters voluntarily suspended all hunting (CIMMC & NMFS 2008). As a result of legal action, an average five-year abundance estimate of 350 for Cook Inlet belugas was set as a threshold below which a catch was not allowed (NOAA/NMFS 2008). The current population is provisionally estimated to be 328 whales (Sheldon *et al.* 2017). Since 2000 the sale of Cook Inlet beluga products has been prohibited under federal law.<sup>5</sup>

<sup>4</sup> <https://www.fisheries.noaa.gov/video/species-spotlight-cook-inlet-beluga-whale>

<sup>5</sup> <https://alaskafisheries.noaa.gov/sites/default/files/march29.pdf>

### 3.1.2 CANADA

#### Targeted species:

beluga (*Delphinapterus leucas*), narwhal (*Monodon monoceros*), harbour porpoise (*Phocoena phocoena*), white-beaked dolphin (*Lagenorhynchus albirostris*), Atlantic white-sided dolphin (*Lagenorhynchus acutus*)

Numbers killed: up to 1,300 animals a year

Type of hunt: directed hunt (harpoons, rifles)

Under the Fisheries Act, commercial hunts of small cetaceans have been prohibited since 1972. Canada’s subsistence hunts of small cetaceans continued to be unregulated (Roberge & Dunn 1990) until annual quotas were put in place in 1996 by the Federal Department of Fisheries and Oceans (DFO), in collaboration with the governments of Nunavut and Nunavik. Beluga whales in the St. Lawrence Estuary are fully protected and cannot be legally hunted; the Nastapoka and Little Whale River area for EHB are now also closed (NAMMCO 2018).

‘Mattaq’ (blubber with attached skin, photo next page) and the meat of small cetaceans are shared amongst the hunters and the local community for use as food for humans and, to a lesser extent, sled dogs (Hovelsrud *et al.* 2008). Carvings from both teeth and bones are sold





in domestic and foreign markets (UNEP WCMC 2018). Male narwhals (which almost exclusively bear tusks) may be disproportionately targeted for their valuable ivory (UNEP WCMC 2018; Lowry *et al.* 2017a).

Currently, quotas for seven narwhal<sup>6</sup> and four beluga<sup>7</sup> populations (Meehan *et al.* 2017; Richard & Pike 1993) are shared among an estimated 20 communities in Nunavut and northern Quebec (Hurtubise 2016; Armstrong 2013). Annual quotas have significantly varied between 400 and 700 belugas and between 400 and 700 narwhals (Hurtubise 2016). Actual kill and landing numbers are lower: The reported beluga harvest for communities on the west coast of Hudson Bay, Southampton Island, and southeastern Baffin Island including Arviat, Baker Lake, Cape Dorset, Chesterfield Inlet, Coral Harbour, Kimmirut, Rankin Inlet, Nauyaat (formerly Repulse Bay), Whale Cove, and Igaluit ranged from a low of 172 in 2013 to a high of 331 in 2010.<sup>8</sup> The total number of reported landings for all management stocks of belugas in Nunavik and Sanikiluaq (in Nunavut) range from a low of 154 in 2016 to a high of 297 in 2015.<sup>9</sup> Landings reported of EHB belugas averaged 57.5 animals per year, including a high of 95 killed in 2015 and a low of 33 killed in 2016.<sup>10</sup>

An additional 28 per cent of hunted narwhals (NWMB 2013) and 20–60 per cent of hunted belugas, depending on whether hunts take place in shallow or deep water (Hammill *et al.* 2017 and literature cited therein), are struck and lost. Local beluga hunters, competing amongst each other, fail to report all landings and regularly exceed the allowed quota. This is especially serious in East Hudson Bay (EHB) (NAMMCO 2018; Environmental Investigation Agency 2014; COSEWIC 2004):

According to the Environmental Investigation Agency (2014), the EHB beluga quota was exceeded in as many as 23 years over a 26 year period. Although a complete closure of hunting in EHB was recommended in 2003 (de March & Postma 2003), the hunts continued. In 2004, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) highlighted the ongoing and unsustainable exploitation of the beluga stocks in Eastern and Western Hudson Bay as well as in Ungava Bay. Under a new management system, introduced in 2014, any belugas hunted outside the EHB area are proportionately counted against the EHB quota using conversion factors and depending on where the whale was killed. Accordingly, each beluga whale caught in areas outside of Eastern Hudson Bay are counted toward the total allowable take (which was 162 when this new management system was implemented) at a proportion ranging from 10 to 40 per cent depending on the hunting season and hunt location. According to Rogers (2014), this new management system introduces a high level of uncertainty into the calculation of total take. In 2017, a new three-year quota of 187 EHB belugas was set for the period April 2017–January 2020 (Frizzell 2017); a slight increase from the previous three-year quota of 180 individuals (DFO 2016). The Nunavut community of Sanikiluaq has agreed not to hunt between July 15 and September 30, the time when EHB beluga are most likely to be found (DFO 2018).

Inuit communities repeatedly refuse quotas set by the DFO, as they consider science-based recommendations to be in conflict with their traditional knowledge (Gregoire 2016; Hurtubise 2016). There are currently no restrictions on subsistence harvesting of WHB beluga (DFO 2018). According to both the IUCN and the recent global monodontid review, there is concern that Cumberland Sound belugas are still being hunted at unsustainable levels (Lowry *et al.* 2017b, NAMMCO 2018).

<sup>6</sup> Eclipse Sound; Admiralty Inlet, Somerset Island, Jones Sound, Smith Sound, East Baffin Island fjords, Northern Hudson Bay

<sup>7</sup> Western and Eastern Hudson Bay, James Bay, Ungava Bay, Cumberland Sound

<sup>8</sup> Total kill numbers include 331 in 2010, 296 in 2011, 249 in 2012, 172 in 2013, 186 in 2014, and 293 in 2015 (NAMMCO 2018, Annex 11, Table 1).

<sup>9</sup> Total kill numbers include 230 in 2010, 237 in 2011, 298 in 2012, 256 in 2013, 2093 in 2014, 297 in 2015, and 154 in 2016 (NAMMCO 2018, Annex 13, Table 3). Total number of belugas reported landed by Nunavik communities and the community of Sanikiluaq (Nunavut).

<sup>10</sup> Total landings included 54 in 2010, 56 in 2011, 56 in 2012, 54 in 2013, 62 in 2014, 95 in 2015, and 33 in 2016. (NAMMCO 2018, Annex 13, Table 4). Total number of EHB belugas reported landed by Nunavik communities and the community of Sanikiluaq (Nunavut).

### 3.1.3 GREENLAND

#### Targeted species:

harbour porpoise (*Phocoena phocoena*), narwhal (*Monodon monoceros*), beluga (*Delphinapterus leucas*), long-finned pilot whale (*Globicephala melas*), northern bottlenose whale (*Hyperoodon ampullatus*), orca (*Orcinus orca*), Atlantic white-sided dolphin (*Lagenorhynchus acutus*), white-beaked dolphin (*Lagenorhynchus albirostris*)

#### Numbers killed:

less than 3,100 individuals a year

#### Type of hunt:

directed hunts (harpoons, rifles, nets)

In Greenland, subsistence hunting is allowed under a quota system, based on Executive Order No 1 (2016) on protection and hunting of beluga and narwhal<sup>11</sup>. Inuit communities hunt small cetaceans throughout the year along shores and on ice edges, using rifles and sometimes nets (NAMMCO 2011b; Hovelsrud *et al.* 2008; Hjarsen 2005). Over the last decade, an average of 3,200 small cetaceans were killed yearly (see Table 1), most of them harbour porpoises, followed by narwhals, pilot whales (only targeted since 1998), beluga whales, and orca. While not listed in the official statistics, white-sided and white-beaked dolphins have recently also become targets of subsistence hunters (NAMMCO 2011a, b). Although hunting for beluga and narwhal, both classified in Greenland's Red List as critically endangered (Boertmann 2007<sup>12</sup>), is now limited by quotas, all other small cetacean hunts are unlimited.

By far, most small cetaceans killed in Greenland are killed in West Greenland, where human populations are concentrated. Meat and blubber are used for human consumption (Hjarsen 2005), although Bjerregaard and Larsen (2018) documented a reduction in the consumption of marine mammals (including small cetaceans), primarily in traditionally living populations in Greenlandic villages.

Narwhal hunting has intensified since the 1970s, increasing from a reported annual catch of approximately 500 in the 1970s to 683 within the period 1995–2004. An additional 15–30 per cent of the number of animals killed and landed were struck and lost over that period (Hjarsen 2005). Small cetacean hunts remained completely unregulated until 1989, when the Greenlandic-Canadian Joint Commission for Narwhal and Beluga (JCNB) was established in response to criticism of the sustainability of the narwhal and beluga hunts.

Initial management attempts by the then Home Rule Department of Fisheries, Hunting and Agriculture failed, resulting in a precipitous decline of 57 per cent of West Greenland's beluga within the period 1970–2004 (Heide-Jørgensen *et al.* 2017; Sejersen 2001). A quota system for both beluga and narwhal was finally established for West Greenland in 2004 (Meehan *et al.* 2017; Hurtubise 2016; Greenland Institute of Natural Resources (GINR) 2012), and for East Greenland in 2008 (Nielsen & Meilby 2013). Concerns continued to be expressed that the permitted catch of both species was too large (GINR 2012) and that robust abundance estimates for narwhal were not available.

NAMMCO and the JCNB have noted that the Melville Bay narwhal stock is small and likely overexploited, and that hunts in Upernavik exceed recommended quotas, prompting a high level of concern for the stock. Similar concerns have also been raised for the three stocks of narwhals off East Greenland (NAMMCO 2018). However, in West Greenland, after hunting quotas were introduced, the number of animals killed has been reduced and the beluga population is thought to be recovering from previous overhunting (NAMMCO 2016a). The hunt is now considered to be sustainable by those involved in the hunt (NAMMCO 2018).

<sup>11</sup> <http://lovgivning.gl/lov?rid=%7b482B7987-C939-4587-8940-A21E5F886C72%7d>

<sup>12</sup> <http://pbsg.npolar.no/en/issues/conservation/redlist-greenland.html>

Table 1: Hunting of small cetaceans in Greenland 2007–2016 (based on Statistics Greenland 2012, 2017)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Beluga	147	191	174	225	151	211	305	271	127	203	2,005
Harbour porpoise	2,910	1,759	2,029	2,093	2,828	2,385	2,646	2,558	1,765	2,191	23,164
Narwhal	482	467	425	268	294	361	350	415	312	401	3,775
Orca	3	26	14	15	39	44	38	16	23	14	232
Pilot whale	288	182	238	338	274	432	316	433	238	171	2,910
<b>Total</b>	<b>3,830</b>	<b>2,625</b>	<b>2,880</b>	<b>2,939</b>	<b>3,586</b>	<b>3,433</b>	<b>3,655</b>	<b>3,693</b>	<b>2,465</b>	<b>2,980</b>	<b>32,086</b>

### 3.1.4 RUSSIAN FEDERATION

#### Targeted species:

beluga (*Delphinapterus leucas*), harbour porpoise (*Phocoena phocoena*), long-finned pilot whale (*Globicephala melas*), southern bottlenose whale (*Hyperoodon planifrons*), Baird's beaked whale (*Berardius bairdii*), orca (*Orcinus orca*)

Numbers killed: less than 100 animals a year

Type of hunt: directed hunts (harpoons, rifles)

Russia prohibited all hunting of narwhals in 1956 and commercial hunting of belugas in 1999. Subsistence hunts for beluga are managed under a quota system in the White, Kara, and Laptev Seas, and in the Gulf of Anadyr (Meehan *et al.* 2017) but the number of animals taken is unknown. While several indigenous groups used to target beluga whales, as well as some unspecified dolphin species (Watanabe 2013), interviews in the 1990s suggested beluga hunting was no longer common practice and was only undertaken occasionally (Mymrin 1999).

Nevertheless, the government still sets high quotas: In 2002, the Russian Commission for Fisheries set an annual quota of 1,000 beluga whales, which was

criticised by the IWC Scientific Committee's Small Cetacean Sub-Committee as being unsustainable (Culik 2004). In 2005, the last time information was made publicly available about these hunts, a quota of 1,220–1,550 whales was reported (Environmental Investigation Agency 2014). Based on anecdotal evidence, the actual number of animals killed is much lower, with perhaps only a few dozen animals taken (Environmental Investigation Agency 2014 and literature cited therein; Huntington 2001). NAMMCO (2018) noted that the Russian government is reportedly setting quotas for the Barents Sea/Laptev Sea beluga whale stock based on outdated abundance information, and reported a high level of concern for belugas in this region due to both data deficiencies and increased anthropogenic activities.

Although current catch levels remain uncertain, there are indications of a revival of beluga hunts, at least in some regions. Since the breakup of the Soviet Union, the Chukchi (under management of the Chukotka Marine Mammal Hunting Association) and the Yup'it peoples of northeastern Russia have resumed some small-scale traditional whaling, including of beluga (Hovelsrud *et al.* 2008). A 2015 United National Educational, Scientific and Cultural Organization (UNESCO) report also documents hunters from Chukotka targeting belugas but indicates that other marine mammals are more relevant (UNESCO 2015).

A catch quota for live belugas and orcas is still permitted for the entertainment industry despite concerns about the sustainability of these takes (see Section 6.2, Box 3).

## 3.2 EUROPE

Until the late 20th century, small cetaceans were hunted in large numbers in several European countries. For example, in Norway northern bottlenose whales were intensely hunted until 1972 and an average of 54 orcas were killed each year between 1938 and 1981 (Culik 2004). Dolphins were hunted by Norwegian tuna fishers into the 1990s and their meat was ground up and used as chum for catching live bait such as mackerel or sardine used in the fishery (Cruz *et al.* 2018; DOP/IMAR 2008). Lately, an increasing number of Norwegian fishers are calling for a cull on orca (Fiskeribladet 2017).

An estimated 5.5–6.5 million dolphins and porpoises were killed in the Black Sea during the 20th century (Birkun 2002). Until a ban came into force in 1988, common dolphins were also taken in significant numbers in the Mediterranean Sea off the coast of Spain (Robards & Reeves 2011; Bearzi *et al.* 2004; Culik 2004). Recent reports indicate that several dolphin species are still hunted to be used as bait in Spanish trap and longline fisheries (Mintzer *et al.* 2018).

From the late 19th century, dolphin culls were supported by the governments of Italy, France, and the former Yugoslavia for several decades (Bearzi *et al.* 2008). Furthermore, a local population of little more than 30 orcas in the Strait of Gibraltar is still targeted by Spanish fishers who use harpoons and rifles to kill them, believing they are competitors for more lucrative

tuna. In 2004–2005, eight orcas from this small population were killed (Keeley 2007).

Two regional agreements, the Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS) and the Agreement on the Conservation of Small Cetaceans of the Baltic, North East Atlantic, Irish and North Seas (ASCOBANS), both under the auspices of the Convention on the Conservation of Migratory Species of Wild Animals (CMS), contributed to the cessation of directed hunts in Europe.<sup>33</sup> Nevertheless, anecdotal accounts of the killing of dolphins, including by harpooning or shooting, continue to garner attention in European media (WDC 2017). In Iceland, small cetaceans are also occasionally targeted, albeit opportunistically. In September 2013, 20 long-finned pilot whales out of 70 stranded on a beach in the west of Iceland were killed and their meat and blubber removed for human consumption (Whittaker 2013).

Currently, the only European country where dolphins are still legally hunted is the Kingdom of Denmark, which includes the self-governing overseas administrative divisions of the Faroe Islands and Greenland (See Section 3.1.3).

<sup>33</sup> ASCOBANS, established in 1991, came into force in 1994 and ACCOBAMS, established in 1996, came into force in 2001.

### 3.2.1 FAROE ISLANDS

#### Targeted species:

long-finned pilot whale (*Globicephala melas*), Atlantic white-sided dolphin (*Lagenorhynchus acutus*), common bottlenose dolphin (*Tursiops truncatus*), northern bottlenose whale (*Hyperoodon ampullatus*), harbour porpoise (*Phocoena phocoena*), Risso's dolphin (*Grampus griseus*)

#### Numbers killed:

500-1,700 individuals a year; 920 on average

**Type of hunt:** directed hunts (acoustic drive hunt, knives), shooting

The Faroe Islands' history of hunting small cetaceans dates back to 1584. Over the last 20 years, at least 18,405 small cetaceans have been killed (see Table 2), including 1,746 in 2017 (Føroya landsstýr 2017). The long-finned pilot whale is the main species targeted, followed by the Atlantic white-sided dolphin, common bottlenose dolphin, and harbour porpoise (under Faroese law, the harbour porpoise may only be shot).<sup>14</sup> Although Risso's dolphins are not permitted to be hunted, three were killed in 2009 (reportedly due to a case of mistaken identity) and another 21 were killed in 2010 (Føroya landsstýr 2017). Stranded bottlenose whales are recorded as being processed for human consumption as well (see Table 2). In addition to the use of pilot whales for human consumption, pilot whale organs have been used as bait for line fisheries (Bloch

2007). Despite such large annual kills, the Faroese government does not set quotas for any species (ASCOBANS 2012) and few scientific studies exist on the status of the species (see Section 6.2), raising concerns about the sustainability of the hunts.

The primary hunting method is a drive hunt, known as a *grindadráp* (or 'grind'), with significant questions remaining about the humaneness of the hunt (see Section 6.3).

The meat, intestines, and blubber of the hunted animals are heavily contaminated with mercury and organochlorines, such as polychlorinated biphenyl (PCB) and dichlorodiphenyltrichloroethane (DDT) (see Section 5). These contaminants lead the Faroese Islands Chief Medical Officer and the Chief Physician in 2008 to warn that pilot whales should not be considered fit for human consumption (Weihe & Joensen 2008). Three years later, the Faroese Food and Veterinary Authority recommended reduced consumption of pilot whale products. Nevertheless, whale meat continues to be widely consumed (see Section 5 and Box 2).

Pilot whales, in addition to directed hunts, are bycaught in the blue whiting and mackerel fisheries (Kiseleva *et al.* 2016). However, no solid data exists on numbers due to variability in the fisheries observer coverage. It is also not known what happens to the bycaught whales, as their fate does not appear to be reported by any government agency.

<sup>14</sup> <http://logir.fo/Logtingslog/56-fra-19-05-2015-um-grind-og-annan-smahval>



Hunted Atlantic white-sided dolphins, Hvalba, Faroe Islands

*Table 2: Species and numbers of small cetaceans, hunted and stranded in the Faroe Islands*

Year	Long-finned pilot whales	White-sided dolphins	Common bottlenose dolphins	Risso's dolphin	Bottlenose whales ('strandings')	Total
1998	815	543				<b>1,358</b>
1999	608					<b>608</b>
2000	588	265			3	<b>856</b>
2001	918	546	6			<b>1,470</b>
2002	626	773	18		6	<b>1,423</b>
2003	503	186	3			<b>692</b>
2004	1,012	333				<b>1,345</b>
2005	302	312			1	<b>615</b>
2006	856	622	17			<b>1,495</b>
2007	633				3	<b>636</b>
2008		1			7	<b>8</b>
2009	310	170	1	3	2	<b>486</b>
2010	1,107	14		21		<b>1,142</b>
2011	726					<b>726</b>
2012	713				2	<b>715</b>
2013	1,104	430				<b>1,534</b>
2014	48				5	<b>53</b>
2015	501				2	<b>503</b>
2016	295					<b>295</b>
2017	1,203	488				<b>1,691</b>
<b>Total</b>	<b>12,868</b>	<b>4,683</b>	<b>45</b>	<b>24</b>	<b>31</b>	<b>17,651</b>

(Official records by the Faroese Authorities<sup>15</sup>, data for 1998-1999 from heimabeiti.fo<sup>16</sup>)

<sup>15</sup> <http://www.whaling.fo/en/regulated/450-years-of-statistics/catches/>

<sup>16</sup> Data from Heimabeiti. Hagtøl-Statistics Grindir. 1998, 1999. Available at: <http://heimabeiti.fo/1986-2000>.

### 3.2.2 ITALY

**Targeted species:**

common bottlenose dolphin (*Tursiops truncatus*), common dolphin (*Delphinus delphis*), long-finned pilot whale (*Globicephala melas*), Risso's dolphin (*Grampus griseus*), striped dolphin (*Stenella coeruleoalba*)

**Numbers killed:** less than 100 a year

**Type of hunt:** commercialised bycatch, directed hunts (rifles, spears)

In Liguria and some other parts of Italy, preserved dolphin meat was consumed regularly as a traditional food known as *musciame* (Curci & Brescia 2015). Between the 1930s and 1960, common bottlenose dolphins were targeted in an effort to eradicate perceived competitors of the fishing industry in the Adriatic Sea (Bearzi *et al.* 2010, 2008). At present, Italian fishers must report any bycaught dolphins to

the authorities and bring the carcasses to the Coast Guard for documentation. However, In 2013, several restaurants in and around Rome were found to be selling dolphin meat at a price between 100 and 900 Euro per kg (Hooper 2013; WDC 2013). Additionally, in January 2014, authorities found a shipment of illegal dolphin meat in the port of Civitavecchia, near Rome. The meat was vacuum packed and, although assumed to have originated in Japan, its origins were never determined. This discovery supported the claim that there is a black market for dolphin meat in certain places in Italy (Gazetta del Sud 2014; Curci & Brescia 2015). Furthermore, recent reports indicate the use of dolphins as bait (Mintzer *et al.* 2018).

Dolphins killed by spears and hunting rifles have washed up occasionally on Italian beaches—believed to be the victims of fishers who blame dolphins for poor fishing yields (McLaughlin 2017; Squires 2017).

### 3.2.3 TURKEY

**Targeted species:**

harbour porpoise (*Phocoena phocoena*), common dolphin (*Delphinus delphis*), common bottlenose dolphin (*Tursiops truncatus*)

**Numbers killed:** less than 100 a year

**Type of hunt:** directed hunts (rifles, spears)

Turkey, which has hunted small cetaceans for more than 2,300 years, was the only country in the world that hunted them for commercial oil production (Berkes 1977). In the 1970s, 150–200 small cetaceans were processed per day for oil for domestic use or for export. Harbour porpoises accounted for about 80 per cent of total catches (Tonay & Öztürk 2012; Birkun 2002). In the 16 years preceding a ban in 1983, an estimated 200,000 dolphins were shot and processed (Tonay & Öztürk 2012) and up to 50 per cent more died when carcasses sank faster than they could be retrieved (Birkun 2002).

Despite the ban, fishers continued until the 1990s to extract oil from small cetaceans that were allegedly bycaught (Tonay & Öztürk 2012). They also targeted dolphins as competitors for fish (Birkun 2002). Despite repeated calls for a resumption of dolphin hunts (e.g., Hürriyet Daily News 2017, Adams 2002), the ban remains in place and, as a precautionary measure, dolphins<sup>27</sup> have been included in the Black Sea Red Data Book (Adams 2002).

Despite the absence of a domestic market for their products, illegal dolphin hunts still occur (Birkun *et al.* 2014): In 2015, a baby dolphin, speared and burned, was found near Bodrum (Doğan News Agency 2015) and a bottlenose dolphin killed using a shotgun was found on the beach near Istanbul (Hürriyet Daily News 2015). In April 2017, the Forestry and Water Affairs Directorate investigated fishers observed shooting at least six dolphins in Zonguldak (Hürriyet Daily News 2017).

<sup>27</sup> *Delphinus delphis*, *Phocoena phocoena*, and *Tursiops truncatus* (see <https://bit.ly/2HiPxoa>)

## 3.3 LATIN AMERICA AND THE CARIBBEAN

Small cetaceans have been used for meat and bait in commercial fisheries in several Latin American countries. In Argentina and Chile<sup>18</sup> various species of small cetacean, mainly Commerson's and Peale's dolphins, were harpooned by the thousands until the late 1990s—to be used as bait in crab fisheries (Crespo *et al.* 2017; Lescauwae & Gibbons 1994; Cardenas *et al.* 1987). In Chile, most recent reports on the hunt of Commerson and Chilean dolphins are from 2017 (Mintzer *et al.* 2018). In Mexico, small cetaceans were hunted with harpoons, guns, and gillnets until 2000, and bottlenose dolphins have been reported to be used as bait for shark fisheries even in recent years (Mintzer *et al.* 2018).

While the current number of directed kills in the region seem to be low (Fruet *et al.* 2018), there is a pattern of increasing use of small cetaceans in many South American countries, including several countries not previously known to engage in such hunts (Fruet *et al.* 2018).

In Bolivia, intentional killing of Bolivian river dolphins (*Inia boliviensis*) for food and bait has been highlighted in the Action Plan for South American River Dolphins 2010–2020 as a current threat (Fruet *et al.* 2018; Tavera *et al.* 2010). Killing of bycaught dolphins for bait using machetes was reported as recently as 2017 (Mintzer *et al.* 2018). In addition, some dolphins are shot for amusement or by sport hunters (Tavera *et al.* 2010; Aliaga-Rossel 2009). In Ecuador, small cetaceans killed as bycatch are now used as bait and it is feared that this practice could rapidly expand and lead to direct kills (Castro *et al.* 2018). For other Latin American countries, available information indicates even higher levels of hunting.

<sup>18</sup> In Chile, between 1976 and 1979, crab fisheries were responsible for the death of more than 7,600 dolphins. In the 1980s, a ban on crab nets helped to reduce the annual catch to 1,300–1,500 (Culik 2004). In the 1990s, due to the availability of alternative bait the number killed was reduced to around 600 per year. In 1995, a 30-year ban on hunting marine mammals was established via Decree No. 225 (1995). Recent reports are scarce; but according to Culik (2004) enforcement in remote areas is poor. In 2014, two fishermen were arrested for processing a Chilean dolphin.

### 3.3.1 BRAZIL

#### Targeted species:

Amazon river dolphin/boto (*Inia geoffrensis*), tucuxi (*Sotalia fluviatilis*), Guiana dolphin (*Sotalia guianensis*), franciscana (*Pontoporia blainvillei*), common dolphin (*Delphinus delphis*), false killer whale (*Pseudorca crassidens*), Atlantic spotted dolphin (*Stenella frontalis*), pantropical spotted dolphin (*Stenella attenuata*), spinner dolphin (*Stenella longirostris*), Clymene dolphin (*Stenella clymene*), striped dolphin (*Stenella coeruleoalba*), rough-toothed dolphin (*Steno bredanensis*), common bottlenose dolphin (*Tursiops truncatus*), short-finned pilot whale (*Globicephala macrorhynchus*), Fraser's dolphin (*Lagenodelphis hosei*), dwarf sperm whale (*Kogia sima*)

**Numbers killed:** several thousand a year

**Type of hunt:** directed hunts (harpoons, nets (including gillnets), knives, axes, machete)

Although the hunting, killing, and harassment of cetaceans has been strictly prohibited in Brazil since 1987, harpooning of dolphins has been documented in the northern state of Pará since 1994. Their blubber is used as shark bait in several states along the Brazilian coast (Siciliano 1994). Interviews with fishers in 2012 revealed the widespread use of dolphin meat in shark longline fisheries, with 81.5 per cent of the fishers in Bahia aware of the practice (Barbosa-Filho *et al.* 2018, 2016).

Thousands of botos and tucuxis are hunted annually for use as bait in commercial fisheries—a practice that has increased over the last decade (da Silva *et al.* 2018). Methods used include hand-harpoons, nets, spears, axes, machetes and cudgels. While oil derived from dolphins is used in some areas to treat rheumatism (Barrionuevo 2011), their flesh is the main



product, used as bait for a popular scavenger catfish, called piracatinga (see Box 1). Although the killing of botos is illegal, large areas in the Amazon region are remote, with poor monitoring and enforcement (Brum *et al.* 2015). Alleged and real conflicts with fisheries (Mintzer *et al.* 2015; da Silva & Martin 2010) are exacerbated by local legends that botos are evil (Iriarte & Marmontel 2013) which has led, in some cases, to their slaughter without any meat or other products being used (Barrionuevo 2011; Loch *et al.* 2009).

In the Mamirauá Reserve, in northwestern Brazil, more than 1,500 individuals are estimated to be killed each year (Cardiff 2014) while near the city of Tefé,

over 1,650 are killed annually (da Silva *et al.* 2011). Researchers have found annual declines of up to 10 per cent of both boto (Mintzer *et al.* 2013; da Silva *et al.* 2011) and tucuxi populations (Barnett 2014), and even a 50 per cent decline of a boto population in the Solimões River between 2004 and 2014 (Barnett 2014). The Brazilian government responded to this decline by enacting a five-year ban on piracatinga fishing in 2015. Fruet *et al.* (2018) report, however, that enforcement has been suspended due to lack of funds, and market surveys in 2017 reveal piracatinga still being sold in large numbers, suggesting that illegal killings of boto and tucuxi continue (da Silva *et al.* 2018) (see Box 1).

### Box 1: Catfish fisheries responsible for the death of thousands of freshwater dolphins

Since the 1990s, several commercial fisheries for the scavenger catfish (*Calophysus macropterus*) have operated in Latin America. The fish is called ‘piracatinga’ or ‘douradinha’ in Brazil, ‘mota’ in Colombia, ‘simi’ in Peru, ‘blanquillo’ in Bolivia, and ‘mapurite’ in the Venezuelan Amazon (Fruet *et al.* 2018; Flores *et al.* 2008).

Its exploitation is a major threat to botos and tucuxis (Fruet *et al.* 2018; Portocarrero Aya *et al.* 2010; Trujillo *et al.* 2010) whose meat and blubber is put in wooden underwater crates to rot and attract the fish. The popularity of this fishing method, first described in 2000, has spread, resulting in a commensurate increase in the number of botos and tucuxis killed (Cunha *et al.* 2015; da Silva & Martin 2010), especially in Brazil, Peru, Bolivia, Ecuador, and Venezuela. Catches of piracatinga are mainly for export to Colombia (Fruet *et al.* 2018) but it is also now consumed in Brazil, Peru, Bolivia, and Ecuador.

In some areas of the Brazilian Amazon, the annual catch of piracatinga increased by nearly 450 per cent, from 865 kg in 2003 to 23,176 kg in 2009 (Brum *et al.* 2015). Bait derived from boto—and to a lesser extent from tucuxi—is freely available, highly effective, and therefore used by the vast majority of piracatinga fishers in Brazil (Brum *et al.* 2015; Iriarte & Marmontel 2013). Consumers of piracatinga in Latin America are not aware that their consumption of the species drives the hunting of freshwater dolphins in Brazil (Cunha *et al.* 2015; Salinas *et al.* 2014).

In March 2018, an IWC workshop in Santos, Brazil, on the poorly documented takes of small cetaceans in South America highlighted gaps in legislation and poor enforcement of piracatinga fishery regulations (Fruet *et al.* 2018).



### 3.3.2 COLOMBIA

**Targeted species:**

pantropical spotted dolphin (*Stenella attenuata*), common bottlenose dolphin (*Tursiops truncatus*), Amazon River dolphin/boto (*Inia geoffrensis*), tucuxi (*Sotalia fluviatilis*), striped dolphin (*Stenella coeruleoalba*)

**Numbers killed:** hundreds a year

**Type of hunt:** directed hunts (harpoons)

The hunting of small cetaceans is common practice both in the Amazon and off the Pacific coast. In the Colombian Amazon, botos and, on a smaller scale, tucuxis have been hunted since at least the late 1980s for use as aphrodisiacs, amulets, and traditional medicine (Trujillo *et al.* 2010). The main driver of recent increases in kills is to use the meat and blubber as bait to facilitate the catch of dwindling fish stocks in the

Amazon River and its tributaries (Salinas *et al.* 2014; Robards & Reeves 2011). In 2017, Colombia responded to concerns about poaching and high mercury levels in the fish by banning the import and sale of piracatinga (Fruet *et al.* 2018).

According to Avila *et al.* (2008) dolphins were harpooned and used as bait in government shark fisheries' research expeditions in the 1980s; this subsequently became a common practice of fishers in the 1990s. According to interviews in 2015–2016 with 122 longline fishers in Bahía Solano, in the Chocó Department of Colombia, 37.3 per cent used dolphin meat as bait.

Pantropical spotted dolphins are the preferred target, as they are easier to kill than common bottlenose dolphins (Avila *et al.* 2008). Fishers tend to focus on mother-calf pairs, as they make an easier target and allow them to catch two dolphins in one hunt. Some industrial longline vessels have also hunted small cetaceans, taking an average of 10–20 dolphins in one hunt (Avila *et al.* 2008), although there are no recent figures to draw upon. Today, directed hunts by fishers still occur (Flórez-González & Capella 2010).

### 3.3.3 GUATEMALA

**Targeted species:**

spinner dolphin (*Stenella longirostris*), striped dolphin (*Stenella coeruleoalba*), common dolphin (*Delphinus delphis*), common bottlenose dolphin (*Tursiops truncatus*)

**Numbers killed:** less than 1,000 a year

**Type of hunt:** directed hunts (harpoons)

Although the hunting and intentional capture of small cetaceans is illegal in Guatemala, harpooning of dolphins is still practiced in some communities to obtain bait for shark fishing (Quintana-Rizzo 2011). Interviews with fishers in 2009 revealed that as many as three adult dolphins may be used for a single 'cimbra' (a pelagic longline of up to 15 km) (Quintana-Rizzo 2011). In 2005, more than 350 fishers were registered as owning at least one cimbra. Fishers target the common bottlenose dolphin and a species known as the 'white belly dolphin', which may be the common or striped dolphin (Quintana-Rizzo 2011).

### 3.3.4 PERU

#### Targeted species:

dusky dolphin (*Lagenorhynchus obscurus*),  
Burmeister's porpoise (*Phocoena spinipinnis*),  
common dolphin (*Delphinus delphis*), long-beaked  
common dolphin (*Delphinus capensis*), short-  
finned pilot whale (*Globicephala macrorhynchus*),  
long-finned pilot whale (*Globicephala melas*),  
Risso's dolphin (*Grampus griseus*), false killer  
whale (*Pseudorca crassidens*), pygmy killer whale  
(*Feresa attenuata*), pantropical spotted dolphin  
(*Stenella attenuata*), common bottlenose dolphin  
(*Tursiops truncatus*), pygmy beaked whale  
(*Mesoplodon peruvianus*), Cuvier's beaked whale  
(*Ziphius cavirostris*), southern right whale dolphin  
(*Lissodelphis peronii*), boto (*Inia geoffrensis*)

**Numbers killed:** 5,000–15,000 individuals a year

**Type of hunt:** transition from opportunistic to  
directed hunts (harpoons, nets)

In Latin America, the largest number of small cetaceans are illegally killed in Peru (OceanCare 2017b; Mundo Azul 2016; Mangel *et al.* 2010) both for human consumption and for shark bait (Mangel *et al.* 2010). The main species hunted are the dusky, common, and common bottlenose dolphins, as well as the Burmeister's porpoise (Alfaro-Shigueto *et al.* 2008; Van Waerebeek *et al.* 2002; Garcia-Godos 1992; Read *et al.* 1988).

Throughout the 1980s, the commercialization of small cetacean hunts increased dramatically. Harpooning, originally conducted opportunistically, evolved into a common killing method (Van Waerebeek & Reyes 1994; 1990); by the 1990s, annual directed kills had increased to an estimated 15,000–20,000 animals a year (Mintzer *et al.* 2018; Van Waerebeek & Reyes 1990, 1994; Read *et al.* 1988). Furthermore, the hunting of botos for bait in the piracatinga fishery (see Box 1) has recently developed in Peru, with an estimated annual take of 8 per cent of botos from a small population of approximately 250 animals in the Javari River (Fruet *et al.* 2018).

Peru adopted legislation banning dolphin hunts in 1996. This resulted in a significant decline in landings and less dolphin meat openly for sale at fish markets. Both unreported or underground landings and sale of meat, however, continued (Garcia-Godos & Cardich 2010;

Alfaro-Shigueto *et al.* 2008) and the level of cetacean bycatch has not declined (Mangel *et al.* 2010). Although the authorities stopped gathering dolphin kill statistics (due to the ban on dolphin hunting), in situ surveys at ports and beaches as well as interviews with fishers indicated poor enforcement of the ban, with up to 20,000 dolphins killed each year—a level similar to the years before the ban (Van Waerebeek & Reyer 1994).

Undercover investigations indicate that the illegal harpooning of dolphins in both longline and gillnet shark fisheries is still prevalent along the entire Peruvian coast (Mangel 2012). Whole dolphin carcasses are no longer landed; instead, fishers now kill small cetaceans at sea because smaller, filleted meat pieces are easier to hide and more difficult to identify (Van Waerebeek *et al.* 2002). It is estimated that between 5,000–15,000 dolphins and porpoises are killed annually in Peru, using hand-harpoons (calculation based on 500 registered longline shark fishing vessels making 10 fishing trips per year, each killing an average of 1–3 dolphins per trip) (OceanCare 2017b). A considerable amount of dolphin meat is also sold illegally in Peruvian markets for human consumption.

Recently, enforcement of the hunting ban appears to be improving, with criminal charges brought against three fishers who had killed dolphins for use as shark bait (Mares 2016). In November 2016, the Peruvian Ministry of Production banned the possession and use of 'animal harpoons' aboard fishing boats by decree (OceanCare 2016b).



Harpooned dusky dolphin, to be used as bait in Peruvian fisheries

### 3.3.5 VENEZUELA

#### Targeted species:

long-beaked common dolphin (*Delphinus capensis*), common bottlenose dolphin (*Tursiops truncatus*), Amazon River dolphin/boto (*Inia geoffrensis*), tucuxi (*Sotalia fluviatilis*), Guiana dolphin (*Sotalia guianensis*), spinner dolphin (*Stenella longirostris*), Clymene dolphin (*Stenella clymene*), Atlantic spotted dolphin (*Stenella frontalis*), Guiana dolphin (*Sotalia guianensis*)

**Numbers killed:** thousands per year

**Type of hunt:** directed hunts (harpoons, nets, rifles, machete)

Since the 1960s, small cetaceans have been hunted on a large scale in Venezuela for human consumption, oil production, and, increasingly, for bait in catfish, crab, and shark fisheries (Mintzer *et al.* 2018; Romero *et al.* 1997). Of the 20 cetacean species found in Venezuelan waters, 11 are known to be targeted in hunts. Common bottlenose and spinner dolphins are subject to the highest levels of hunting, primarily around Margarita Island off eastern Venezuela (Romero *et al.* 2001, 1997).

In 1991, the Venezuelan government estimated that 200 to 300 small cetaceans were hunted per year. Others estimated the figure to be 25–70 times higher—at between 5,000 (Aguero 1992, cited in Avila *et al.* 2008) and 21,000 (Holliday *et al.* 1996; May 1990; Gutkin 1989). While more recent statistics have not been published, hunts continue to occur. Tucuxis and botos are killed in remote areas for their blubber, used to treat respiratory diseases, and their teeth, used for necklaces (Avila *et al.* 2008). They are primarily targeted in villages along the Orinoco River for piracatinga bait (see Box 1), with an estimated minimum of 840 botos taken from 1990–2008 (Diniz *et al.* 2011, cited in da Silva *et al.* 2018). No information is available about the piracatinga trade or dolphin catches in Venezuela since 2008, when exports of piracatinga to Colombia (previously the main market) were prohibited (Fruet *et al.* 2018).

During a workshop in 2016 to establish an action plan for the conservation of freshwater marine mammals in Venezuela, illegal hunting for meat and for use as bait was identified as the major threat to small cetaceans (Herrera-Trujillo 2017).



### 3.3.6 WIDER CARIBBEAN REGION

Commercial hunts for pilot whales were carried out in the 18th and 19th centuries; more recently, however, captures of several species of small cetacean are known to occur throughout the region, including in St. Vincent and the Grenadines, St. Lucia, Trinidad & Tobago, and Dominica (Bolaños-Jiménez *et al.* 2014).

#### ST. VINCENT AND THE GRENADINES

**Targeted species:** Atlantic spotted dolphin (*Stenella frontalis*), short-finned pilot whale (*Globicephala macrorhynchus*), spinner dolphin (*Stenella longirostris*), Fraser's dolphin (*Lagenodelphis hosei*), orca (*Orcinus orca*), false killer whale (*Pseudorca crassidens*), Risso's dolphin (*Grampus griseus*), rough-toothed dolphin (*Steno bredanensis*), melon-headed whale (*Peponocephala electra*), dwarf sperm whale (*Kogia sima*), pygmy killer whale (*Feresa attenuata*), common bottlenose dolphin (*Tursiops truncatus*), Gervais' beaked whale (*Mesoplodon europaeus*), Clymene dolphin (*Stenella clymene*), striped dolphin (*Stenella coeruleoalba*), pantropical spotted dolphin (*Stenella attenuata*)

**Numbers killed:** more than 550 a year

**Type of hunt:** directed hunts (harpoons)

Detailed information on small cetacean hunts for human consumption, although conducted for many years, is scarce. The small-cetacean operation based in Barrouallie takes approximately 578 cetaceans annually, though with much variation from year to year. As for the species composition, the majority of the take is from the *Stenella* genus (~50 per cent), including both Atlantic spotted and spinner dolphins. Pilot whales make up about 25 per cent and the remaining 25 per cent comprises about 10 other species (Fielding 2018; Fielding & Evans 2014). However, official numbers reported by the Caribbean Regional Fisheries Mechanism are significantly lower (Masters 2014).

Meat and blubber from small cetaceans are consumed regularly by 64 and 55 per cent of the population, respectively (Fielding 2013). The blubber is processed to produce oil for cooking or to be used as a topical medicine, while small pieces of blubber and meat, known locally as 'crisps', are eaten throughout the country (Fielding 2013).

Orcas are also targeted (Gibbens 2017; Bolaños-Jiménez *et al.* 2014; Vail 2005), including four killed in

2015 (Gaworecky 2015), two in April 2017 (Gibbens 2017) and three in April 2018 (Chance 2018). After the 2017 kills, which triggered national and international criticism, Prime Minister Gonsalves announced that a law banning hunting would be passed (Chance 2018; Antigua Observer 2017); to date, however, none has been enacted.

In small cetacean hunts, hand harpoons are used more frequently than harpoons fired from a gun due to their higher accuracy and the cost of gunpowder (Meltzer 2017; Fielding 2000).

#### ST. LUCIA

**Targeted species:** Atlantic spotted dolphin (*Stenella frontalis*), short-finned pilot whale (*Globicephala macrorhynchus*), common bottlenose dolphin (*Tursiops truncatus*), pygmy killer whale (*Feresa attenuata*), false killer whale (*Pseudorca crassidens*), common dolphin (*Delphinus delphis*), Fraser's dolphin (*Lagenodelphis hosei*), orca (*Orcinus orca*), Clymene dolphin (*Stenella clymene*), striped dolphin (*Stenella coeruleoalba*), melon-headed whale (*Peponocephala electra*)

**Numbers killed:** more than 100 a year

**Type of hunt:** directed hunts

Small cetaceans have been routinely hunted off Castries since the early 1900s (Vail 2005; Fielding 2000). For the year 2000, St. Lucia reported a hunt of 161 small cetaceans to the IWC Scientific Committee. The government also acknowledged in reports submitted to the Convention on Biological Diversity an ongoing hunt of four adult pilot whales per year from 2006 through 2009. A 2013 government brochure notes that approximately 20 people operating out of Castries and Vieux Fort engage in small cetacean hunting for food (meat and blubber are consumed fresh, salted, or cooked in stews) and oil for medicinal purposes (Government of St. Lucia 2013).



### 3.4 AFRICA

Pressure from rapid population growth and declining fish catches has undermined traditional reluctance to consume cetaceans. Small cetacean hunts are now known to occur in many coastal countries on the continent, with meat and other body parts used for human consumption, medicinal purposes, traditional rituals, and shark bait (Weir 2010; Weir & Pierce 2013; Cosentino & Fisher 2016). A paucity of data for some countries in the region does not indicate that directed hunts or meat utilisation do not occur in those countries (Cosentino *et al.* 2016).

The socio-economic implications associated with cetacean consumption and use in many African countries are similar to those of terrestrial bushmeat. Displacement due to industrialised land use, including monoculture crops and mining, has restricted access to traditional aquatic and terrestrial foods, placing pressure on growing populations. In addition, overfishing by industrial fishing vessels from Europe, China, Taiwan (PRC), and Japan already take more fish than local artisanal fishers in the West African region by at least 20:1 (Telesetsky 2013; Bennett *et al.* 2015; Prideaux 2016). IUU fishing is also widespread in the region and transshipments at sea make it hard for port authorities to monitor how, by whom, and where transferred fish were originally caught (Daniels *et al.* 2016; Prideaux 2016).

In Benin for example, dolphins were known to be landed and traded. In recent years, stranded and bycaught cetaceans are increasingly exploited to supply a

thriving, albeit illegal, aquatic wild meat trade (Sohou *et al.* 2013). Evidence suggests that, in addition to the use of bycaught dolphins, small cetaceans are known to be targeted, consumed, and marketed in many African countries. These include Angola (Brito & Viera 2009), Cape Verde (Brito & Carvalho 2013; Hazevoet & Wenzel 2000), Gabon (Weir & Pierce 2013), Ivory Coast (Maigret 1994), Sao Tome and Principe (Cosentino *et al.* 2016), South Africa (where a humpback whale that stranded in Kwa-Zulu Natal was recently killed by locals for food and medicine (Citizen Reporter 2014), Sierra Leone (Collins 2015), and Guinea (where there is anecdotal evidence for the consumption and sale of Atlantic humpback dolphins (Collins 2015; Van Waerebeek *et al.* 2017, 2004, 2002; Bamy *et al.* 2010; Maigret 1994). In addition, CMS (2017) noted reports of smoked cetacean meat from Burkina Faso, Niger, and Mali. Weir and Pierce (2013) found evidence for directed hunts of small cetaceans in 12 out of 21 countries bordering the eastern tropical Atlantic (Mauritania to Angola) and identified the use of small cetaceans as a food source in 15 of the 21 countries.

The increase in the value of dolphin meat (or individual carcasses) suggests an escalating trade in small cetacean products despite national prohibitions. This is of particular concern in both Ghana and Nigeria, which are currently responsible for the highest documented number of kills of small cetaceans in West Africa (Van Waerebeek *et al.* 2017).

### 3.4.1 CAMEROON

**Targeted species:**

common bottlenose dolphin (*Tursiops truncatus*), pantropical spotted dolphin (*Stenella attenuata*), Atlantic humpback dolphin (*Sousa teuszii*)

**Numbers killed:** hundreds a year

**Type of hunt:** directed hunts

In 2011, 14 per cent of interviewed fishers from Kribi and Londji reported actively hunting dolphins a few times a month, while the same proportion of fishers from Eboundja reported rarely hunting dolphins (Ayissi et al. 2011). Eighty-five per cent of fishers confirmed that captured dolphins are used as food, while use for shark bait appears to be an uncommon practice. The meat from small cetaceans is cooked or smoked for local consumption (Ayissi et al. 2011). Eyewitnesses reported the killing and processing for consumption of two Atlantic humpback dolphins, one in 2012 and one in 2014 (Van Waerebeek et al. 2017).

### 3.4.2 GAMBIA, THE

**Targeted species:**

Atlantic humpback dolphin (*Sousa teuszii*), common bottlenose dolphin (*Tursiops truncatus*), short-finned pilot whale (*Globicephala macrorhynchus*)

**Numbers killed:**

unknown (estimated hundreds a year)

**Type of hunt:** commercialised bycatch

The exploitation of small cetaceans for food and, to some extent, for medicinal use was reported to occur on a minor scale during the 1990s despite such use violating national laws (Cosentino & Fisher 2016). To avoid being caught engaging in an illegal act, fishers dumped carcasses at sea or buried them on the beach (Van Waerebeek et al. 2000). Today, there is a limited trade in dolphin carcasses (many of them bycaught in shark and barracuda fisheries) for food and medicinal treatments (Leeney et al. 2015). In 2015, an entire carcass sold for US\$6. The expert flensing skills exhibited by locals suggests that cetacean landings are common (Van Waerebeek et al. 2003). Indeed, 59 per cent of fishers interviewed (n=79) admitted to eating dolphin meat (Leeney et al. 2015).



Dead Clymene dolphins

### 3.4.3 GHANA

#### Targeted species:

Clymene dolphin (*Stenella clymene*), pantropical spotted dolphin (*Stenella attenuata*), common bottlenose dolphin (*Tursiops truncatus*), melon-headed whale (*Peponocephala electra*), short-finned pilot whale (*Globicephala macrorhynchus*), long-beaked common dolphin (*Delphinus capensis*), rough-toothed dolphin (*Steno bredanensis*), Risso's dolphin (*Grampus griseus*), dwarf sperm whale (*Kogia sima*), spinner dolphin (*Stenella longirostris*), Atlantic spotted dolphin (*Stenella frontalis*), Fraser's dolphin (*Lagenodelphis hosei*), false killer whale (*Pseudorca crassidens*), pygmy killer whale (*Feresa attenuata*), Cuvier's beaked whale (*Ziphius cavirostris*)

**Numbers killed:** thousands a year

**Type of hunt:** transition from commercialised bycatch to directed hunts (harpoons, spears, nets)

Although dolphin meat was not consumed by humans until the 1980s and Ghanaian law prohibits dolphin hunting, bycatch of dolphins in commercial fisheries has gradually turned into a directed dolphin hunt. Although estimates of total numbers caught per year remain piecemeal, various reports reveal that the number of dolphins killed nationwide is likely to be in the high hundreds or even low thousands per year (Ofari-Danson *et al.* 2003; Van Waerebeek *et al.* 2014).

In terms of the numbers of individuals and species taken, Ghana's hunt is one of the largest in West Africa (Robards & Reeves 2011) and continent-wide (Cosentino & Fisher 2016).

Between 1998 and 2000, landing data provide evidence of regular dolphin catches reported for at least eight ports (Ofari-Danson *et al.* 2003). A significant increase in the scale of landings was subsequently documented from 2001–2003 (Debrah *et al.* 2010) when 822 dead dolphins were reported landed at just three ports. More recently, catch data from 2013–2014 documented an estimated 743 small cetaceans landed at the fishing village of Dixcove alone, which represents an increase of almost 400 per cent since 2003 (Van Waerebeek *et al.* 2014; Debrah *et al.* 2010).

Directed catches have been documented from at least the villages of Apam, Axim, and Dixcove (Ofari-Danson *et al.* 2003). From there, dried, salted, or smoked dolphin meat is transported to remote areas for sale, with the price of dolphin meat roughly equivalent to that of a large billfish. Higher prices are paid for dolphin meat to be used for shark bait (Debrah *et al.* 2010).

Both bycatch and deliberate hunting of the Atlantic humpback dolphin were so intensive that the species was driven to local extinction (Van Waerebeek *et al.* 2017). Furthermore, catch statistics suggest that common bottlenose dolphins are now being depleted faster than other species and the total annual catch is considered unsustainable (Van Waerebeek *et al.* 2016).

### 3.4.4 GUINEA-BISSAU

#### Targeted species:

dolphin species (most likely *Sousa teuszii*)

**Numbers killed:** hundreds a year

In a recent survey undertaken by Leeney *et al.* (2015), 37 per cent of interviewed fishers (n=259) stated that they had eaten dolphin meat. Fishers claimed to release any dolphins that were alive when caught and to use those found dead for personal consumption. Throughout the country, dolphins are used for medicinal purposes and in traditional ceremonies, particularly in the Bijagós Islands, where the oil is used to purportedly heal broken bones, cure stomach aches, and treat weakness (Leeney *et al.* 2015).



### 3.4.5 MADAGASCAR

**Targeted species:**

Indo-Pacific humpback dolphin (*Sousa chinensis*), Indian Ocean humpback dolphin (*Sousa plumbea*), spinner dolphin (*Stenella longirostris*), Fraser's dolphin (*Lagenodelphis hosei*), orca (*Orcinus orca*), melon-headed whale (*Peponocephala electra*), Indo-Pacific bottlenose dolphin (*Tursiops aduncus*)

**Numbers killed:** thousands a year

**Type of hunt:** directed hunts (harpoons, drive hunts)

Both hunting and bycatch of small cetaceans were reported extensively during interviews conducted with fishers between 2008 and 2013 (Cerchio *et al.* 2014). Coastal dolphin populations are regularly impacted by humans, with local fishers conducting unsustainable hunts from villages in the southwest of the country (Cerchio *et al.* 2009). Dolphin mortality per village can be as high as 166 dolphins annually, and dolphin meat has been sold in the past for approximately US\$1 per kilo (Cockcroft *et al.* 1997).

The Vezo people, who reside in the southwestern portions of the country, are known dolphin hunters, historically using harpoons but more recently employing

a drive-hunt technique using nets (Cerchio *et al.* 2015). Over 6,000 dolphins were taken between 1985 and 1999 from a single Vezo village, with a substantial increase in catches between 1995 and 1999 (Cerchio *et al.* 2009). The increase is likely due to a change in hunting technique (from harpoons to nets), depletion of other food resources, and increased human consumption of cetaceans throughout the 1990s (Cerchio *et al.* 2015). Cerchio *et al.* (2015) indicate that the reported mortality rate due to fisheries interactions in the southwest is almost certainly an underestimate, and that kill rates are unsustainable.

In the northwest, consumption of dolphins was previously considered taboo, and bycatch was mostly discarded. Today, however, there is mounting evidence of dolphin hunting, with both bycatch rates and consumption escalating in at least one village as a direct result of fishers setting their nets on dolphins (Cerchio *et al.* 2015).

In Madagascar, small cetaceans receive full legal protection from exploitation by Decree 93-022. Local community engagement efforts focusing on local conservation associations and dolphin-watching tourism have met with some success at mitigating hunting and bycatch (Cerchio *et al.* 2009, 2014).

### 3.4.6 MAURITANIA

**Targeted species:**

Atlantic humpback dolphin (*Sousa teuszii*), harbour porpoise (*Phocoena phocoena*), common bottlenose dolphin (*Tursiops truncatus*), dolphin sp.

**Numbers killed:** unknown

**Type of hunt:** commercialised bycatch, directed hunts (harpoons, spears)

Bycatch is known to be significant in Mauritanian fisheries and consumption of small cetaceans occurs at least occasionally (Van Waerebeek *et al.* 2004, 2003; Alfaro-Shigueto & Van Waerebeek 2001). Weir and Pierce (2013) also presented evidence of the consumption of several dolphin species, as well as directed hunts on harbour porpoises. According to Van Waerebeek *et al.* (2016) Ghanaian fishers, operating from Mauritania to Congo, actively exploit small cetaceans using fishing techniques commonly used in Ghana.

### 3.4.7 MOZAMBIQUE

**Targeted species:**

Indian Ocean humpback dolphin (*Sousa plumbea*), common bottlenose dolphin (*Tursiops truncatus*)

**Numbers killed:** unknown

**Type of hunt:** commercialised bycatch, supported bycatch (gillnets)

Traditionally, communities along the coast have consumed bycaught or stranded marine mammals (Guissamulo 2008). There are also a number of records of both incidental and intentional takes of humpback and common bottlenose dolphins using gillnets, although this is illegal (Karczmarski 2000;

Guissamulo & Cockcroft 1997, cited in Guissamulo 2008). In Maputo Bay, dolphins were hunted for meat in intertidal shallow areas (Guissamulo 2008). Consistent with other countries in the region, there has been a long-standing concern in Mozambique that increasing intentional take has evolved from incidental catches (Guissamulo & Cockcroft 1997, cited in Guissamulo 2008). More recent research conducted in 2012 found almost 20 per cent of fishers interviewed (n = 296) admitted to keeping meat from bycaught animals for medicinal purposes or food (Kiszka 2012), indicating the historical catch numbers likely still stand. According to anecdotal reports, any bycaught or stranded animals are consumed by humans regardless of condition. In 2017, for example, the body of a striped dolphin infested with parasites was consumed by humans (Gullan pers. comm. 2018).

### 3.4.8 NIGERIA

**Targeted Species:**

common bottlenose dolphin (*Tursiops truncatus*), Clymene dolphin (*Stenella clymene*), pantropical spotted dolphin (*Stenella attenuata*), Atlantic humpback dolphin (*Sousa teuszii*)

**Numbers killed:** about 10,000 a year

**Type of hunt:** assisted bycatch (gillnets)

According to Cosentina and Fisher (2016), Nigeria appears to be one of the largest consumers of small cetacean wild meat in West Africa, with recent annual catches (both accidental and intentional) estimated at 10,000 dolphins. Most are caught and killed incidental to fishing activities, with nearly all meat retained and consumed by the fisher. Other products are sold at market (Lewison & Moore 2012).

Interviews with artisanal fishers of Brass Island in the Niger Delta, conducted in 2008–09, revealed regular directed captures of various dolphin species for human consumption. Fishers admitted taking between two

and five adults with large mesh drift gillnets once every one to two weeks and selling them for 150–300 Euro each. Under such a regime, a hunter could take more than a hundred dolphins each year (Uwagbae & Van Waerebeek 2010).

Dolphin captures are known to have increased in recent years due to a nationwide economic downturn and decrease in fish sales. Most fishers of the Imbikiri community, including some identified as ‘dedicated dolphin hunters’, appear to have resorted to catching dolphins, smoking the meat, and selling it as food (Uwagbae & Van Waerebeek 2010).

Fifty-eight per cent of interviewed fishers said they intentionally caught a dolphin, either for shark bait (92 per cent of respondents) or food (8 per cent) (Uwagbae & Van Waerebeek 2010). They claimed that dolphin hunting and trading was a ‘traditional practice’, although this implies that the utilisation of dolphins as aquatic wild meat is far more prevalent than the interview data suggest. The use of dolphin meat as shark bait is a relatively new development intended to supply shark fins to the Asian market. The cost of dolphin meat has also increased in recent times, with the price of a carcass ranging between US\$300 and US\$600 (Van Waerebeek *et al.* 2017; Lewison & Moore 2012).

### 3.4.9 REPUBLIC OF THE CONGO

**Targeted Species:**

common bottlenose dolphin (*Tursiops truncatus*), Atlantic humpback dolphin (*Sousa teuszii*)

**Numbers killed:** unknown

**Type of hunt:** commercialised bycatch, assisted bycatch/directed entanglement

According to Robards and Reeves (2011) the principal species killed in the Republic of the Congo are common bottlenose and Atlantic humpback dolphins. In 2008, an Atlantic humpback dolphin was killed and distributed amongst villagers almost as soon as it was landed, while in 2009, two common bottlenose

dolphins were also killed and subsequently consumed (Collins *et al.* 2010).

Fishers in Conkouati-Douli National Park (CDNP) claimed that although dolphins were never directly targeted, those considered bycatch and reported to park authorities could be consumed. In 2009, interviews with villagers in CDNP suggested that at least one dolphin was taken annually in each of the 16 villages within the park. There is also an indication of increased commercial interest in dolphin products and some evidence of a limited trade in dolphin meat based on four seizures of smoked dolphin meat within CDNP between 2003 and 2009 (Collins *et al.* 2010).

### 3.4.10 SENEGAL

**Targeted species:**

common bottlenose dolphin (*Tursiops truncatus*), Atlantic humpback dolphin (*Sousa teuszii*), harbour porpoise (*Phocoena phocoena*), common dolphin (*Delphinus delphis*), short-finned pilot whale (*Globicephala macrorhynchus*), pantropical spotted dolphin (*Stenella attenuata*), Risso's dolphin (*Grampus griseus*), rough-toothed dolphin (*Steno bredanensis*), pygmy killer whale (*Feresa attenuata*)

**Numbers killed:** hundreds a year

**Type of hunt:** commercialised bycatch, directed catch (harpoons)

From the 1990s to at least 2001, small cetaceans were killed regularly and opportunistically (Van Waerebeek *et al.* 2000, 2003) as dolphin meat is a local commercial commodity. Most fishers were aware that dolphins are legally protected. Consequently, they dumped carcasses at sea or buried them on beaches to hide illegal hunts (Van Waerebeek *et al.* 2000).

Robards & Reeves (2011) reported the more recent targeting of six to nine different species, although a targeted harpoon hunt for dolphins may now have ceased (Leeney *et al.* 2015).

There is a growing acceptance of dolphin consumption by humans, especially of bycaught animals (Van Waerebeek *et al.* 2004). A recent survey found that 40 per cent of interviewed fishers (n=136) from the Saloum Delta had eaten dolphin meat. There is also evidence of a limited trade in dolphin meat (Leeney *et al.* 2015).

In addition to use of dolphin meat for human consumption, there is use of dolphin meat for bait in a cephalopod fishery, use of meat and body parts for traditional medicines and ceremonies, use of bones as incense, and use of oil or fat to treat rheumatism and dermatological conditions (Leeney *et al.* 2015).

### 3.4.11 TANZANIA

#### Targeted species:

Indo-Pacific bottlenose dolphin (*Tursiops aduncus*), common bottlenose dolphin (*Tursiops truncatus*), Indian Ocean humpback dolphin (*Sousa plumbea*), Indo-Pacific humpback dolphin (*Sousa chinensis*), common dolphin (*Delphinus delphis*), Risso's dolphin (*Grampus griseus*), pantropical spotted dolphin (*Stenella attenuata*), spinner dolphin (*Stenella longirostris*), rough-toothed dolphin (*Steno bredanensis*)

**Numbers killed:** hundreds a year

**Type of hunt:** decreasing directed hunts (harpoons); but still commercialised bycatch (nets)

In the early 1990s, dedicated dolphin hunting undertaken by a few villages on the southwest coast of Zanzibar was slowly replaced by a dolphin-watching industry. According to locals, tourism provides an alternative to hunting and all aspects of life were considered better after the establishment of the industry (Berggren *et al.* 2007). However, in 1996, the final year of active dolphin hunting, around 15 per cent of the total population was removed (St. Clair-Hughes 2017; Stensland & Berggren 2007).

Many uses of captured dolphins in Tanzania have been identified, including local consumption, bait for sharks

and other fish, and oil for waterproofing boats (Braulik *et al.* 2017). Historically, there have been regional differences in use of dolphin meat and other products. In Zanzibar, fishers from some villages discard bycaught individuals at sea, while elsewhere bycaught dolphins are eaten or used as shark bait in the longline fisheries. During longline season, whole dolphin carcasses were transported to Nungwi or to the central market in Zanzibar Town and sold for between US\$6 and US\$12.50 (Amir *et al.* 2002).

In 2012, interviews of fishers ( $n = 316$ ) revealed that bycaught dolphins were retained, with a significant proportion kept and consumed (63 per cent) while the rest were sold (37 per cent) (Kiszka 2012). In 2017, interviews with approximately 5 per cent of fishers who are part of the mainland fishing fleet ( $n = 573$ ) found that bycaught dolphins continued to be used, with 37 per cent eaten, 14 per cent used for bait, and 4 per cent processed for their oil, which is used to waterproof boats. Fishers reported that the remaining animals were released or discarded dead.

Although there was little evidence of commercial sale of dolphin meat, a whole dolphin was sold recently in a market on Pemba for US\$7.50–10. Researchers suggested that monitoring of fish markets may reveal that consumption and sale is more common than suggested by interview results (Braulik *et al.* 2017).

### 3.4.12 TOGO

#### Targeted species:

pantropical spotted dolphin (*Stenella attenuata*), common dolphin (*Delphinus delphis*), common bottlenose dolphin (*Tursiops truncatus*), and pygmy killer whale (*Feresa attenuata*), Atlantic humpback dolphin (*Sousa teuszii*)

**Numbers killed:** tens to hundreds a year

**Type of hunt:** transition from commercialised bycatch to directed hunts

Consistent with developments elsewhere in West Africa, opportunistic use of bycaught small cetaceans has led to directed hunts of the species (Segniabeto & Van Waerebeek 2010). Robards and Reeves (2011) did not report any small cetacean hunts in Togo, but the situation is changing and Ghanaian artisanal fishers (who constitute 70 per cent of artisanal fishers operating in Togo) have been blamed for more recent promotion of cetacean exploitation (Segniabeto *et al.* 2014). At Lomé fishing harbour, small cetaceans are landed either covertly or taken—often already processed—to smaller or more remote landing sites. Cetacean meat that is not consumed locally is salted, smoked and dried, and then traded into northern Togo, Burkina Faso, Niger, and Mali (Segniabeto & Van Waerebeek 2010; Alfaro-Shigueto & Van Waerebeek 2001).



### 3.5 ASIA

All countries of Southeast and East Asia report directed hunts for marine mammals, as well as the opportunistic use of live and dead marine mammals obtained from stranding and bycatch (Porter & Lai 2016). Elsewhere in Asia, such as in Bangladesh, there is a market for bycaught dolphins (Kurigram & Roy 2018) and dolphins are killed in small scale intentional hunts for meat, oil, and use as bait (Mintzer *et al.* 2018). The meat is used for human consumption, while the oil is used for medicinal purposes or to

waterproof boats. Demand for marine protein has recently increased in several countries due to human population growth, resulting in the evolution of dolphin bycatch into directed hunts (Porter & Lai 2017; Perrin 2002). Reductions in traditionally targeted commercial fish species, diminishing returns for traditional fishers, and an increase in market demand for marine mammal products are all factors as well (Porter & Lai 2017).

### 3.5.1 INDIA

#### Targeted species:

South Asian river dolphin (*Platanista gangetica*), Indo-Pacific finless porpoise (*Neophocaena phocaenoides*), spinner dolphin (*Stenella longirostris*), common dolphin (*Delphinus delphis*), Indo-Pacific humpback dolphin (*Sousa chinensis*), Indian Ocean humpback dolphin (*Sousa plumbea*), Indo-Pacific bottlenose dolphin (*Tursiops aduncus*), common bottlenose dolphin (*Tursiops truncatus*), pantropical spotted dolphin (*Stenella attenuata*), Risso's dolphin (*Grampus griseus*)

**Numbers killed:** thousands a year

**Type of hunt:** directed hunts (gillnets)



Poached Gangetic dolphin, Bhabanathola, Malda district, West Bengal, December 2017

Thousands of small cetaceans are intentionally killed annually for food, medicine, and bait (Porter & Lai 2017; Kumarran 2012; Yousuf *et al.* 2009) despite a prohibition on hunting under the Indian Wildlife Act of 1972. Implementation and enforcement of the hunting ban in India is weak (Kumarran 2012). Small cetaceans, including the endangered Indian Ocean humpback dolphin and Indo-Pacific finless porpoise, are targeted and marketed along the west coast of India and there is an open market for cetacean meat in several locations in the states Goa, Karnataka, and Kerala (Kumarran 2012).

Yousuf *et al.* (2009) estimated that 9,000–10,000 cetaceans are bycaught in gillnets every year but noted that the figure was likely an underestimate. Indeed, Kumarran (2012) estimated that 2,000 cetaceans are bycaught per year in Karnataka alone. Dolphin meat is used as bait in longline fisheries for sharks and tuna near Kakinada and Kanyakumari, in the Indian states of Andhra Pradesh and Tamil Nadu, respectively (Sathasivam 2004). A former large drive fishery operating in the Lakshadweep archipelago off the southern coast of India (Lal Mohan 1985) has largely ended, although a recent survey of 40 fishers in the area indicated that some traditional hunting might still continue (Panicker 2017).

The recently developed Conservation Action Plan for the Ganges river dolphin notes that this endangered species is under threat from poaching throughout its range. It also reiterates that ongoing demand for dolphin products provides little incentive for fishers to reduce bycatch or to release live entangled dolphins (Sinha *et al.* 2010). The species is killed for food, as a liniment and aphrodisiac, for its oil to waterproof boats, and for bait to catch two valuable but declining catfish species, *Eutropiichthys vacha* and *Clupisoma garua* (TRAFFIC India 2017; Sinha & Kannan 2014; Mishral 2011; Sinha *et al.* 2010). In Bihar alone, an estimated 25–30 Ganges river dolphins are poached annually (Mishral 2011).

## 3.5.2 INDONESIA

### Targeted species:

pygmy sperm whale (*Kogia breviceps*), orca (*Orcinus orca*), spinner dolphin (*Stenella longirostris*), short-finned pilot whale (*Globicephala macrorhynchus*), Risso's dolphin (*Grampus griseus*), Fraser's dolphin (*Lagenodelphis hosei*), Irrawaddy dolphin (*Orcaella brevirostris*), melon-headed whale (*Peponocephala electra*), false killer whale (*Pseudorca crassidens*), pantropical spotted dolphin (*Stenella attenuata*), common bottlenose dolphin (*Tursiops truncatus*), Indo-Pacific bottlenose dolphin (*Tursiops aduncus*), Blainville's beaked whale (*Mesoplodon densirostris*), Cuvier's beaked whale (*Ziphius cavirostris*)

**Numbers killed:** hundreds to thousands a year

**Type of hunt:** directed hunts (tiger nets, harpoons, homemade explosives)

Small cetaceans are killed in three types of hunts in Indonesia:

**Traditional hunt:** The villages of Lamalera (Lembata Island) and Lamakera (Solor Island) have long been known for their hunting of sperm whales and small cetaceans to provide food for the community (Porter & Lai 2017). Today, hunting only continues in Lamalera (Mustika 2011, 2006). These hunts are permitted by the Indonesian government, as they are considered traditional subsistence hunts.

In recent years, modern hunting equipment (including motorboats and dynamite) have replaced traditional sailboats. Also, since 2001, in response to declining sperm whale catches islanders have increasingly targeted small cetaceans (Porter & Lai 2017; Mustika 2006), with 140 orca killed in 2003 and more than 140 other small cetaceans killed annually from 2002 to 2004 (Mustika 2006).

Although commercial use is prohibited, an increase in kills is likely motivated by the commercial value of meat, oil, bones, and teeth, which are sold at market. Fishers also receive payment from tourists and journalists for allowing them to observe the hunts (Sands 2018, 2017; Emont 2017; Mustika 2006). Following discussions between the Ministry of Fisheries and stakeholders about the increasing commercialization of the hunts, stricter regulations were said to come into force later in 2018 (Sands 2018).

**Tiger nets:** Small cetaceans have been taken deliberately in 'tiger nets', also called 'experimental nets', that are strategically positioned to catch extremely high numbers of large migratory marine species. These large mesh nets can span hundreds of metres and are set in migratory corridors or island passages. A single net set in the pelagic migratory corridor of Tangkoko, in the Manado area, was found to catch over 577 pilot whales and 312 unidentified dolphins during one 11-month 'set'. All marine species killed using this method were processed into pet food for export (Kahn 2002). Current information about this practice is not available.

**Illegal commercial hunt:** Indonesia has by far the largest shark fishery in the world, including a small-scale longline fishery. The use of dolphin blood to attract sharks and the illegal use of dolphin meat for bait has become more common in recent years. At a 2013 workshop held in Bali to identify the extent of small cetacean bycatch, directed catches for human consumption or bait in Lampung (Sumatra), Kei Islands (Maluku), Central Sulawesi, and East Nusa Tenggara were identified as threats to small cetaceans (Mustika *et al.* 2014). Hunting methods include the use of harpoons, even in protected areas such as Berau, near East Kutai, Sumatra (CMS 2015).

Surveys in Lombok and Bali showed that whole dolphin carcasses are landed very early in the morning to avoid inspections, or individuals are flensed at sea and used directly as bait on longlines to catch sharks (O'Barry 2017). Undercover surveys in 2010 found dolphin meat for sale in the local fishing markets in Bagansiapiapi, Riau Province, Sumatra (O'Barry undated).

### 3.5.3 JAPAN

#### Targeted species:

Dall's porpoise (*Phocoenoides dalli*, *dalli*- and *truei*-types), short-finned pilot whale (*Globicephala macrorhynchus*, northern and southern forms), Risso's dolphin (*Grampus griseus*), Pacific white-sided dolphin (*Lagenorhynchus obliquidens*), false killer whale (*Pseudorca crassidens*), pantropical spotted dolphin (*Stenella attenuata*), striped dolphin (*Stenella coeruleoalba*), common bottlenose dolphin (*Tursiops truncatus*), Baird's beaked whale (*Berardius bairdii*), rough-toothed dolphin (*Steno bredanensis*), melon-headed whale (*Peponocephala electra*), Hubbs' beaked whale (*Mesoplodon carlhubbsi*), ginkgo-toothed beaked whale (*Mesoplodon ginkodens*), Indo-Pacific bottlenose dolphin (*Tursiops aduncus*), pygmy sperm whale (*Kogia breviceps*), dwarf sperm whale (*Kogia sima*), Northern right whale dolphin (*Lissodelphis borealis*), orca (*Orcinus orca*)

**Numbers killed:** less than 3,000 a year; after a constant decline from 46,000 in 1993

**Type of hunt:** directed hunts (acoustic drive hunts, harpoons, spears, knives)

In response to an IWC prohibition on hunting large whales for commercial purposes, which took effect in 1986, the hunting of small cetaceans increased in Japan, peaking in 1993 at more than 46,000 animals. Following the depletion of striped dolphin populations, Dall's porpoise became a heavily targeted species (Adam 2008) with more than 50 per cent of the population removed between 1988 and 1998 (Culik 2004). Japanese scientists (e.g., Miyashita & Kasuya 1988), the IWC Scientific Committee, and the IWC (via several resolutions, e.g., 1990-4, 1992-10, 1999-9, 2001-12) expressed serious concerns about the scale of small cetacean hunting.

In 1993, the Japanese government began setting annual catch limits (see, e.g., Japan Fisheries Agency 2006–2016). Under a licensing system established by the government to ostensibly regulate take, thousands of dolphins, porpoises, pilot whales, and beaked whales are killed annually in Japanese waters in acoustic drive hunts, in hand-harpoon fisheries, and via 'small-type whaling' (see Table 3). Currently, approximately 1,500 Dall's porpoises are killed per year (see Table 3); this is much lower than the authorised take quota of more than 15,000 animals, and several prefectures have drastically reduced or even stopped their hunts (e.g., Hokkaido,<sup>19</sup> Iwate,<sup>20</sup> and Miyagi<sup>21</sup>). While most cetaceans are destined for consumption, common bottlenose dolphins are reportedly also used as bait in fisheries (Mintzer *et al.* 2018).

According to Japan's annual progress reports a total of 173,662 small cetaceans were killed in the period 2000–2016 (Japan Fisheries Agency 2000–2016). However, official hunting records do not include struck and lost animals, nor do they consider the impact that drive hunts—which also remove live individuals for the aquarium industry—may have on the viability of a pod (see Box 3). Furthermore, the government is authorising the killing of an expanded number of small cetacean species. In 2017, for example, it established a new quota for take in Taiji of rough-toothed dolphins and melon-headed whales (Palmer 2017).



Body parts of small cetaceans, Japan

<sup>19</sup> From 2005, when more than 1,290 Dall's porpoises were killed in waters off Hokkaido, Japan, the number of porpoises killed declined until it reached zero in 2010.

<sup>20</sup> Over the past 15 years, the number of Dall's porpoise hunted in waters off Iwate, Japan, has declined from 15,080 in 2001 to 1,058 in 2016, a decline of almost 90 per cent.

<sup>21</sup> The number of small cetaceans killed in waters off Miyagi, Japan, dropped from 280 individuals in 2000 to 53 in 2015.



**Table 3: Small cetaceans hunted in Japan, based on Annual Progress Reports  
(Japan Fisheries Agency 2000–2016)**

Year	Dall's porpoise (dalli- and truei-type)	Striped dolphin	Pantropical spotted dolphin	Bottlenose dolphin	Risso's dolphin	Short-finned pilot whale, southern form	Short-finned pilot whale, northern form	False killer whale	Baird's beaked whale	White-sided dolphin	Total
2000	16,171	300	39	1,358	506	254	50	8	62	-	18,748
2001	16,650	484	10	247	474	342	47	26	62	-	18,342
2002	15,949	642	418	729	386	129	47	7	62	-	18,369
2003	15,720	450	132	164	373	118	42	16	62	-	17,077
2004	13,790	637	2	537	504	163	13	3	62	-	15,711
2005	14,664	457	13	361	394	154	22	1	66	-	16,132
2006	12,014	515	405	372	344	264	7	35	63	-	14,019
2007	11,357	470	16	401	517	338	-	4	67	-	13,170
2008	7,226	593	323	334	338	180	-	5	67	16	9,082
2009	9,745	419	3	335	422	294	-	1	67	20	11,306
2010	4,919	556	116	266	387	44	-	0	66	10	6,364
2011	1,952	494	106	94	360	114	-	10	61	3	3,194
2012	405	600	110	131	216	206	-	0	71	2	1,741
2013	1,293	564	85	177	324	144	-	1	62	10	2,660
2014	1,636	430	128	129	356	60	-	3	70	1	2,813
2015	1,592	375	59	224	224	109	-	1	57	7	2,648
2016	1,059	635	22	163	233	107	-	-	61	6	2,286
<b>Total</b>	<b>146,142</b>	<b>8,621</b>	<b>1,987</b>	<b>6,022</b>	<b>6,358</b>	<b>3,020</b>	<b>228</b>	<b>121</b>	<b>1,088</b>	<b>75</b>	<b>173,662</b>

### 3.5.4 KOREA, REPUBLIC OF

#### Targeted species:

common dolphin (*Delphinus delphis*), short-finned pilot whale (*Globicephala macrorhynchus*), Risso's dolphin (*Grampus griseus*), Pacific white-sided dolphin (*Lagenorhynchus obliquidens*), common bottlenose dolphin (*Tursiops truncatus*), Baird's beaked whale (*Berardius bairdii*), Cuvier's beaked whale (*Ziphius cavirostris*), Stejneger's Beaked Whale (*Mesoplodon stejnegeri*), orca (*Orcinus orca*), false killer whale (*Pseudorca crassidens*), Blainville's beaked whale (*Mesoplodon densirostris*), Indo-Pacific finless porpoise (*Neophocaena phocaenoides*), harbour porpoise (*Phocoena phocoena*), Dall's porpoise (*Phocoenoides dalli*)

**Numbers killed:** thousands a year

**Type of hunt:** commercialised bycatch, supported bycatch (nets)

The directed catch of all cetacean species has been prohibited since 1986, yet an abundance of whale and dolphin products are sold in many markets and restaurants throughout the country. Legislation permits the domestic sale and consumption of bycaught individuals as long as the incident is reported to the Maritime Police. This appears to provide cover for deliberate bycatch of dolphins, including by herding large numbers toward nets (Kang & Phipps 2000). DNA analyses of products purchased during systematic market surveys from 2003–2005 identified several small cetacean species that were not recorded in official bycatch records (Endo *et al.* 2007; Baker *et al.* 2006). In addition, the amount of dolphin meat sold in several cities, which reportedly originated from bycatch, exceeded official bycatch records (Baker *et al.* 2006).

While the South Korean government has advocated for a 'release alive' policy since 1998, fishers appear to have little incentive to comply, given the commercial

value of cetacean meat and a belief that dolphins are competitors for dwindling fish stocks (MacMillen & Han 2011). Indeed, according to fish wholesalers, about 70 per cent of 'whale' products in markets are dolphins or porpoises (Jeonghee 2012). Another market survey in 2010 found that an unknown proportion of dolphins and other small cetaceans are privately sold or consumed directly by locals (MacMillen & Han 2011).

The commercial value of small cetacean products is evidenced by the fact that in 2005 the city of Ulsan planned to build a factory to process whale and dolphin meat. These plans were cancelled shortly after becoming public in response to international criticism.<sup>22</sup>

In October 2010, the government introduced new regulations requiring registration of bycaught cetaceans

and the issuance of a cetacean trade certificate for each cetacean sold (Kim *et al.* 2013; Li 2013). This resulted in significantly higher reporting of bycaught animals, from an average of about 400 per year in the 2000s (An & Kim 2006) to 1,047 and 2,548 in 2011 and 2012, respectively (Kim *et al.* 2013). The most highly affected species were the Indo-Pacific finless porpoise, common dolphin, harbour porpoise, and Pacific white-sided dolphin.

Although the supply of illegally sourced cetaceans seems to be declining, the number of dolphin meat shops (Li 2013) and the price of bycaught meat (Jeonghee 2012) is increasing. This growth may encourage misreporting of directed hunts as bycatch.

<sup>22</sup> <http://www.ens-newswire.com/ens/jun2005/2005-06-15-04.html>

### 3.5.5 MALAYSIA

#### Targeted species:

pantropical spotted dolphin (*Stenella attenuata*), spinner dolphin (*Stenella longirostris*), common bottlenose dolphin (*Tursiops truncatus*), Irrawaddy dolphin (*Orcaella brevirostris*), Indo-Pacific finless porpoise (*Neophocaena phocaenoides*)

**Numbers killed:** thousands a year

**Type of hunt:** commercialised bycatch, opportunistic and regular directed hunts

Hunting, catching, or selling of any marine mammal found in Malaysian waters is illegal under the Fisheries Act of 1985 and Fisheries Regulations of 1999. Nevertheless, in some regions of Sabah and Sarawak, East Malaysia, dolphins are killed—both incidentally and deliberately—for human consumption and for use in traditional ceremonies (CMS 2015). While the total number of dolphins killed has decreased since the 1990s, it has not stopped. According to interviews with fishers in Sabah, within the period 1997–2004 approximately 4,626 dolphins (mainly *Tursiops* spp. and *Stenella* spp.) were killed each year. According to the interview results, 11 per cent of fishers confirmed that they continued to kill dolphins at least occasionally

or opportunistically, using their meat for human consumption or shark bait (Jaaman *et al.* 2005, 2008). Unpublished information indicates that the hunts are ongoing (Hodgins pers. comm. 2018).

In Sabah, spinner dolphins were targeted by 95 per cent of interviewed fishers, bottlenose dolphins by 70 per cent, and spotted dolphins by 29 per cent. Larger cetacean species were not targeted due to limited space on the vessels. Irrawaddy dolphins were spared from directed kills due to a cultural taboo, although incidentally caught Irrawaddy dolphins are used for human consumption or shark bait (Jaaman *et al.* 2005).

Dolphins are killed with harpoons (locally known as 'bujak', 'tempuling', or 'sangkir'), spears, dynamite, and fishing nets (Jaaman *et al.* 2008). Unfortunately, the prescribed punishment for killing a dolphin is rarely meted out and therefore has not served as a deterrent. For example, while the maximum penalty for killing marine mammals is a fine of up to US\$12,500 and/or imprisonment of up to five years, in 1999 three fishers were caught with 12 dead dolphins and sentenced to just six months in jail (Jaaman *et al.* 2008). In Sarawak, interviews with local fishers revealed that direct hunting of small cetaceans still occurs in the fishing district of Sebuyau, where Irrawaddy dolphin meat is used as bait for puffer fish (CMS 2015).

### 3.5.6 MYANMAR

**Targeted species:**

Indo-Pacific bottlenose dolphin (*Tursiops aduncus*), spinner dolphin (*Stenella longirostris*), Irrawaddy dolphin (*Orcaella brevirostris*), Indo-Pacific humpback dolphin (*Sousa chinensis*), Indo-Pacific finless porpoise (*Neophocaena phocaenoides*)

**Numbers killed:** hundreds a year

**Type of hunt:** commercialised bycatch, directed hunts (harpoons)

Both bycatch and directed catch of small cetaceans appear to be common in coastal waters in southeastern Myanmar, with fishers in the areas of Myeik and Dawei involved in hunts using hand-

harpoons (Tun 2006). During a field survey in autumn 2005 and spring 2006, dolphin meat (dried and salted), skin, fins, and internal organs were found every day at market. Fish sellers estimated that two or three dolphins per month could be found in the fish market in Myeik, while approximately 30 cetaceans were available per month at the Maungmagan fish market (Tun 2006). Over one year this would correspond to several hundred dolphins (Tun 2006). At least four dolphin and one porpoise species have been identified at the fish markets, with Indo-Pacific bottlenose and spinner dolphins being the most common species available for sale. The price for a whole dolphin was about US\$35 (Tun 2006). According to Tun (2006), local people are not aware of the protected status of Irrawaddy dolphins. Robards & Reeves (2011) estimate the total number of small cetaceans killed annually in Myanmar to total a few hundred individuals.

### 3.5.7 PAKISTAN

**Species targeted:**

Risso's dolphin (*Grampus griseus*), Indian Ocean humpback dolphin (*Sousa plumbea*), spinner dolphin (*Stenella longirostris*), Indo-Pacific bottlenose dolphin (*Tursiops aduncus*), Indo-Pacific finless porpoise (*Neophocaena phocaenoides*)

**Numbers killed:**

unknown, but estimated up to hundreds a year

**Type of hunt:**

commercialised bycatch, directed hunts

While Robards and Reeves (2011) did not report dolphin hunting in Pakistan, recent information indicates that dolphins are actively hunted: In addition to the opportunistic exploitation of dolphin bycatch, dolphins are intentionally killed for use as bait in fisheries, for food, for medicinal purposes, and, in the case of Indo-Pacific finless porpoises, for sexual gratification (Gore *et al.* 2012).

Fishers in the Indus Delta and along the Balochistan coast use humpback dolphin oil to treat rheumatism and waterproof their boats (Kiani & Van Waerebeek 2015). Many fishers reported that they or others had killed or used cetaceans, yet the wholesale price for an entire dolphin was only US\$0.35 (Gore *et al.* 2012). Reports of cetacean meat being used as bait for shark fishing are of particular concern, since shark fishing has been intensifying as a consequence of the demand for shark fins in Asia (Gore *et al.* 2012). Directed takes along the Balochistan coast, driven by demand for bait in shark fisheries, have reportedly declined following a decline in shark stocks (Kiani & Van Waerebeek 2015).

### 3.5.8 PHILIPPINES

#### Targeted species:

spinner dolphin (*Stenella longirostris*), Fraser's dolphin (*Lagenodelphis hosei*), pantropical spotted dolphin (*Stenella attenuata*), common bottlenose dolphin (*Tursiops truncatus*), Indo-Pacific bottlenose dolphin (*Tursiops aduncus*), Risso's dolphin (*Grampus griseus*), melon-headed whale (*Peponocephala electra*), short-finned pilot whale (*Globicephala macrorhynchus*), pygmy killer whale (*Feresa attenuata*), Irrawaddy dolphin (*Orcaella brevirostris*), striped dolphin (*Stenella coeruleoalba*), pygmy sperm whale (*Kogia breviceps*), dwarf sperm whale (*Kogia sima*), Blainville's beaked whale (*Mesoplodon densirostris*)

**Numbers killed:** hundreds a year

**Type of hunt:** commercialised bycatch, opportunistic hunts, directed hunts (harpoons, guns, spears, whale hook, dynamite)

Both historically and currently, at least 29 fishing villages in the Philippines have been reported to hunt cetaceans in small-scale hunts. In the southern parts of the country a group of indigenous people known as Badjaos consume dolphins as part of their traditional diet. Several of these small-scale hunts still occur (CMS 2017).

From at least the early 1970s, commercial hunting of dolphins has been conducted in several islands, with the meat used for human consumption and as bait in fisheries for chambered nautilus (CMS 2015; Dolar *et al.* 1997) and sharks (Mintzer *et al.* 2018), among others. The Negros, Palawan, Panay, Pamilacan, Selinog, Bohol, Camiguin, Mapun (Badjao), Booan, and Kinapusan Islands are the principal islands where dolphin hunts occur (Dolar *et al.* 1997). In the 1990s, the total number of small cetaceans killed in the hunts was estimated at a minimum of 800 animals per year, with most being killed by fishers on Negros Island. In addition, struck-and-lost rates of between 10 and 33 per cent of total take were reported.

Dolphins are hunted using hand-harpoons and, increasingly, toggling harpoons.<sup>23</sup> Other methods, such as the use of dynamite to kill small cetaceans, have been documented. In 2014, for example, two dwarf sperm whales and 21 dolphins, destined for human consumption, were killed using dynamite (Legarda 2014). The most frequently targeted species are bottlenose, spotted, and Risso's dolphins, as well as short-finned pilot whales (Culik 2004; Dolar *et al.* 1997, 1994).

Legislation, which came into force in 1992, to protect dolphins by banning the taking, catching, selling, purchasing, possessing, transporting, or exporting of dolphins (with some exceptions for the capture of live dolphins for public exhibition) did not stop the dolphin hunts. Instead, it served to drive the activities and the market underground (Acebes 2009; Dolar *et al.* 1994). Although many are aware of the laws prohibiting the killing of dolphins, they continue to be ignored by some people in local communities and efforts to enforce the law by the responsible government agencies is inadequate (Acebes 2009, Perrin 2002).

According to a survey of fishers from former whaling locations on the islands of Pamilacan, Camiguin, and Salay, the province of Misamis Oriental, and elsewhere who fish in the Sulu-Sulawesi Marine Ecoregion, whales and dolphins continue to be caught directly, incidentally, and opportunistically (Acebes 2009); in 2014, for example, two dwarf sperm whales and 21 dolphins were dynamited for human consumption (Legarda 2014).

<sup>23</sup> A toggling harpoon is an ancient weapon used to impale a whale. Unlike earlier harpoons that had only one point, toggling harpoons have two points. One is attached to the base and the other fits over the first point and is attached using sinew or similar materials. When the toggling harpoon is used, the top point detaches and twists into the animal under his/her skin, making it impossible to remove the remainder out of the harpoon out of the animal while pulling the animal back to ship or shore.

### 3.5.9 SRI LANKA

#### Targeted species:

spinner dolphin (*Stenella longirostris*), common bottlenose dolphin (*Tursiops truncatus*), Indo-Pacific bottlenose dolphin (*Tursiops aduncus*), striped dolphin (*Stenella coeruleoalba*), pantropical spotted dolphin (*Stenella attenuata*), Risso's dolphin (*Grampus griseus*), rough-toothed dolphin (*Steno bredanensis*), Fraser's dolphin (*Lagenodelphis hosei*), common dolphin (*Delphinus delphis*), melon-headed dolphin (*Peponocephala electra*), pygmy killer whale (*Feresa attenuata*), false killer whale (*Pseudorca crassidens*), dwarf sperm whale (*Kogia sima*), pygmy sperm whale (*Kogia breviceps*), southern bottlenose whale (*Hyperoodon planifrons*)

**Numbers killed:** 1,500–2,000 a year, down from thousands a year in the 1990s

**Type of hunt:** commercialised bycatch, directed hunts (hand-harpoons, nets, dynamite)

Historically, dolphin meat was used for local human consumption in some areas (Lantz & Gunasekera 1955). In the early 1990s, a commercial market developed for dolphin meat from dolphins incidentally captured in industrial fisheries. Since dolphin meat became a commercial commodity, the capture of cetaceans, both deliberate and incidental, has increased sharply as a source of revenue to compensate for poor fish catches (Robards & Reeves 2011; Ilangakoon *et al.* 2000a; Dayaratne & Joseph 1993). Porter and Lai (2017) suggest that the recent cessation of human conflicts in Sri Lanka has revitalised the traditional market for marine mammals.

According to a survey conducted in 1991–1992 by the Sri Lankan National Aquatic Resources Agency (NARA), the total number of landed small cetaceans was estimated at 5,000 animals per year—with 70 per cent bycaught in tuna and shark fisheries and the remainder killed through direct takes using harpoons (Dayaratne & Joseph 1993). Hand-harpoons are used to kill small cetaceans in the waters off the coastal cities of Negombo, Beruwala, Mirissa, and Dondra, where anecdotal information indicates the hunts continue (Hodgins pers. comm. 2018; Ilangakoon 2012).

At least 14 species of small cetaceans are killed in Sri Lanka, with spinner (> 50 per cent), bottlenose, striped, spotted, and Risso's dolphins being the most common species landed (Ilangakoon *et al.* 2000b; Dayaratne & Joseph 1993). Although the price of dolphin meat is significantly lower than that of mackerel, tuna, beef, or chicken, the amount sold for local consumption was equal to that used as bait in the shark longline fishery (Dayaratne & Joseph 1993). The Sri Lankan government responded to NARA's alarming report by adopting laws to protect small cetaceans in Sri Lankan waters. Nevertheless, according to surveys in 1994 in Beruwala and Negombo, the geographic size of the hunting area increased, as did the number of dolphins killed (Ilangakoon *et al.* 2000a, b).

While reports on deliberate killings in Sri Lanka have become scarce, there are regular reports of dolphin-killing incidents. In January 2013, for example, more than 50 dolphins were killed in Kalpitiya, using nets and dynamite (Adaderana Sri Lanka 2013). Nanayakkara *et al.* (2014) found that small cetaceans with severed flukes were observed in Trincomalee Bay and adjacent waters and that fishers off eastern Sri Lanka sell bycaught dolphins for human consumption, as well as for use as longline shark bait.

Stricter legislation, promulgated in 1993, has resulted in dolphins no longer being openly landed. Instead, they are processed at sea and cut into pieces, making seizures and species identification difficult (Yatawara 2016). Recent investigations by the Matara Unit of the Department of Wildlife Conservation (DWC) and the Sri Lanka Coast Guard estimated that an average of 30 to 40 dolphins are killed daily (Yatawara 2016), which corresponds to 1,560–2,080 animals killed per year. Only a few such cases become public. In October 2016, the Minister of Fisheries asked the Sri Lanka Navy and Coast Guard to take legal actions against fishers engaged in illegal cetacean hunts off Mirissa (Asian Mirror 2016). Subsequently, in March 2017, nine fishers were arrested for killing 12 spinner dolphins (Daily Mirror Sri Lanka 2017). Four months later, two men were caught with two dead dolphins (Liyanage 2017).

### 3.5.10 TAIWAN, PROVINCE OF CHINA

#### Targeted species:

short-finned pilot whale (*Globicephala macrorhynchus*), common dolphin (*Delphinus delphis*), Risso's dolphin (*Grampus griseus*), Fraser's dolphin (*Lagenodelphis hosei*), orca (*Orcinus orca*), false killer whale (*Pseudorca crassidens*), pantropical spotted dolphin (*Stenella attenuata*), spinner dolphin (*Stenella longirostris*), striped dolphin (*Stenella coeruleoalba*), rough-toothed dolphin (*Steno bredanensis*), common bottlenose dolphin (*Tursiops truncatus*), Indo-Pacific bottlenose dolphin (*Tursiops aduncus*), Indo-Pacific humpback dolphin (*Sousa chinensis*), striped dolphin (*Stenella coeruleoalba*), Cuvier's beaked whale (*Ziphius cavirostris*), melon-headed whale (*Peponocephala electra*), ginkgo-toothed beaked whale (*Mesoplodon ginkodens*), Blainville's beaked whale (*Mesoplodon densirostris*), pygmy killer whale (*Feresa attenuata*)

**Numbers killed:** more than 1,000 a year

**Type of hunt:** commercialised bycatch, directed hunts (harpoons, spear)

Dolphin meat, especially popular in Yunlin and Chiayi Counties (Chang *et al.* 2014), is used as food and is widely believed to have medicinal value (Hsu 2002). However, after national and international media reports of dolphin hunts at Penghu Island in spring 1990, where both species of bottlenose dolphin were targeted (Reeves *et al.* 2003), all cetacean species were protected under the Wildlife Conservation Law (Chou 2002).

Despite legal protection and a burgeoning dolphin-watching industry (Chou 2002) an active and

substantial black market for dolphin meat still exists, and the harpooning of cetaceans continues with animals now killed at sea, processed on board the fishing vessels, and landed as parts (CMS 2015). The main domestic markets are in Yunlin and Chiayi counties, while the majority of landings of dolphin products are reported for Nanfang Ao and Tungkang. Undercover research by journalists and recent seizures of dolphin meat and other products verify that kills continue and reveal the extent of the problem (e.g., Sui 2014; 2013a; Hsu 2002). For example, in 2014, 7.65 tonnes of dolphin meat was found in a frozen goods factory in Kaohsiung. The factory owner indicated that he had bought the meat from local fishers (Agence France Press 2014).

As fishers consider dolphins to be competitors for fish, many small cetaceans bycaught in nets are left to die. Fishers then transport the carcasses to port and the meat is sold to restaurants, although it does not appear on restaurant menus (Sui 2014; Hsu 2002); rather, it is sold surreptitiously to particular clients. Since 2013, DNA tests have been used to identify dolphin meat being sold in markets and restaurants. These tests reveal that the majority of the sampled meat came from Risso's, common bottlenose, and rough-toothed dolphins, as well as pygmy killer whales (Chang *et al.* 2014; Agence France Press 2013b). Experts estimate that as many as 1,000 dolphins are brought ashore by Taiwanese fishers each year (Agence France Press 2014).

In addition to the human consumption of bycaught dolphins, a directed harpoon hunt of small cetaceans continues illegally, with a rough estimate of 600 individuals killed per year. The carcasses or products of these dolphins are covertly brought to shore, often in small pieces. The recent confiscation of large amounts of cetacean parts suggests that there may still be an active illegal trade in dolphin parts and products (Sui 2014).



### 3.5.11 VIETNAM

**Targeted species:**

Risso's dolphin (*Grampus griseus*), pygmy killer whale (*Feresa attenuata*), melon-headed whale (*Peponocephala electra*), Irrawaddy dolphin (*Orcaella brevirostris*)

**Numbers killed:** dozens to few hundreds a year

**Type of hunt:** commercialised bycatch, directed hunts (rifles)

In 1997, a survey found no evidence of directed hunts in Vietnam. Nevertheless, several bycaught Risso's dolphins, taken in Chinese trawlers off the coast of Vietnam, were sold in the market at Cat Ba for US\$5/kg, while the meat from bycaught pygmy killer or melon-headed whales was consumed by the fishers who killed them. At approximately the same time, Vietnamese media reported a dolphin shot, killed, and available for sale in the Halong Tourist Area (Smith *et al.* 1997).

Despite the venerated status of dolphins among fishers and a law protecting all dolphin species, a new dolphin

hunt has reportedly developed in Vietnam. Limited numbers of deliberately killed dolphins and evidence of regional consumption of dolphin products have been reported (Porter & Lai 2017; Robards & Reeves 2011). CMS (2015) noted that local people from Tien Giang and Kien Giang Provinces stated that fishers from Ben Tre Province caught Irrawaddy dolphin for sale. The killing of two Irrawaddy dolphins has also been documented in Can Gio Biosphere Reserve (BR) in October 2005 and in Ca Mau BR in January 2011 (Hines *et al.* 2008). Furthermore, Phu Quoc provincial officers found 12 dolphins killed in 2002, five in 2003, and four in 2004 (Hines *et al.* 2008).

Furthermore, according to recent media reports, Vietnamese fishers have been repeatedly arrested in Thailand's waters for illegally fishing for dolphins. The Thai Navy found dead dolphins aboard six fishing vessels over a three-day period in April 2016 (Panrak 2016a,b) and seized two more vessels off Koh Chuang in June 2016 (Panrak 2016c).

In Australia, intentional killing of common dolphins (usually by shooting) occurred in many states before new legislation came into force in 1999 (Ross 2006). Around the coastline dolphins were killed deliberately and illegally either for sport or bait (e.g., for crayfish) or as targets of wanton aggression. This practice is rare now. There has been a sustained hunt of dolphins by northern Australian aboriginal communities, for traditional use and local consumption. In addition,

fishers in some areas (e.g., Tasmania) reportedly shoot orcas and possibly other small cetaceans in retaliation for the depredation of their fish catches (Ross 2006).

According to Robards and Reeves (2011), small cetaceans were hunted in the 1970s and 1980s in Papua New Guinea and French Polynesia. In addition, utilisation of stranded animals is known from New Caledonia and Vanuatu.



### 3.6.1. KIRIBATI

#### Targeted species:

new species or subspecies of beaked whale (*Mesoplodon sp.*), dense-beaked whale (*Mesoplodon densirostris*), Cuvier's beaked whale (*Ziphius cavirostris*), pygmy sperm whale (*Kogia breviceps*), spinner dolphin (*Stenella longirostris*)

**Numbers killed:** around 1,000 a year

**Type of hunt:** directed hunts (harpoons, snares), facilitated stranding

Harpooning or snaring of porpoises has been reported (Whimp 2008 and literature cited therein). Twice a year on the Butaritari Islands, the dolphin 'callers' of Kuma call dolphins to shallow waters, where they are killed. Cressey (1998) reported that this hunt resulted

in the death of several hundreds and, on occasion, several thousand dolphins each year. Although the practice of calling dolphins was thought to have ceased in the mid 1980s, there are recent reports of dolphin callings in January 2017 in Kuma (Jackson 2017) and also in the Gilbert Islands, where hundreds of spinner dolphins were killed (Mike Donoghue pers. comm. 2017). Cuvier's beaked whales, dense-beaked whales, pygmy sperm whales, and an as-yet-unnamed new species or subspecies of beaked whale are also known to be used for human consumption in the islands of Kiribati (Baker *et al.* 2013).



### 3.6.2 SOLOMON ISLANDS

#### Targeted species:

pantropical spotted dolphin (*Stenella attenuata*), spinner dolphin (*Stenella longirostris*), Indo-Pacific bottlenose dolphin (*Tursiops aduncus*), common bottlenose dolphin (*Tursiops truncatus*), striped dolphin (*Stenella coeruleoalba*), Fraser's dolphin (*Lagenodelphis hosei*), melon-headed whale (*Peponocephala electra*), false killer whale (*Pseudorca crassidens*), Cuvier's beaked whale (*Ziphius cavirostris*), Risso's dolphin (*Grampus griseus*), rough-toothed dolphin (*Steno bredanensis*)

**Numbers killed:** more than 1,000 a year

**Type of hunt:** directed hunts (acoustic drive hunts)

On Malaita Island in the Solomon Islands, dolphins are hunted for both their meat and teeth, with the latter used as traditional currency (e.g., for dowries) and for personal adornment. According to Takekawa (1996a), an average of 100,000 teeth are collected annually.

Oremus *et al.* (2015) reported dolphin hunting from six villages, with Fanalei being the only community that catches dolphins on a regular basis. Spotted dolphins ('unubulu' in the traditional language) and spinner dolphins ('raa') are the most targeted species, due to their preferred small teeth, followed by bottlenose dolphins ('robo'), melon-headed whales ('robo au') and striped dolphins ('robo tetefe') (Takekawa 1996b). In recent years, melon-headed whales have not been hunted, likely due to their reduced numbers as a result of historical hunting pressure (Reeves & Brownell 2009).

The dolphins are caught in drive hunts which are conducted from January to April. Fishers in canoes hit stones together beneath the water's surface to drive dolphin schools near to shore or into the mangroves (Brownell *et al.* 2008; Whimp 2008; Takekawa 2000, 1996b).

There is no government-authorised quota for the number of dolphins that can be killed in the hunts, and the numbers taken can be as high as the low thousands. Takekawa (2000) estimated average annual takes of 865 dolphins in Fanalei alone, although Oremus *et al.* (2015) report that, in some years, the number of dolphins killed was much higher. For example, they report 1,950 dolphins killed in 1986 and 1,200 in 2004. Within the first quarter of 2013, villagers in Fanalei killed at least 1,698 dolphins, including 240 calves that had no monetary value and were left to rot (Oremus *et al.* 2015). In the first few months of 2018, over 700 dolphins were hunted (O'Barry 2018).

The value of dolphin teeth increased from US\$0.14/tooth in 2004 to \$0.70/tooth in 2013, providing villagers more incentive to hunt (Oremus *et al.* 2015). In 2013, the IWC Scientific Committee expressed concern regarding the potential depletion of local populations, given the scale of the recent (and historical) catches (IWC SC 2013, p. 67). Furthermore, DNA analysis has revealed the limited connectivity of local bottlenose dolphin populations and, consequently, a low likelihood for repopulation after offtakes if a local population is extirpated (Oremus & Garrigue 2015).



Dolphin hunt, Solomon Islands

# SECTION 4 // SMALL CETACEANS IN INTERNATIONAL CONVENTIONS

In contrast to the hunting of large whales, which is prohibited by a moratorium on commercial whaling under the International Convention for the Regulation of Whaling (ICRW),<sup>24</sup> international conservation measures for dolphins, porpoises, and smaller whales are focused on broader conservation measures and are carried out through a number of instruments. Although some species or populations have been granted strict protection status by some international instruments, many others have not. Given that the conservation status of many small cetacean populations has become precarious due to a culmination of threats, stronger international mechanisms for their protection are overdue.

## 4.1 INTERNATIONAL CONVENTION ON THE REGULATION OF WHALING

In the past, the competence of the IWC for the conservation and management of small cetaceans has been questioned by a number of contracting governments. However, the text of the ICRW, adopted in Washington, DC, in December 1946, uses the terms ‘whales’ or ‘whale stocks’, which is not limited to large whales. While the primary focus of the IWC is on the conservation and management of great whale stocks, it also provides advice on the conservation and management of small cetaceans. A number of legal analyses (e.g., Goetschel 1998; Gillespie 2001; Stephenson *et al.* 2014) have concluded that the IWC has legal authority in relation to small cetaceans. Goetschel (1998) and Stephenson *et al.* (2014) concluded that small cetaceans are subject to possible regulation by the IWC while Gillespie (2001) posited that the IWC has primacy over regional organisations for the management of small cetaceans, particularly when the species in question migrate across national EEZs or are endangered.

Despite the lack of consensus regarding the competence of the IWC for small cetaceans, the Commission ‘recognises the need for international co-operation to conserve and rebuild depleted populations of small cetaceans’ (IWC 2018b). Indeed, there has been extensive work on small cetacean research and conservation since the establishment

of the IWC Scientific Committee’s Small Cetaceans Subcommittee in 1979. The IWC’s interest in small cetaceans has resulted in a number of efforts to address their exploitation (legal and illegal) and enhance their conservation, including a series of resolutions, for example, on directed takes of Dall’s porpoises, belugas, narwhals, and striped dolphins. In 2012, a Working Committee on Poorly Documented Takes of Small Cetaceans was established by the Scientific Committee. In 2015, the Small Cetacean Sub-Committee prioritised the issue of poorly documented takes of small cetaceans, due to concerns that localised takes of small cetaceans were escalating and some populations were subject to unsustainable pressure. Two regional workshops to gather more data have already taken place, in Thailand (2016) and Brazil (March 2018), and a third is planned in Kenya in 2019.

Despite extensive documentation by the IWC Scientific Committee of the alarming trends in small cetacean hunts and the numbers killed, limited action has been taken by the IWC in response to these concerns. While IWC Resolution 2014-2 seeks ‘enhanced collaboration in the conservation of migratory cetaceans with other intergovernmental organisations’, no single resolution on directed hunts of small cetaceans has been passed since 2001; yet the scale of these hunts, both in terms of species taken and numbers landed, has increased exponentially in recent years.

<sup>24</sup> The ICRW established the IWC.

## 4.2 CONVENTION ON THE CONSERVATION OF MIGRATORY SPECIES OF WILD ANIMALS

The Convention on the Conservation of Migratory Species of Wild Animals (CMS) lists a number of small cetaceans in its appendices, including six species and populations on Appendix I and 37 species and populations on Appendix II. Species listed on Appendix I are strictly protected from hunting pursuant to Article III of the Convention, which explicitly prohibits their take. Small cetaceans listed on the Appendices are covered by CMS decisions and resolutions, as well as

regional agreements and memoranda of understanding (MoUs). These combined measures aim to maintain a favourable conservation status for small cetaceans, including by addressing threats from directed catches (such as for aquatic wild meat and bycatch). Two regional agreements and two memoranda of understanding directly address the conservation of small cetaceans:

- The Agreement on the Conservation of Small Cetaceans of the Baltic, North East Atlantic, Irish and North Seas (ASCOBANS),<sup>25</sup> which entered into force in 1994, covers all species of toothed whales (except sperm whales) in the Agreement area;
- The Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS),<sup>26</sup> which entered into force in 2001, prohibits deliberate taking of all cetacean species in the Agreement Area (Art. 2 of the Agreement).
- The Memorandum of Understanding for the Conservation of Cetaceans and their Habitats in the Pacific Islands Region<sup>27</sup> came into effect in 2006 and covers all populations of cetaceans in the Pacific Islands, within the region defined by the Noumea Convention, including high seas;
- The Memorandum of Understanding concerning the Conservation of the Manatee and Small Cetaceans of Western Africa and Macaronesia,<sup>28</sup> including an Action Plan for the region,<sup>29</sup> came into effect in 2008 and covers small cetaceans and sirenians in the exclusive economic zones (EEZs) of the signatories.

In 2011, the Conference of the Parties to the CMS adopted a Global Programme of Work for Cetaceans (2012–2024), which has helped to drive a conservation focus for all CMS-listed cetacean species. Aquatic wild meat was highlighted within the Global Programme of Work as one of the key threats to be addressed by the CMS. At COP12 in Manila in 2017, Resolution 12.15 on Aquatic Wild Meat was adopted,<sup>30</sup> formally recognising aquatic wild meat as a significant and immediate threat to at least 33 CMS-listed aquatic species, which included a number of cetaceans, sirenians, turtles, and crocodiles. A new cross-taxa Aquatic Wild Meat Working Group was formed within the structure of the CMS Scientific Council, to establish an online repository of papers and other information (knowledge base) on aquatic wild meat relating to CMS-listed cetaceans, sirenians, turtles, and crocodiles; share information with IWC and, subject to funding availability, participate in IWC meetings with a focus on

aquatic wild meat; input aquatic wild meat information to the *Abidjan Convention Endangered, Threatened or Protected Coastal and Marine Species Action Plan*; and serve as an expert resource for CMS Parties and the CMS Secretariat about aquatic wild meat issues.

<sup>25</sup> <http://www.ascobans.org/>

<sup>26</sup> <http://www.accobams.org/>

<sup>27</sup> <http://www.cms.int/pacific-cetaceans/>

<sup>28</sup> <http://www.cms.int/aquatic-mammals/>

<sup>29</sup> [https://www.cms.int/sites/default/files/document/Afr\\_Cet\\_Man\\_Cetaceans\\_AP\\_e\\_o.pdf](https://www.cms.int/sites/default/files/document/Afr_Cet_Man_Cetaceans_AP_e_o.pdf)

<sup>30</sup> [https://www.cms.int/sites/default/files/document/cms\\_cop12\\_res.12.15\\_aquatic\\_wild\\_meat\\_e.pdf](https://www.cms.int/sites/default/files/document/cms_cop12_res.12.15_aquatic_wild_meat_e.pdf)

### 4.3 CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES OF WILD FAUNA AND FLORA

The purpose of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is to ensure that international trade in specimens of endangered species of wild animals and plants does not threaten their survival. At present, 19 species of small cetaceans are listed on CITES Appendix I,<sup>31</sup> which prohibits international trade for primarily commercial purposes.<sup>32</sup> All remaining small cetacean species are listed on Appendix II, which regulates international trade to ostensibly ensure that it is sustainable.

Any CITES Party wishing to export live small cetaceans listed on CITES Appendix II (e.g., for the international aquarium trade) or parts and derivatives (such as meat or tusk carvings) must first (1) declare that the animal was legally acquired, (2) make a Non-Detriment Finding (NDF) confirming that the export will not be detrimental to the survival of the species in the wild, and (3) for live specimens, ensure that the specimen will be prepared and shipped so as to minimise the risk of injury, damage to health, or cruel treatment.<sup>33</sup> However, in the absence of robust population, range, and other data for the exploited population, NDFs (which do not have to be made public) are not reliable.

<sup>31</sup> Irrawaddy dolphin (*Orcaella brevirostris*), Australian snubfin dolphin (*Orcaella heinsohni*), Guiana dolphin (*Sotalia guianensis*), tucuxi (*Sotalia fluviatilis*), Humpback dolphins (*Sousa chinensis*, *S. plumbea*, *S. teuszii*, *S. sahalensis*), baiji (*Lipotes vexillifer*), pygmy right whale (*Caperea marginata*), narrow-ridged finless porpoise (*Neophocaena asiaeorientalis*), Indo-Pacific finless porpoise (*Neophocaena phocaenoides*), vaquita (*Phocoena sinus*), South Asian river dolphin (*Platanista gangetica*), giant beaked whales (*Berardius arnuxii*, *B. bairdii*, *B. sp. nov.*), bottlenose whales (*Hyperoodon ampullatus*, *H. planifrons*).

<sup>32</sup> CITES Article III.

<sup>33</sup> CITES Article IV.

If an importing country is concerned about the robustness of an NDF, it may refuse the import. In 2013, for example, the United States refused an import request by several commercial aquaria for 18 wild-caught beluga whales from Russia (NOAA 2013).

For trade in Appendix I specimens, the exporting country must meet the same three obligations listed above for Appendix II specimens, and the importing country must (1) make its own NDF, (2) ensure that the specimen is not to be used for primarily commercial purposes, and (3) for live specimens, be satisfied that the proposed recipient is suitably equipped to house and care for the animals.<sup>34</sup>

While CITES can be effective in reducing threats caused by international trade, its welfare mandate is limited (e.g., it has no remit over the treatment of a live Appendix II specimen before export takes place), and it does not regulate domestic trade.

In 2000, CITES established a Bushmeat Working Group, which subsequently evolved into the CITES Central Africa Bushmeat Working Group. CITES Decision 14.73 urged the Group to cooperate with the Convention on Biological Diversity's (CBD) Liaison Group on Bushmeat (CITES 2011). To date, the Working Group has focused only on the terrestrial bushmeat trade, and concrete results have been limited.

<sup>34</sup> CITES Article III.

## 4.4 CONVENTION ON BIOLOGICAL DIVERSITY

In 2009, the Conference of the Parties (COP) to the Convention on Biological Diversity (CBD) identified the unsustainable hunting of bushmeat and its effect on nontarget species ('bushmeat crisis') as a priority to be addressed by Parties (CBD Decision IX/5) and created a CBD Liaison Group on Bushmeat. The CBD focus is both on bushmeat and sustainable wildlife management. However, while the CBD COP has taken several decisions regarding terrestrial bushmeat and how to ensure sustainable use, aquatic wild meat has so far not been addressed as a specific issue.

Nonetheless, in 2013, the Collaborative Partnership on Sustainable Wildlife Management (CPW), coordinated by the CBD Secretariat and the Food and Agricultural

Organisation (FAO), was formed and remains an important fora for addressing cetacean hunts.

At the thirteenth meeting of the CBD COP, 'Decision XIII/8. Sustainable use of biodiversity: bushmeat and sustainable wildlife management' specifically tasked the Executive Secretary to (1) further elaborate technical guidance for better governance towards a more sustainable bushmeat sector and (2) enhance synergies with the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services about the re-scoping of the assessment on the sustainable use of biodiversity (CBD 2016).

The CBD Secretariat, in collaboration with other members of the Collaborative Partnership on Sustainable Wildlife Management, is tasked to further elaborate technical guidance for better governance towards a more sustainable bushmeat sector, taking into account the perspective and knowledge of indigenous peoples and local communities in customary sustainable use of biodiversity. The Secretariat is also to jointly scope and organise a Wildlife Forum event to consider and define the priorities for work with respect to sustainable wildlife use and management. Crucially, it is to work with the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services on the re-scoping of the assessment on sustainable use of biodiversity. The CBD also clearly links the issue to wildlife trafficking and the Secretariat is to continue to support efforts by Parties to combat illicit trafficking in wildlife, and to enhance institutional capacities on wildlife conservation and law enforcement, with relevant law enforcement bodies such as the members of the International Consortium on Combating Wildlife Crime (CBD 2016).

The CBD requires countries to provide national reports on a regular basis regarding the main drivers of biodiversity loss. In response to this mandate, a number of countries (e. g., Brazil,<sup>35</sup> Ghana,<sup>36</sup> Madagascar,<sup>37</sup> and Sri Lanka<sup>38</sup>) have reported on small cetacean directed hunts, as well as on bycatch issues.

CBD member countries should be encouraged to provide as much information as possible on small cetacean hunts and bycatch in their required national reports.

<sup>35</sup> <https://www.cbd.int/doc/world/br/br-nr-05-en.pdf>

<sup>36</sup> <https://www.cbd.int/doc/world/gh/gh-nr-05-en.pdf>

<sup>37</sup> <https://www.cbd.int/doc/world/mg/mg-nr-05-en.pdf>

<sup>38</sup> <https://www.cbd.int/doc/world/lk/lk-nr-05-en.pdf>

## 4.5 BERN CONVENTION

The Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) entered into force in June 1982 and has been ratified by 45 European countries plus Belarus, Burkina Faso, Morocco, Senegal, and Tunisia. Twenty-one species of small cetaceans<sup>39</sup> are listed on Appendix II (strictly protected fauna species) of the Convention, which by its Article 6 prohibits all forms of deliberate capture, possession of, and internal trade in these animals, as well as their deliberate killing. All remaining small cetaceans are listed on Appendix III (protected fauna species).

The European Union (EU) implements the provisions of the Bern Convention in Council Directive 92/43/EEC 2. Annex IV of that Council Directive lists all cetaceans as species of EU interest in need of strict protection. Therefore, all cetaceans are protected from deliberate disturbance, capture, or killing within EU waters. Accordingly, the EU's policy regarding the conservation of cetaceans at other international fora includes small cetaceans.

<sup>39</sup> *Monodon monoceros*, *Delphinus delphis*, *Globicephala macrorhynchus*, *Globicephala melas*, *Grampus griseus*, *Lagenorhynchus acutus*, *Lagenorhynchus albirostris*, *Orcinus orca*, *Pseudorca crassidens*, *Steno bredanensis*, *Stenella coeruleoalba*, *Stenella frontalis*, *Tursiops truncatus*, *Phocoena phocoena*, *Kogia breviceps*, *Kogia simus* (Mediterranean population), *Hyperoodon rostratus*, *Mesoplodon bidens*, *Mesoplodon densirostris* (Mediterranean population), *Mesoplodon mirus*, *Ziphius cavirostris*

## 4.6 ABIDJAN CONVENTION / ABIDJAN AQUATIC WILDLIFE PARTNERSHIP

At the 12<sup>th</sup> Conference of the Parties to the Convention for Cooperation in the Protection, Management and Development of the Marine & Coastal Environment of the Atlantic Coast of the West, Central and Southern Africa Region (hereafter Abidjan Convention) (ABC

COP12) in March 2017, Parties considered the direct consumption and other uses of endangered, threatened, or protected coastal and marine species in western Africa and the African Strategy to Combat Illegal and Unlawful Trade in Wild Fauna and Flora in Africa (ABC 2017). There was strong support for the development of a programme to assess wild meat harvest of aquatic mammal, reptile, and amphibian species on sale in markets; the origins of the meat; and which species are traditionally caught and consumed (ABC 2017). ABC COP12 invited representatives of the CMS, the CMS Memorandum of Understanding concerning Conservation Measures for Marine Turtles of the Atlantic Coast of Africa, Western African Aquatic Mammals MOU, CBD, FAO, CPW, CITES, World Bank, and other partners, led by the Abidjan Secretariat, to develop an Abidjan Convention Action Plan to Combat Trade, Direct Consumption, Illegal Logging, and Other Uses of Endangered, Threatened or Protected Coastal and Marine Species (ABC 2017). This work is being undertaken by the multi-stakeholder Abidjan Aquatic Wildlife Partnership (AAWP), formed in 2018.

Although in its infancy, the AAWP will work with western African countries (Parties to the Abidjan Convention) to identify and address the key issues driving aquatic wild meat consumption and use in the region.

In July 2018, the first workshop was held of the AAWP. Workshop participants met in Abidjan, Ivory Coast, to develop the objectives, structure, and function of the AAWP and identified priorities for the development of a West African regional action plan. The next meeting of the AAWP will be in the spring of 2020 (OceanCare 2018).



# SECTION 5 // SMALL CETACEANS AND FOOD SECURITY

According to the United Nation's World Food Programme, food security is achieved 'when people have availability and adequate access at all times to sufficient, safe, nutritious food to maintain a healthy and active life' (UN World Food Programme 2018). While in recent years the issue of food security has been increasingly used as a justification for hunting cetaceans (e.g., COMHAFAT 2016), there are significant flaws in this argument. These include the profound challenges of ensuring such hunts are sustainable and humane (see Sections 6.2 and 6.3), the hunt's impact on ecosystem function, and the adverse consequences of consuming cetacean meat on human health.

Although some fishers and governments claim that cetaceans are competitors for target fisheries, the issue is ecologically complex (Lavigne 2003) and there is no evidence that commercial fisheries would benefit from large-scale killing of cetaceans (Corkeron 2009; Morissette *et al.* 2010, 2012). In fact, there is growing evidence of the vital role cetaceans play in the healthy functioning of the marine ecosystem. This includes fertilising occupied habitat with iron-rich faeces and circulating micronutrients both vertically and horizontally, which improves ecosystem productivity and acts as a repository for carbon dioxide (Roman *et al.* 2017; Roman *et al.* 2014; Smith *et al.* 2013; Pershing *et al.* 2010; Roman & McCarthy 2010). Upon death, the carcasses of whales and dolphins sequester carbon and increase biodiversity on the ocean floor (Roman *et al.* 2017; Smith *et al.* 2015; Smith & Baco 2003; Smith 2002). As recognised in IWC Resolution 2016-3 ('Resolution on Cetaceans and Their Contributions to Ecosystem Functioning') these functions support healthy marine ecosystems on which marine life, including commercially valuable fish stocks, depend.

In addition, and of critical importance, good health in humans is dependent on healthy, nutritious food. The mounting evidence of high contamination levels in small cetaceans is a major concern, not only for the individual animals but also for the humans who consume their meat, blubber, and other products.

## 5.1 CONTAMINATION BURDEN IN SMALL CETACEANS AND HUMAN HEALTH ISSUES

As top predators, small cetaceans, especially those in coastal areas, can accumulate high levels of heavy metals, chlorinated organic compounds, and other toxic substances (e.g., AMAP 2011; Hall 2018; Isobe *et al.* 2009). Average mercury concentration in dried small cetacean muscle from St. Vincent and the Grenadines is  $7.59 \mu\text{g g}^{-1}$ , making it the third highest concentration of mercury (after blue marlin and hammerhead shark) in the Seafood Hg database (Fielding & Evans 2014). In a study examining mercury contamination in small cetaceans in the Amazon and Orinoco River basins in Colombia and Bolivia, Mosquera-Guerra *et al.* (2018) found mercury in all samples tested with levels in excess of World Health Organization standards discovered most frequently in the Orinoco River dolphin.

Such high contaminant burdens negatively impact small cetaceans' viability and fertility (e.g., Strand *et al.* 2005; Parsons 2004, Lahvis *et al.* 1995), and the health risks for consumers of small cetacean products are alarming. These products regularly exceed the safety limit for mercury and PCBs set by the FAO (see Bosch *et al.* 2015) and national health authorities in the Faroe Islands, Canada, Greenland, Alaska, South Korea, Japan, and elsewhere (AMAP 2011; see Box 2). In St. Vincent and the Grenadines, the traditional method used to prepare cetacean products often yields a finished food product with a much higher mercury concentration than unprocessed tissue (Fielding & Evans 2014).

Of similar concern are the contamination levels for chlordane, DDT, and polybrominated diphenyl ethers (PBDE). In several regions, the national health limits for these contaminants in human food are significantly exceeded by cetacean meat and other edible products (see Table 4). For example, in Taiji, Japan, mercury concentrations in samples of striped dolphin liver were up to 5,000 times higher than the maximum allowable limit (Endo *et al.* 2002).

**Table 4: Health effects of different chemicals and national health advice for marine food in different regions**

Substance	Health Effects for Humans	Maximum Allowable Limits/ National Health Advice	Contamination Levels in Small Cetacean Products
Mercury	Damage to brain and nervous system, weakening of immune system, birth defects (methylated mercury easily passes placenta and can thus damage the foetus' development), arteriosclerosis, hypertension, increased risks for Parkinson's disease	<ul style="list-style-type: none"> <li>FAO: 0.5 µg/g</li> <li>Japan: 0.4 µg/g ww limit</li> <li>Advice for pregnant women depending on cetacean species, e.g. ~80g of bottlenose dolphin (1 meal) per 2 months</li> <li>Canada: 0.5 µg/g ww</li> <li>EU, Norway: 0.5-1 µg/g ww</li> </ul>	<ul style="list-style-type: none"> <li>striped dolphin, Japan: 1,980 µg/g ww in liver</li> <li>pilot-whale, Faroe Islands: 179 µg/g ww</li> <li>Narwhal, West Greenland: 73.3 µg/g ww in liver</li> <li>Beluga, Canada: 1.4 µg/g ww in muscle (unknown small cetacean species)</li> <li>St. Vincent and the Grenadines: 7.59 µg g<sup>-1</sup> (dried muscle)</li> </ul>
PCB	Effects on liver, reproduction, immune system, neuro-behavioural development, lower birth weight, cancer, dental caries	<ul style="list-style-type: none"> <li>Japan: 0.5 µg/g ww</li> <li>EU: 0.008 ng/g ww</li> <li>Norway: 0.2 µg/g ww (meat)</li> </ul>	<ul style="list-style-type: none"> <li>Pilot whale, Faroe Islands: 30 µg/g ww in blubber</li> <li>Belugas, Nunavut, Canada: 9.17 µg/g ww in blubber</li> <li>Narwhal, West Greenland: 2.31 µg/g ww in blubber</li> </ul>
DDT	Suppressing of immune system, mimicking of hormones, possibly carcinogenic	<ul style="list-style-type: none"> <li>USA (as WHO): 5.0 µg/g ww</li> </ul>	<ul style="list-style-type: none"> <li>White-sided dolphin, Japan: 22.46 µg/g ww in blubber</li> <li>Pilot whale, Faroe Islands: 16.5 µg/g ww in blubber</li> <li>Narwhal, Nunavut, Canada: 4.2 µg/g in blubber</li> </ul>
CHL	Headache, nausea, excitability, confusion, and muscle tremors	<ul style="list-style-type: none"> <li>USA: 0.1 µg/g ww</li> </ul>	<ul style="list-style-type: none"> <li>Narwhal, Nunavut, Canada: 1.5 µg/g in blubber</li> <li>Beluga, West Greenland: 1.2 µg/g ww in blubber</li> </ul>
PBDE	Mimicking of hormones, possibly carcinogenic, impact on neurodevelopment	<ul style="list-style-type: none"> <li>No data</li> </ul>	<ul style="list-style-type: none"> <li>Indo-Pacific humpback dolphin, Hong Kong: 6 µg/g in blubber</li> </ul>

(Based on Altherr & Lüber (2012) and literature cited therein. PCB = polychlorinated biphenyls, DDT = dichlorodiphenyltrichloroethane; CHL = chlordane; ww = wet weight)

Japanese scientists found that both chronic and acute mercury intoxication could result from a single portion of the liver from a small cetacean (Endo *et al.* 2002). Only recently, in all 20 tested samples of cetacean products bought on Yahoo! Japan, an internet shopping site, mercury levels exceeded Japan's safety limits for total mercury (Environmental Investigation Agency 2015). A study in Nunavik, Canada, found a correlation

between consumption of beluga meat and 'poor intellectual function and attention in schools' (Nunavik Regional Board of Health 2011). Consequently, health authorities in several countries warn that pregnant women and other vulnerable population groups should limit or even stop their consumption of odontocete products (Nunavik Regional Board of Health 2011; Prime Minister's Office 2011; Weihe & Joensen 2008).

## Box 2: Contaminated Whale Products – the Faroe Islands

In the 1980s, Faroese health authorities started a cohort study of more than 1,000 mother-child pairs in the Faroe Islands. The scientists found very high mercury and PCB levels in maternal hair, with samples exceeding the critical level of 10 µg/g, beyond which a risk of neuro-behavioural dysfunction in children may occur.

Tests indicated that 7-year-old children's reaction time, attention, verbal memory, language, and visuospatial function negatively correlated with maternal contamination levels (Grandjean *et al.* 2003; Weihe *et al.* 1996). At the age of 12, some neurotoxic effects linked to pilot whale consumption were determined to be irreversible (Weihe 2007; Debes *et al.* 2006). Additional studies have linked mercury exposure caused by pilot whale meat consumption to both a delay in postnatal growth and differences in heart function (Grandjean *et al.* 2004, 2003). Consequently, in 2008, the Faroese Chief Medical Officer and Chief Physician to the Government wrote in an open letter that:

*'... the results have so far shown that mercury from pilot whale meat adversely affects the foetal development of the nervous system: a) The mercury effect is still detectable during adolescence; b) The mercury from the maternal diet affects the blood pressure of the children; c) The contaminants of the blubber adversely affect the immune system so that children react poorly to immunisations and according to newest studies; d) contaminants in pilot whales appear to increase the risk of developing*

*Parkinson's disease in those who often eat pilot whale; e) The risk of hypertension and arteriosclerosis of the carotid arteries is increased in adults, who have an increased exposure to mercury. ... It can therefore be concluded that pilot whales today contain contaminants to a degree that neither meat nor blubber would comply with current limits for acceptable concentrations of toxic contaminants. ...'*

In response to the results of five more studies, the Faroese Food and Veterinary Authority released new health recommendations (Weihe and Grandjean 2012) recommending that:

*'consumption should be limited to one meal of whale meat and blubber per month. Women of child-bearing age are advised, as in 1998, not to consume blubber at all until they have had their children. Women are also advised to refrain from eating whale meat three months prior to, and during, pregnancy and while breast feeding' (Prime Minister's Office 2011).*

Despite these warnings, the pilot whale hunt and consumption of pilot whale products continues. According to the Faroese authorities, *'the annual average catch of up to 900 [pilot] whales is roughly equivalent to 500 tonnes of meat and blubber, which is some 30% of all meat produced locally in the Faroe Islands'* (Sloth 2009).

Numerous reports on contaminated dolphin and whale products and the risks of consuming such products to humans have been published (e.g., Environmental Investigation Agency 2015; Endo *et al.* 2013; Altherr & Luber 2012; NAMMCO 2014). The IWC has also adopted resolutions highlighting the potential for negative human health impacts caused by consumption of cetacean products

(resolutions 1998-11 and 2012-1). Despite such evidence, Ghana, the Ivory Coast, and the Republic of Guinea tabled a Resolution IWC/66/12 on food security at the 66<sup>th</sup> meeting of the IWC that had been drafted at that year's COMHAFAT (Ministerial Conference for Fisheries Cooperation between African Atlantic Coastal States) meeting. While this resolution did not pass, it is again tabled for the 67<sup>th</sup> Meeting of



the IWC in September 2018. Member governments should reject Resolution IWC/67/07 due to the detrimental effect of high contaminant levels on those who consume such products.

Further, cetacean species are inherently unsuited to contribute to the 'zero hunger' food security goal called for in the United Nation's 2030 agenda for Sustainable Development (SDG2). Sustainable development is, by common definition,<sup>40</sup> 'development which meets the needs of the present without compromising the ability of future generations to meet their own needs'. Yet, many cetacean hunts throughout the world, including some that are increasing in scale or range, are not sustainable. Furthermore, the consumption of products from such hunts are detrimental to human health and will adversely impact future food availability by impairing the ecosystem functions provided by cetaceans and diminishing marine biodiversity.

<sup>40</sup> <http://www.iisd.org/topic/sustainable-development>

## 5.2 SMALL CETACEAN HUNTS DRIVEN BY INDUSTRIAL FISHING

Poverty is more than a lack of income and resources to ensure a sustainable livelihood. It also reflects a lack of opportunities and capabilities in many interlinked areas, including access to food, education and decision making (United Nations No Date). Decades of continual expansion in the fisheries sector has led to global overexploitation of resources and escalating threats to habitats and ecosystems. Practices which traditionally allowed for the fair allocation and sharing of resource benefits in small-scale fisheries have been altered by the imposition of non-participatory and often centralised fisheries management systems, rapid technology developments, and demographic changes (FAO 2015, 2018).

Declining fish stocks caused by unsustainable, industrial scale fishing practices, including IUU fishing, is pressuring coastal communities, creating socio-economic circumstances that fuel their increased engagement in damaging and unsustainable fishing activities, such as ignoring bans on fishing within marine protected areas, using illegally sized mesh in nets, and failing to accurately report catches (Chatham House 2017). Such unsustainable activity includes the capture and trade of cetaceans (Prideaux 2016).

Salt and freshwater fish have been an important protein resources for many communities in western Africa, South and Southeast Asia, the Pacific Islands Region and Latin America. Distant-water industrialised fishing, however, is removing this resource from local consumption, forcing these communities to seek alternatives. Brashares *et al.* (2004) found that years of poor fish supply coincided with increased hunting in nature reserves and sharp declines in biomass of 41 wildlife species in western Africa. Local market data has provided evidence of a direct link between fish supply and subsequent wild meat demand in villages (Brashares *et al.* 2004, 2011; Khan & Sesay 2015; Prideaux 2016).

IUU fish can enter markets in developed countries in a variety of ways: transshipment at sea, port landings, and controlled harbours near to shore. Countries that import fisheries resources must recognise their responsibility for creating greater aquatic wild meat demand through their significant industrialised fisheries harvests. There is a need to address fisheries regulations that increase these negative impacts. For example, although the EU requires tracking of reefer vessels (deep freeze factory ships) significant quantities of IUU fish are still entering EU markets in container vessels that are exempt from inspections (Daniels *et al.* 2016). There are also major imbalances in fisheries subsidies, with 90 per cent of capacity building subsidies going to large-scale industrial fisheries (Schuhbauer *et al.* 2017), thus exacerbating the impacts on small scale fisheries that interact with cetaceans.

# SECTION 6 // ECOLOGICAL AND WELFARE IMPACTS OF THE HUNTS

## 6.1 SMALL CETACEAN HUNTS WORLDWIDE

Table 5 gives an overview on small cetacean species targeted worldwide, the countries, where they are killed, their international conservation status and conservation measures taken so far by CITES and the CMS.

**Table 5: Small cetaceans being hunted and their international conservation status**

("Taiwan" is used as a short-cut for Taiwan, Province of China/Chinese Taipei)

Targeted species		Countries	IUCN		Conservation Measures	
Scientific Name	Common Name	In Parenthesis: Hunts Stopped only Recently	Status	Trend	CITES	CMS
<i>Berardius bairdii</i>	Baird's beaked whale	Japan, South Korea, (Canada, Russia, USA)	Data Deficient (2008)	Unknown	I	II
<i>Cephalorhynchus commersonii</i>	Commerson's dolphin	Chile, (Argentina)	Least Concern (2017)	Unknown	II	II <sup>41</sup>
<i>Cephalorhynchus eutropia</i>	Chilean dolphin	Chile	Near Threatened (2017)	Decreasing	II	II
<i>Cephalorhynchus heavisidii</i>	Heaviside's dolphin	South Africa	Data Deficient (2013)	Unknown	II	II
<i>Delphinapterus leucas</i>	Beluga, white whale	Canada, Greenland, Alaska/USA, Russia	Least Concern (2017)	Unknown	II	II
<i>Delphinus capensis</i>	Long-beaked common dolphin	Ghana, Japan, Mexico, Peru, Taiwan, Venezuela	Data Deficient (2008)	Unknown	II	
<i>Delphinus delphis</i>	Common dolphin	Australia, Brazil, Cape Verde, Gabon, Guatemala, India, Italy, Senegal, Solomon Islands, South Africa, South Korea, Spain, Sri Lanka, Taiwan, Tanzania, Togo, Turkey, Venezuela, (Mexico, Panama)	Least Concern (2008)	Unknown	II	I/II <sup>42</sup> ASCOBANS, ACCOBAMS
<i>Feresa attenuata</i>	Pygmy killer whale	Ghana, Indonesia, Peru, Philippines, Senegal, Solomon Islands, Sri Lanka, St. Lucia, St. Vincent and the Grenadines, Taiwan, Togo, Vietnam	Data Deficient (2008)	Unknown	II	ASCOBANS
<i>Globicephala macrorhynchus</i>	Short-finned pilot whale	Benin, Brazil, Cape Verde, Gambia, Ghana, Indonesia, Ivory Coast, Japan, (Mexico), Peru, Philippines, Senegal, South Korea, St. Lucia, St. Vincent and the Grenadines, Taiwan	Data Deficient (2011)	Unknown	II	ASCOBANS
<i>Globicephala melas</i>	Long-finned pilot whale	Faroe Islands, Greenland, Italy, Peru, (Chile)	Data Deficient (2008)	Unknown	II	II <sup>43</sup> ASCOBANS ACCOBAMS
<i>Grampus griseus</i>	Risso's dolphin	Faroe Islands, Ghana, India, Italy, Japan, Pakistan, Peru, Philippines, Senegal, South Africa, South Korea, Sri Lanka, St. Vincent and the Grenadines, Taiwan, Tanzania, Vietnam, (Chile)	Least Concern (2012)	Unknown	II	II <sup>44</sup> ASCOBANS ACCOBAMS
<i>Hyperoodon ampullatus</i>	Northern bottlenose whale	Faroe Islands, Greenland	Data Deficient (2008)	Unknown	I	II ASCOBANS

Targeted species		Countries	IUCN		Conservation Measures	
Scientific Name	Common Name	In Parenthesis: Hunts Stopped only Recently	Status	Trend	CITES	CMS
<i>Hyperoodon planifrons</i>	Southern bottlenose whale	Sri Lanka	Least Concern (2008)	Unknown	I	
<i>Inia boliviensis</i>	Bolivian river dolphin	Bolivia	Not Assessed	Unknown	II	
<i>Inia geoffrensis</i>	Amazon river dolphin, Boto, Inia	Bolivia, Brazil, Colombia, Peru, Venezuela	Data Deficient (2011)	Unknown	II	II
<i>Kogia breviceps</i>	Pygmy sperm whale	Guinea, Indonesia, Japan, Kiribati, Philippines, Sri Lanka	Data Deficient (2012)	Unknown	II	ASCOBANS
<i>Kogia sima</i>	Dwarf sperm whale	Brazil, Ghana, Japan, Philippines, Sri Lanka, St. Vincent and the Grenadines	Data Deficient (2012)	Unknown	II	ACCOBAMS
<i>Lagenodelphis hosei</i>	Fraser's dolphin	Brazil, Ghana, Indonesia, Japan, Philippines, Madagascar, Solomon Islands, South Africa, Sri Lanka, St. Lucia, St. Vincent and the Grenadines, Taiwan	Least Concern (2012)	Unknown	II	II <sup>45</sup>
<i>Lagenorhynchus acutus</i>	Atlantic white-sided dolphin	Greenland, Canada, Faroe Islands	Least Concern (2008)	Unknown	II	II <sup>46</sup> ASCOBANS
<i>Lagenorhynchus albirostris</i>	White-beaked dolphin	Greenland, (Canada)	Least Concern (2008)	Unknown	II	II <sup>47</sup> ASCOBANS
<i>Lagenorhynchus australis</i>	Peale's dolphin	Chile, (Argentina)	Data Deficient (2008)	Unknown	II	II
<i>Lagenorhynchus obliquidens</i>	Pacific white-sided dolphin	Japan, South Korea	Least Concern (2012)	Unknown	II	
<i>Lagenorhynchus obscurus</i>	Dusky dolphin	Peru, South Africa, (Argentina, Chile)	Data Deficient (2008)	Unknown	II	II
<i>Lissodelphis borealis</i>	Northern right-whale dolphin	Japan	Least Concern (2012)	Unknown	II	
<i>Lissodelphis peronii</i>	Southern right-whale dolphin	Chile, Peru	Data Deficient (2012)	Unknown	II	
<i>Mesoplodon carlhubbsi</i>	Hubbs' beaked whale	Japan	Data Deficient (2008)	Unknown	II	
<i>Mesoplodon densirostris</i>	Blainville's beaked whale	Indonesia, Kiribati, Philippines, South Korea, Taiwan	Data Deficient (2008)	Unknown	II	ASCOBANS ACCOBAMS
<i>Mesoplodon europaeus</i>	Gervais' beaked whale	St. Vincent and the Grenadines	Data Deficient (2008)	Unknown	II	ASCOBANS
<i>Mesoplodon ginkgodens</i>	Ginkgo-toothed whale	Japan, Taiwan	Data Deficient (2008)	Unknown	II	
<i>Mesoplodon layardii</i>	Strap-toothed whale	South Africa	Data Deficient (2008)	Unknown	II	
<i>Mesoplodon peruvianus</i>	Peruvian beaked whale	Peru	Data Deficient (2008)	Unknown	II	
<i>Mesoplodon stejnegeri</i>	Stejneger's beaked whale	South Korea	Data Deficient (2008)	Unknown	II	
<i>Monodon monoceros</i>	Narwhal	Canada, Greenland	Least Concern (2017)	Unknown	II	II
<i>Neophocaena phocaenoides</i>	Finless porpoise	India, Malaysia, Myanmar, Pakistan, South Korea,	Vulnerable (2017)	Decreasing	I	II
<i>Orcaella brevirostris</i>	Irrawaddy dolphin	Indonesia, Malaysia, Myanmar, Philippines, Vietnam	Endangered (2017)	Decreasing	I	I/II
<i>Orcinus orca</i>	Orca, killer whale	Alaska/USA, Australia, Equatorial Guinea, Gabon, Greenland, Indonesia, Ivory Coast, Japan, Madagascar, South Korea, St. Lucia, St. Vincent and the Grenadines, Taiwan	Data Deficient (2017)	Unknown	II	II ASCOBANS ACCOBAMS

Targeted species		Countries	IUCN		Conservation Measures	
Scientific Name	Common Name	In Parenthesis: Hunts Stopped only Recently	Status	Trend	CITES	CMS
<i>Peponocephala electra</i>	Melon-headed whale	Cape Verde, Ghana, Indonesia, Japan, Madagascar, Philippines, Solomon Islands, Sri Lanka, St. Lucia, St. Vincent and the Grenadines, Taiwan, Vietnam	Least Concern (2008)	Unknown	II	
<i>Phocoena dioptrica</i>	Spectacled porpoise	Chile, (Argentina)	Data Deficient (2008)	Unknown	II	II
<i>Phocoena phocoena</i>	Harbour porpoise	Greenland, Faroe Islands, Mauritania, Senegal, South Korea, Turkey, (Canada, Russia)	Least Concern (2008)	Unknown	II	II <sup>48</sup> ASCOBANS ACCOBAMS
<i>Phocoena spinipinnis</i>	Burmeister porpoise	Chile, Peru	Data Deficient (2012)	Unknown	II	II
<i>Phocoenoides dalli</i>	Dall's porpoise	Japan, South Korea	Least Concern (2012)	Unknown	II	II
<i>Platanista gangetica</i>	South Asian river dolphin, Ganges river dolphin, susu	Bangladesh, India	Endangered (2017)	Unknown	I	I/II
<i>Pontoporia blainvillei</i>	La Plata dolphin; Franciscana	Brazil	Vulnerable (2017)	Decreasing	II	I/II
<i>Pseudorca crassidens</i>	False killer whale	Brazil, Gabon, Ghana, Indonesia, Japan, Peru, Solomon Islands, South Korea, Sri Lanka, St. Lucia, St. Vincent and the Grenadines, Taiwan	Data Deficient (2008)	Unknown	II	ASCOBANS ACCOBAMS
<i>Sotalia fluviatilis</i>	Tucuxi; boto dolphin	Brazil, Colombia, Venezuela	Data Deficient (2012)	Unknown	I	II
<i>Sotalia guianensis</i>	Guiana dolphin	Brazil, Venezuela	Data Deficient (2012)		I	II
<i>Sousa chinensis</i>	Indo-Pacific humpbacked dolphin, Chinese white dolphin	India, Madagascar, Myanmar, Taiwan, Tanzania	Vulnerable (2017)	Decreasing	I	II
<i>Sousa plumbea</i>	Indian Ocean humpback dolphin, plumbeous dolphin, speckled dolphin, freckled dolphin	India, Madagascar, Mozambique, Pakistan, Tanzania	Endangered (2017)	Decreasing	I	
<i>Sousa teuszii</i>	Atlantic humpbacked dolphin, Cameroon dolphin	Cameroon, Gambia, Guinea, Guinea Bissau, Mauritania, Nigeria, Republic of Congo, Senegal, Sierra Leone, Togo	CR (2017)	Decreasing	I	I/II
<i>Stenella attenuata</i>	Pantropical spotted dolphin, blue-white dolphin	Brazil, Cameroon, Colombia, Gabon, Ghana, India, Indonesia, Japan, Malaysia, Nigeria, Peru, Philippines, Senegal, Solomon Islands, Sri Lanka, St. Helena, St. Vincent and the Grenadines, Taiwan, Tanzania, Togo, (Mexico)	Least Concern (2012)	Unknown	II	II <sup>49</sup>
<i>Stenella clymene</i>	Clymene dolphin	Brazil, Ghana, Nigeria, St. Lucia, St. Vincent and the Grenadines, Venezuela	Data Deficient (2012)	Unknown	II	II <sup>50</sup>
<i>Stenella coeruleoalba</i>	Striped dolphin	Brazil, Colombia, Guatemala, Italy, Japan, Philippines, Solomon Islands, Spain, Sri Lanka, St. Lucia, St. Vincent and the Grenadines, Taiwan	Least Concern (2008)	Unknown	II	II <sup>51</sup> ASCOBANS ACCOBAMS

Targeted species		Countries	IUCN		Conservation Measures	
Scientific Name	Common Name	In Parenthesis: Hunts Stopped only Recently	Status	Trend	CITES	CMS
<i>Stenella frontalis</i>	Atlantic spotted dolphin	Brazil, Ghana, Ivory Coast, St. Lucia, St. Vincent and the Grenadines, Venezuela, (Azores, Mexico)	Data Deficient (2012)	Unknown	II	
<i>Stenella longirostris</i>	Spinner dolphin	Brazil, Ghana, Guatemala, India, Indonesia, Kiribati, Madagascar, Malaysia, Myanmar, Pakistan, Philippines, Solomon Islands, Sri Lanka, St. Vincent and the Grenadines, Taiwan, Tanzania, Venezuela	Data Deficient (2012)	Unknown	II	II <sup>52</sup>
<i>Steno bredanensis</i>	Rough-toothed dolphin	Brazil, Ghana, Ivory Coast, Japan, Senegal, Solomon Islands, Sri Lanka, St. Vincent and the Grenadines, Taiwan, Tanzania	Least Concern (2012)	Unknown	II	ASCOBANS ACCOBAMS
<i>Tursiops aduncus</i>	Indo-Pacific bottlenose dolphin	Australia, India, Indonesia, Japan, Madagascar, Myanmar, Pakistan, Philippines, Sri Lanka, Taiwan, Tanzania	Data Deficient (2012)	Unknown	II	II <sup>53</sup>
<i>Tursiops truncatus</i>	Common bottlenose dolphin	Benin, Brazil, Cameroon, Cape Verde, Colombia, Faroe Islands, Gabon, Gambia, Ghana, Guatemala, Guinea, India, Indonesia, Italy, Ivory Coast, Japan, Malaysia, Mauritania, Morocco, Nigeria, Peru, Philippines, Republic of Congo, Senegal, Solomon Islands, South Africa, South Korea, Spain, Sri Lanka, St. Lucia, Taiwan, Tanzania, Togo, Turkey, Venezuela, (Ecuador, Mexico, Panama)	Least Concern (2012)	Unknown	II	I/II <sup>54</sup> ASCOBANS ACCOBAMS
<i>Ziphius cavirostris</i>	Cuvier's beaked whale, Goosebeak whale	Benin, Ghana, Indonesia, Kiribati, Peru, Solomon Islands, South Korea, Taiwan, (Japan)	Least Concern (2008)	Unknown	II	I <sup>55</sup> ASCOBANS ACCOBAMS

<sup>41</sup> South American population

<sup>42</sup> App. I: Mediterranean population; App. II: North and Baltic Sea, Black Sea and eastern tropical Pacific populations

<sup>43</sup> Only North and Baltic Sea populations

<sup>44</sup> Only North Sea, Baltic Sea and Mediterranean populations

<sup>45</sup> Southeast Asian populations

<sup>46</sup> Only North and Baltic Sea populations

<sup>47</sup> Only North and Baltic Sea populations

<sup>48</sup> North and Baltic Sea, western North Atlantic, Black Sea and North West African populations

<sup>49</sup> Eastern tropical Pacific population, Southeast Asian populations

<sup>50</sup> West African population

<sup>51</sup> Eastern tropical Pacific population, Mediterranean population

<sup>52</sup> Eastern tropical Pacific populations, Southeast Asian populations

<sup>53</sup> Arafura/Timor Sea populations

<sup>54</sup> App. I: subsp. *ponticus*; App. II: North Sea, Baltic Sea, Mediterranean and Black Sea populations

<sup>55</sup> Only Mediterranean subpopulation

## 6.2 SUSTAINABILITY OF THE HUNT

Small cetaceans face a barrage of anthropogenic threats, including bycatch, directed hunts, climate change, environmental degradation, chemical pollution, marine debris, underwater noise, prey depletion due to commercial overfishing, unsustainable tourism, and, in some places, live capture for the entertainment industry (see Box 3) (e.g., Baulch & Perry 2014; Simmonds 2012; Bailey *et al.* 2010<sup>56</sup>; MacLeod 2009; Robinson *et al.* 2009; Culik 2004; Minh *et al.* 2000). For most species the impact of these threats, including directed (and non-directed) hunts, is cumulative and contributes to a decline in fertility, population or stock viability, and total numbers. Such threats, combined with the unique biological and ecological characteristics of small cetaceans (e.g., late age of maturity, low reproduction rate, complex social structure, site fidelity, naturally low population, and high genetic differentiation—which are described in more detail below), make them highly prone to overexploitation.

- **Reproductive biology:** Small cetaceans are ‘K strategists’, which means their reproductive biology is optimised to a stable environment with low natural mortality rates for both adult animals and their offspring. Accordingly, their reproduction rate is low (a single offspring at intervals of up to three years), with late maturity and a relatively long life span. Populations cannot, therefore, withstand large numbers of removals. Field studies of intensely exploited striped dolphin populations in Japan identified altered age composition and reproductive status and a significant decline in mean age at sexual maturity (Kasuya 1985). Increased capture of females, as has been documented in Sri Lanka, where female dolphins are twice as likely to be landed (Dayaratne & Joseph 1993), interferes with both the reproductive capacity and social structure of any population. The same is true for the preferred take of mother-calf-pairs, as occurs in Colombia (Avila *et al.* 2008).
- **Complex social structure:** According to Wade *et al.* (2012) the complex social structure of dolphin and porpoise populations are particularly susceptible to adverse impacts resulting from animal removal by killing or capture. For small cetaceans, survival and reproductive success depends on (1) social cohesion and organization, (2) mutual defence against predators and possible alloparental care, (3) inter-generational transfer of knowledge and (4) leadership by older individuals (Wade *et al.* 2012).

Notably, exploitation can have effects beyond the dynamics of individual removals, such as a decrease in birth rates following exploitation. Possible reasons are a reduction of reproductive females or males, as well as a disruption of mating systems.

- **Site fidelity (philopatry):** Several dolphin species, populations, and stocks show strong levels of site fidelity, increasing their vulnerability to overexploitation. Dolphins off the Solomon Islands, for example, tend to form small, insular, and genetically isolated populations (Oremus *et al.* 2015; Oremus & Garrigue 2015) while female botos in Latin America inhabit a geographically limited area (Iriarte & Marmontel 2013; Hollatz *et al.* 2011). The strong philopatry of belugas causes them to return to the same estuaries year after year, making them highly vulnerable to overexploitation (Lowry *et al.* 2017b).
- **Nonselective nature of the hunts:** In several countries, dolphin hunts are opportunistic, in which no particular species is targeted but, rather, kills are a product of the ease of the hunt (Barbosa-Filho *et al.* 2016). Hence, even rare and already decimated populations can be targeted.
- **Natural low abundance:** For a variety of small cetaceans with low abundance, such as pygmy killer whales, the IUCN warns that even small takes in localised areas could have significant adverse impacts.<sup>57</sup>
- **Genetic differentiation:** Several small cetaceans, such as tucuxis, show high genetic differentiation over relatively small distances. Removals from these populations may, therefore, result in local extinction. This is particularly true where connectivity to other populations is lacking—which would reduce the likelihood of recolonization of the vacant habitat (Caballero *et al.* 2010).

Many small cetacean populations have already been severely depleted by excessive hunts, such as common dolphins and harbour porpoises in the Black Sea (Birkun *et al.* 2014; Fontaine *et al.* 2012; Birkun 2002), Dall’s porpoises off Japan (Miyashita & Kasuta 1988), melon-headed whales around the Solomon Islands (Takekawa 1996b), the critically endangered Atlantic humpback dolphin off western Africa (Collins *et al.* 2010), beluga whales in Cook Inlet (Environmental Investigation Agency 2014; Lowry *et al.* 2012) and West Greenland (Heide-Jørgensen *et al.* 2017), and botos and tucuxis in Brazil (Mintzer *et al.* 2013). While some depleted populations of baleen whales have shown clear signs of recovery, there are few examples



of the same for small cetaceans. Wade *et al.* (2012) conclude: ‘*The evidence for a lack of strong recovery in heavily exploited odontocete populations indicates that management should be more precautionary*’. Similarly, in contrast to the Faroese Authorities who claim that hunts under their jurisdiction are sustainable (Prime Minister’s Office 2011), concerns about the sustainability of pilot whale hunts in the Faroes have been expressed by ASCOBANS (2012) and NAMMCO (2018) due to outdated population estimates from as far back as 1989, the lack of a hunting quota, and the absence of adequate data on movements and population structure.

While directed catches of small cetaceans have the potential to seriously deplete the targeted population or the species as a whole, those hunts have a much broader impact on biodiversity.

The loss of apex predators such as dolphins or porpoises, for example, may alter the food web structure, water quality, and nutrient cycles (see, e.g., Brum *et al.* 2015; Estes *et al.* 2011). In some cases, such impacts can have cascading effects throughout

the ecosystem resulting in an imbalance that can have a number of adverse direct, indirect, and cumulative impacts on biodiversity and ecosystem health. Furthermore, using dolphins as bait to increase capture of dwindling fish stocks is ecologically irresponsible for both the dolphin and target fish populations. In Peru, for example, the killing of dolphins for bait to capture and kill sharks results in the simultaneous and unsustainable removal of two top predators. Indeed, the meat of small cetaceans is such an effective bait to attract blue (*Prionace glauca*) and shortfin mako sharks (*Isurus oxyrinchus*) (Mundo Azul 2015; Alfaro-Shigueto *et al.* 2008), that reported shark landings have declined since 2000 due to overhunting (Gonzalez-Pestana *et al.* 2016). Further evidence of a collapse in targeted shark populations include evidence that 83.7 per cent of the sharks caught are juveniles (sexually immature) and under the minimum landing size (OceanCare 2017b; Doherty *et al.* 2014).

<sup>56</sup> [https://www.abdn.ac.uk/lighthouse/documents/Bailey\\_Assessing\\_underwater\\_2010\\_MPB.pdf](https://www.abdn.ac.uk/lighthouse/documents/Bailey_Assessing_underwater_2010_MPB.pdf)

<sup>57</sup> <http://www.iucnredlist.org/details/8551/0>

### Box 3: Live Capture of Small Cetaceans from the Wild for Commercial Purposes

Small cetaceans are captured from the wild in a small number of countries, including Russia and Japan, for display in captivity (IWC 2015, 2014; Hammond *et al.* 2012). Such removal of live animals can have serious implications for the welfare of the captured individuals and to the long-term viability of the population from which they are taken (Williams & Lusseau 2006; Lusseau & Newman 2004). Typically, live capture operations selectively target young females (Rose *et al.* 2009), which increases the potential for adverse impacts to the source populations (Williams & Lusseau 2006).

In Russia, the government sets an annual quota for the capture of belugas from the Sakhalin-Amur region in the Sea of Okhotsk for display in aquaria in Russia and overseas (Shpak & Glazov 2013). Local and international beluga scientists have raised concerns that quotas may be in excess of sustainable levels by at least six to eight times (IWC SC 2013, 2014, 2015).

In 2013, the proposed export of 18 wild-caught beluga whales from Russia to several aquaria in the United States created international controversy and attention. Authorities in the United States denied the requested import permit due to doubts over the sustainability of the captures (NOAA 2013). As Russia was unable to export these belugas to the United States, the surviving individuals were likely sold to other aquaria, presumably in China and elsewhere. China's aquarium industry is booming, with at least 39 facilities in operation and 14 more under construction (China Cetacean Alliance 2015). Between 2010 and 2014, China imported as many as 114 wild belugas from Russia (Woody 2016).

Annual catch quotas for orcas of up to 10 per year are also issued by the Russian government for national and overseas aquaria (FEROP 2018).

Other small cetaceans are subject to live capture in Japan, where annual quotas are set by the Japanese government. Since 2000, more than 2,000 dolphins from several species have been captured alive in drive hunts in Japanese waters, to supply the national and international aquarium industry (Japanese Fisheries Agency 2013; Ceta-Base 2018). The IWC's Scientific Committee and other scientific bodies have raised concerns about the sustainability of these hunts for a number of decades (IUCN 2015; Marsh 2013; Wells 2012; IWC 1993; Kishiro & Kasuya 1993).

Conservation concern associated with the live capture of cetaceans for commercial purposes is widespread. In 2002, CITES Parties agreed to a zero quota for the export of live wild-caught specimens of the Black Sea subpopulation of bottlenose dolphins for commercial purposes (CITES COP 12 Prop. 3.). At the 13th CITES COP in 2004, the Irrawaddy dolphin was transferred to Appendix I to protect it from the live captivity trade (CITES COP 13 Prop. 3). In 2014, at the 11<sup>th</sup> CMS COP, Resolution 11.22 invited Parties to develop and implement national legislation prohibiting the live capture of cetaceans from the wild for commercial purposes. It also encouraged Parties to consider taking stricter domestic measures in line with CITES Article XIV with regard to the import and international transit of live cetaceans for commercial purposes that have been captured from the wild. In 2017, at the 12th CMS COP, Resolution 11.22 was revised to include the endorsement of Best Practice Guidelines and Recommendations pertaining to the implementation of Resolution 11.22.



## 6.3 WELFARE CONCERNS FOR SMALL CETACEAN HUNTS

Given that dolphins and porpoises are highly mobile, the difficulty in striking and killing small cetaceans at sea (up to the size strength and speed of an orca) with hand-harpoons, spears, machetes, or rifles is obvious. Some of the methods employed by small cetacean hunters can result in prolonged times to death. Furthermore, individuals who escape being killed can suffer long-term physical injuries, as well as adverse complications from the stress and psychological harm associated with losing conspecifics, including dependent calves and juveniles.

Given the paucity of data relative to the large scale of small cetacean hunts, it is difficult to assess the levels of suffering experienced by small cetaceans taken around the world. However, significant evidence already exists to demonstrate the poor welfare implications associated with large whale hunting and bycatch. Therefore, it can be easily inferred that hunted small cetaceans, especially those taken with rudimentary weapons, are experiencing high levels of suffering and pain as a result of these practices.

The cruelty associated with hunting methods used in grinds conducted on the Faroe Islands has been criticised for decades. In response, the use of harpoons and spears was banned in 1985. Since 1993, the traditional gaff (a hook stabbed into the flesh of the whale to pull it ashore) has been gradually replaced by a blunt hook inserted into the blowhole, which is claimed to be less cruel (Prime Minister's Office 2011). However, forcing a blunt hook into the highly innervated blowhole of a voluntary breather will likely produce a gag response and give the sensation of suffocation (Butterworth *et al.* 2013). After securing the whale with the hook, a spinal lance is inserted one hand's width behind the blowhole, with the aim of severing the spinal cord and an artery that carries blood to the brain (NAMMCO 2016b). Although the new methods are intended to provide a 'swift' death with minimal pain and suffering, death for these animals is still prolonged and painful (Singleton & Fielding 2017; Lonsdale 2013).

In Japan, the overarching welfare concern for small cetacean hunts has been the cruelty associated with the use of spears and knives to kill small cetaceans in drive hunts, as well as the stress of the round-up itself (e.g., Perry & Thornton 2000). In recent years, Japanese hunters have introduced a new hunting method, which involves cutting the spinal cord, similar to the spinal lance used in the Faroe Islands. This method aims to reduce both the amount of blood loss (by the insertion of a wedge into the wound) and time to death (Butterworth *et al.* 2013). However, recent video analyses indicate that, while these methods may reduce blood loss into the water, thereby making the kill less aesthetically disturbing, they do not make the killing method more humane and may cause greater suffering (Butterworth *et al.* 2013).

Struck and lost rates of up to 30 per cent for narwhals in Greenland and Canada (Hjarsen 2005) and 20 to 60 per cent for belugas in Canada (Hammill *et al.* 2017) are a welfare as well as conservation concern. Many struck and lost animals may die as a result of their injuries but their deaths may be prolonged and involve considerable suffering.

In St. Vincent and the Grenadines, small whales and dolphins are harpooned and then either lashed to the side of the hunting vessel, where they are left to bleed out, or are brought on board the vessel, where they will slowly suffocate. Death can take hours. Some individuals who are alive when landed are tied by the peduncle (tail stock) to the edge of the pier until they drown. For other landed small cetaceans, rudimentary knives and cutlasses are used to kill or process the animals (Fielding 2010).

Animal welfare concerns regarding drive hunts in the Solomon Islands have been raised by scientists and animal welfare groups (Oremus *et al.* 2015): Acoustic drive hunts (using stones to generate noise used to herd dolphins toward shore) may take several hours, after which the dolphins are captured and transported live in canoes to the village's beach, where they are lined up and left to die by suffocation or to be killed with knives.

# SECTION 7 // CONCLUSIONS AND RECOMMENDATIONS

The objective of this report is to document the increasing volume and geographic scope of small cetacean hunting and to raise conservation and welfare concerns. A number of conclusions and recommendations are directed to range states and relevant international bodies to address the escalation of small cetacean hunts.

## 7.1 CONCLUSIONS

The present report provides an overview on the number and diversity of small cetacean species killed in directed hunts and as bycatch (intentional or incidental) in several geographic regions.

The world's largest kill of small cetaceans occurs in Peru, where up to 15,000 dolphins are killed annually for use as bait in shark fisheries. In addition to Peru, the 14 other countries where the largest number of small cetaceans are killed per year (with a minimum of 1,000 individual animals killed annually) are Brazil, Canada, Greenland, Ghana, India, Indonesia, Japan, Malaysia, Nigeria, South Korea, Solomon Islands, Sri Lanka, Taiwan (PRC), and Venezuela.

In total, the authors of this report estimate that approximately 100,000 small cetaceans are killed globally each year and that hunting is a critical threat to the survival of many populations of dolphins, porpoises, and small whales. For example, the Indian Ocean humpback dolphin, only recognised as a distinct species in 2014, is now classified by the IUCN as Endangered, while the Atlantic humpback dolphin is listed as Critically Endangered; for both species hunting is identified as a principle threats.

Small cetaceans are under serious anthropogenic pressure on a global scale. The cumulative impacts of habitat degradation, pollution, ocean noise, exposure to toxins, ship strikes, bycatch, and hunting are taking their toll on an increasing number of species. Although the exploitation of dolphins and smaller whales is regulated or prohibited in many countries, the laws are often inconsistent and poorly enforced, and penalties for violating the laws rarely provide a deterrent to prevent similar crimes. Furthermore, given the paucity of population data for many populations/stocks of

small cetaceans, the direct, indirect, and cumulative impacts of all natural and anthropogenic impacts on the species are unknown. Without such data, the sustainability of small cetacean hunts in many areas is highly questionable.

Recent increases in human consumption of aquatic wild meat and the use of dolphin meat as bait in commercial fisheries for sharks, crabs, or catfish, are alarming. Given that many of these commercially valuable fish species are already overexploited, fisheries using cetaceans as bait exacerbate concerns about the sustainability of the takes for both small cetaceans and fish stocks and call into question the long-term survival and viability of all affected species.

The frequency by which the unintended bycatch of small cetaceans has evolved into large-scale directed hunts is also of deep concern. Even when legislation regulates or prohibits such hunts and enforcement efforts are adequate, the killing and subsequent trade in the species, their parts, and products often goes underground, making it difficult to know the full extent of the number of small cetaceans killed and the impacts of the hunts on the small cetacean populations.

There are also serious animal welfare concerns associated with small cetacean hunts. Many of the hunting methods and practices currently in use cause extreme suffering for individual animals even if they are not killed; for example the use of sound to drive dolphins toward shore may create sub-lethal impacts for the animals who escape. Furthermore, very little information exists on time to death for small cetaceans killed by harpoons, spears, machetes, nets, hooks, and rifles, and it would be particularly difficult to collect such data since these hunts often occur under difficult physical and environmental conditions.

As apex-predators, small cetaceans bioaccumulate heavy loads of toxic substances such as mercury, PCBs, and DDT from a multi-trophic level food chain. This raises concerns, not just about the health of the animals themselves, but also that of humans who consume them. It is also directly relevant to questions of food security.

Cetaceans are long-lived and relatively slow breeding, which make them inherently unsuitable as a sustainable food source, particularly if exploited at commercial levels, for an ever-growing human population. In addition, many populations of cetaceans are already severely depleted and human communities that are increasingly reliant on the species for food face an ongoing threat to their food security.

The other side of this problem is the reality that artisanal and local fisheries are suffering due to the activities of industrial, commercial, and often foreign fishing fleets. Governments need to recognise the cause and effect of industrial fishing (including subsidies), mining, palm oil production, and forestry on local communities and aquatic wild meat demand. This will require that local community concerns are considered in resource management decisions, including plans for distant-water industrialised fishing, that might impact their sea resources. Governments will need to facilitate the development of community-based wildlife conservation to maintain wildlife habitats, protect species, and to conserve the social and economic well-being of communities.

The scale, diversity, complexity, and scope of small cetacean hunts exposed in this report should trigger discussions of the management and conservation measures (e.g., legal, economic, educational, and political) needed to protect these species and alleviate their suffering. The following recommendations are intended to achieve those objectives.

## 7.2 RECOMMENDATIONS TO RANGE STATES

As long as small cetaceans are not adequately protected by international conventions, regional agreements and national laws must protect them. To ensure that this crucial responsibility is met, it is recommended that range states do the following:

- **Review national practices and legislation.** Range states should review available reports and data on the number, location, and impacts of small cetacean hunts in their country and then assess the adequacy of national statutes, regulations, and policies, including enforcement efforts and penalties, to identify shortcomings. Where data are not available to assess the impact of hunts on small cetacean populations, range states should, pursuant to

the precautionary principle, prohibit or adopt regulations significantly restricting such hunts until their impacts are studied and understood.

- **Become a contracting party to relevant multilateral environmental agreements.** Range states where legal or illegal directed takes occur and which are not yet signatories to relevant multilateral environmental agreements (MEAs) should join them. International and regional collaboration is of utmost importance to improving the situation for small cetacean species exposed to directed hunts or bycatch.
- **Establish management measures for subsistence hunts.** States in which subsistence hunting of small cetaceans is conducted without any management measures are urged to responsibly regulate these hunts.
- **Ban bycatch commercialisation.** Allowing sales of bycaught cetacean meat incentivises the deliberate hunting and killing of small cetaceans. Range states that prohibit directed hunts but permit the personal use and sale of products from bycaught small cetaceans should prohibit all use of small cetacean products and effectively enforce such laws and/or regulations.
- **Ban the use of wildlife as bait.** Range states that do not prohibit the use of small cetaceans as bait should prohibit such use and effectively enforce such laws and/or regulations. In addition, range states, scientific organisations, fishery agencies, academic institutions, and interested stakeholders should undertake research to identify or develop effective alternative bait.
- **Implement measures to support small-scale fisheries.** Range states should implement the FAO's Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries (SSF Guidelines) and ensure ecosystem-friendly and participatory policies, strategies, and legal frameworks to protect vulnerable and marginalised people by addressing those factors that increase reliance on cetaceans as sources of food and livelihoods. This must include, for example,
  - + recognising the cause and effect of industrial fishing, mining, palm oil production, and forestry on local communities and aquatic wild meat demand;
  - + facilitating the development of community-based wildlife conservation to maintain wildlife habitats and protect species and to enhance the social and economic well-being of communities;

- + closing all IUU container loopholes in international and regional regulations, and subject ships carrying containers to the same scrutiny and reporting requirements as reefers and fishing vessels.
- **Improve fishing techniques and related regulations.** Range states are urged to support the development and use of mechanisms that reduce bycatch, which can include time/area closures, and the replacement of high-risk gear known to capture/kill small cetaceans with safer alternatives. Fisheries that verifiably use best practices to avoid or prevent the capture of small cetaceans should be supported (e.g., financial, quotas).
- **Improve enforcement.** Range states where illegal captures of small cetaceans occur despite adequate legislation should intensify enforcement efforts through the use of sea and air patrols, drone surveillance, vessel monitoring systems (increasingly cost-effective even for small-scale fisheries), landing site inspections, and market surveys, including genetic or enzyme immunoassays to enable species identification (e.g., Lo *et al.* 2013; Baker *et al.* 2007).
- **Launch capacity-building initiatives to raise public awareness and promote dialogue with hunters and fishers to identify alternatives, solutions, and improved enforcements.** Range states where hunters/fishers are deliberately culling dolphins to reduce alleged competition for fish and other species should start intensive public education programmes that describe existing laws, explain the ecological impacts of killing small cetaceans, provide information about alternative gear or methods (i.e., best practices) to prevent or avoid the capture of small cetaceans, and describe welfare concerns to increase acceptance of small cetacean protection laws, regulations, and policies.
- Establish mechanisms in all regions where small cetaceans are taken to collect data on species taken, number, purpose, method of take, type of take (i.e., direct hunt, bycatch, intentional, incidental), and use of carcass/products (if known) and to input the information into a standardised database. The resulting data should be transmitted to the IWC annually and made available by the Secretariat for evaluation and discussion by the IWC Scientific Committee. This type of database was recommended by the Workshop on Poorly Documented Takes of Small Cetaceans: Asia, held in Thailand in 2016.
- Edible products derived from small cetaceans should be included in the calculation of need for Aboriginal Subsistence Whaling catch limit requests.
- Adopt a resolution at IWC 68 on directed hunts of small cetaceans and the commercial use of bycaught animals. The resolution should advocate for closer cooperation with other conventions to (1) protect and conserve small cetacean populations, (2) advance international efforts to address the aquatic wild meat crisis, (3) address the health and safety issues associated with human consumption of small cetacean meat and other products, given high levels of toxins in small cetaceans and contaminants in the marine environment, and (4) harmonise national, regional, and international measures to halt the extensive exploitation of small cetacean populations.

### 7.3 RECOMMENDATIONS TO THE IWC

Although there is currently no consensus amongst IWC Contracting Governments as to the legal competence of the IWC over small cetaceans, several legal analyses conclude that the IWC has the capacity and authority to study small cetaceans and provide appropriate advice for their conservation and management. Consequently, the IWC should consider the following recommendations:

- Increase funding for the Scientific Committee's Marine Bushmeat Working Group and expand its mandate to be global.

### 7.4 RECOMMENDATIONS TO THE CMS

Compared to other international conventions, the CMS has made the most progress on the issue of aquatic wild meat and its Scientific Council has established an Aquatic Mammals Working Group. Regional and international cooperation is necessary to give highly mobile species, like most small cetacean species, increased protection. The CMS Global Programme of Work for Cetaceans (2012–2024) is intended to address some of the problems threatening small cetaceans, but greater emphasis must be focused on (1) implementing approved concerted actions, (2) ensuring that conservation measures for species listed on Appendix I are properly implemented, and (3) increasing regional collaborative efforts to protect small cetaceans, as is encouraged for all Appendix II species. Joining and collaborating with existing regional wildlife management/conservation agreements, joining or endorsing existing MOUs, and reviewing the need for development of new regional initiatives to significantly

reduce dolphin killings should also be pursued. To achieve these objectives, CMS should do the following:

- Encourage Parties to develop additional regional mechanisms, in particular in Asia, Africa, and Latin America, to protect migratory small cetaceans.
- Take measures to reduce bycatch of small cetaceans through, for example, stronger enforcement of existing laws, promulgation of new or revised laws, enhancing technologies to combat illegal activities (e.g., increased surveillance, port inspections, vessel monitoring, market surveys, and DNA analyses), establishing marine protected areas, developing alternative fishing gear, and improving fishing methods to avoid harming/killing small cetaceans.
- Continue to review CMS Appendix I and II species listings, and identify and propose for listing those threatened species of migratory small cetaceans that warrant CMS protections (e.g., West African populations of bottlenose dolphin) on Appendix I. This should include those species already listed on Appendix II (e.g., botos).
- Provide core funding support to the work of the Aquatic Wild Meat Working Group, and in particular the agreed work programme that includes the development of an aquatic wild meat action plan for supporting Range State Parties, to reduce the impact of aquatic wild meat harvests.

## 7.5 RECOMMENDATIONS TO CITES

In regard to the bushmeat discussions that are ongoing within CITES and the findings in this report, CITES Parties should, at the 18<sup>th</sup> Conference of the Parties, do the following:

- Direct the CITES Secretariat to expand the mandate of the CITES Central African Bushmeat Working Group to redesignate itself as the Bushmeat Working Group and to include other geographic regions and aquatic bushmeat in its remit.
- Direct the newly mandated Bushmeat Working Group to analyse information on cross-border trade in aquatic wild meat and its impact on wild populations.
- Consider uplisting threatened species of small cetaceans subject to international trade in meat (such as the Atlantic humpback dolphin) to CITES Appendix I.

## 7.6 RECOMMENDATIONS TO THE CBD

In line with the recommendations to other conventions regarding bushmeat issues, the CBD should do the following:

- In the post-2020 targets, incorporate the development of community-based wildlife conservation to maintain wildlife habitats, protect species, and enhance the social and economic well-being of communities.
- Expand the mandate of the Collaborative Partnership on Sustainable Wildlife Management to formally encompass aquatic wild meat and to recognise the cause and effect of industrial fishing, mining, palm oil production, and forestry on local communities and aquatic wild meat demand.
- Ensure that local community concerns are considered in discussions related to proposals (including plans for distant-water industrialised fishing) that might impact marine resources with regard to Decision XIII/8: Sustainable use of biodiversity: bushmeat and sustainable wildlife management.
- Initiate an international dialogue about the need to close all IUU container loopholes in international and regional regulations, and subject ships carrying containers to the same scrutiny and reporting requirements as reefers and fishing vessels. Support governments in West and Central Africa, South and Southeast Asia, and Latin America to prohibit transshipments at sea and support the authority of governments to only allow transshipments of fish catches under closely monitored conditions where reefers cannot be accommodated.

# SECTION 8 // REFERENCES

- ABC. 2017. Illegal trade, illicit trafficking, consumption and other uses of protected, endangered and/or vulnerable marine and coastal fauna and flora. CP 12/14, Conference of Parties to the Convention for Cooperation in the Protection, Management and Development of the Marine and Coastal Environment of the Atlantic Coast of the West, Central and Southern Africa Region, Abidjan.
- Acebes, J. 2009. Historical whaling in the Philippines: origins of 'indigenous subsistence whaling', mapping whaling grounds and comparison with current known distribution: a HMAP Asia Project Paper. Working Paper No. 161, Murdoch University, Australia, 36.
- Acorn International. 2015. Independent Study of Marine Environmental Conditions in Ghana. 93.
- Adam, R. 2008. The Japanese dolphin hunts: In quest of international legal protection for small cetaceans. *Animal Law* 14(2): 133–178.
- Adams, T. 2002. Europe's Black Sea Dimension. Centre for European Policy Studies (ed.), Brussels, 138. (available at: <http://bit.ly/2GT6glg>).
- Adaderana Sri Lanka. 2013. Ministry launches probe into massacre of over 50 dolphins in Kalpitiya. Article and video as of January 31, 2013.
- Agence France Press. Taiwan seizes seven tonnes of dolphin meat. *Straits Times*. 14 January 2014.
- Alfaro-Shigueto, J. & K. Van Waerebeek. 2001. Drowning in a sea of silence: the bushmeat concept as applied to marine wildlife. Zoos and Aquariums: Committing to Conservation (Orlando: ZACC): 16.
- Alfaro-Shigueto, J., Mangel, J.C., Pajuelo, M., Dulton, P.H., Seminoff, J.A. & Godley, B.J. 2010. Where small can have a large impact: structure and characterization of small-scale fisheries in Peru. *Fisheries Research*, 106 (1): 8–17.
- Alfaro-Shigueto, J., Mangel, J.C., Van Waerebeek, K. 2008. Small cetacean captures and CPUE estimates in artisanal fisheries operating from a port in northern Peru, 2005–2007. International Whaling Commission, Scientific Committee, SC/60/SM19. Santiago, Chile. June 2008
- Aliaga-Rossel, E. 2009. Conservation of river dolphin (*Inia boliviensis*) in Bolivia. In: *Biology, Evolution and Conservation of River Dolphins within South America and Asia*. Shostell & Ruiz-Garcia (eds.), 55–70.
- Allen, B. & R. Angliss. 2011. Beluga whale (*Delphinapterus leucas*): East Chuckchi Sea Stock. National Oceanic & Atmospheric Administration, Technical Memorandum, Alaska Fisheries Science Center. NOAA-TM-AFSC-234.
- Altherr, S. 2007. Going to Pot – The Neotropical bushmeat crisis and its impact on primate populations. Report by Care for the Wild (Kingsfold, UK) and Pro Wildlife (Munich), 32.
- Altherr, S. & S. Lüber. 2012. Toxic Menu: Contamination of whale meat and impact on consumers' health. Pro Wildlife & OceanCare (eds.), Munich / Wädenswil, 32.
- AMAP (Arctic Monitoring Assessment Program). 2011. Mercury in the Arctic. Arctic Monitoring Assessment Program (AMAP), Oslo, Norway. xiv + 193. (available at: [www.amap.no/documents/download/989](http://www.amap.no/documents/download/989)).
- An, Y. & Z. Kim. 2006. Korea progress report on cetacean research with statistical data for the calendar year 2005. International Whaling Commission, Scientific Committee, SC/58/ProgRep Korea. St. Kitts & Nevis, June 2006.
- Antigua Observer. 2017. St. Vincent to introduce legislation outlawing the killing of orcas. 5 April 2017.
- Armstrong, T. 2013. Management plan for the beluga (*Delphinapterus leucas*) in Ontario. Ontario Management Plan Series. Prepared for the Ontario Ministry of Natural Resources, Peterborough, Ontario. vi + 58.
- ASCOBANS. 2012. Pilot whale hunt in the Faroe Islands. AC19/Doc.5-01 (S) for 19th ASCOBANS Advisory Committee Meeting, Galway, Ireland, 20–22 March 2012.
- Asian Mirror. 2016. Security forces to prevent dolphin and whale hunting in Mirissa. 12 October 2016.
- Avila, I. Garcia, C. & Bastidas, J.C. 2008. A note on the use of dolphins as bait in the artisanal fisheries off Bahía Solano, Chocó, Colombia. *Journal of Cetacean Research and Management*, 10(2): 179–182.
- Avila, I. Kaschner, K. & Dormann, C.F. 2018. Current global risks to marine mammals: Taking stock of the threats. *Biological Conservation*, 221: 44–58.
- Ayissi, I., Van Waerebeek, K & Segniabeto, G.I. 2011. Report on the exploratory survey of cetaceans and their status in Cameroon. Conference paper for the 17th Meeting of the CMS Scientific Council, UNEP/CMS/ScC17/Inf.10.
- Baker, C.S., Lukoschek, V., Lavery, S., Dlebout, M.L., Yong-un, M., Endo, T., Funahashi, N. 2006. Incomplete reporting of whale, dolphin and porpoise 'bycatch' revealed by molecular monitoring of Korean markets. *Animal Conservation*, 9: 474–482.
- Baker, C.S., Cooke, J.G., Lavery, S., Dalebout, M.L., Yong-Un Ma, Funahashi, N., Carraher, C., & Brownell, R.K., Jr. 2007. Estimating the number of whales entering trade using DNA profiling and capture-recapture analysis of market products. *Molecular Ecology*, 16:2617–2626.
- Baker, C.S., Thompson, K., Dalebout, M.L., Robins, J., Brownell, R.K., Jr., Stone, G.S. & Hutt, A. 2013. Species identity and human consumption of beaked whales in the Gilbert Islands, Republic of Kiribati. *Animal Conservation*, 16(6): 641–647.
- Bamy, I., Van Waerebeek, K., Bah, S.S. & Dia, M., Kaba, B., Keita, N., and Konate, S. 2010. Species occurrence of cetaceans in Guinea, including humpback whales with Southern Hemisphere seasonality. *Marine Biodiversity Records*, 3:1–10.
- Barbosa-Filho, M., Barreto, R.M.F., Siciliano, S., Seminara, C.I. & Costa-Neto, E.M. 2018. Use of cetaceans as bait in Southern Bahia, Brazil, by expert fishers that market shark fins: a lucrative trade and two threatened zoological groups. *Ethnobiology Letters*, 9(2): 12–18.
- Barnett, A. 2014. Brazil bans catfish fishery that used dolphins as bait. *New Scientist*, July 30, 2014.
- Barrionuevo, A. 2011. Fishermen in Amazon see a rival in dolphins. *The New York Times*, April 16, 2011.
- Baulch, S. & C. Perry. 2014. A sea of plastic: Evaluating the impacts of marine debris on cetaceans. International Whaling Commission, Scientific Committee, SC/64/E10. Panama City, Panama, June/July 2012.
- Bearzi, G., Fortune, C.M., & Reeves, R.R. 2008. Ecology and conservation of common bottlenose dolphins *Tursiops truncatus* in the Mediterranean Sea. *Mammal Review*, 39(2): 92–123.
- Bearzi, G., Pierantonio, N., Bonizzoni, S., di Sciara, B.N. & Demma, M. 2010. Perception of a cetacean mass stranding in Italy: the emergence of compassion. *Aquatic Conservation Marine and Freshwater Ecosystems*, 20 (6): 644–654.
- Bennett, N., Govan, H. & Satterfield, T. 2015. Ocean grabbing. *Marine Policy*, 57: 61–68.
- Berggren, P. & Amir, O.A. 2007. Sustainable dolphin tourism in East Africa. MASMA Technical Report. WIOMSA Book Series No. 7, ix+72, ISSN: 0856-7972.
- Berkes, F. 1977. Turkish dolphin fisheries. *Oryx* 14(2): 163–167.
- Birkun Jr., A. 2008. *Delphinus delphis* ssp. *ponticus*. The IUCN Red List of Threatened Species 2008: e.T133729A3875256. <http://dx.doi.org/10.2305/IUCN.UK.2008.RLTS.T133729A3875256.en>. Downloaded on 10 January 2018.
- Birkun, Jr., A. 2002. Cetacean direct killing and live capture in the Black Sea. In: *Cetaceans of the Mediterranean and Black Seas: state of knowledge and conservation strategies*. G. Notarbartolo di Sciara (ed.), report to the ACCOBAMS Secretariat, Monaco. February 2002. Section 6. 10 p.
- Birkun, Jr., A., Northridge, S.P., Willstead, E.A., James, F.A., Kilgour, C., Lander, M. & Fitzgerald, G.D. 2014. Studies for Carrying Out the Common Fisheries Policy: Adverse Fisheries Impacts on Cetacean Populations in the Black Sea. Final Report to the EU Commission, Brussels, 347p.
- Bjerregaard, P. & C. Larsen. 2018. Three lifestyle-related issues of major significance for public health among the Inuit in contemporary Greenland: a review of adverse childhood conditions, obesity, and smoking in a period of social transition. *Public Health Review*, 39 (5). <http://doi.org/10.1186/s40985-018-0085-8>
- Bloch, D. 2007. Grindhval og Færøernes grindefangst. Føroya Náttúrgripasavn 2007. Pg. 29.
- Boertmann, D. 2007. Grønlands Rødliste 2007. Grønlands Hjemmestyre & Danmarks Miljøundersøgelser (eds.), 156.
- Bolaños-Jiménez, J., Mignucci-Giannoni, A.A., Blumenthal, J., Bogomolni, A., Casas, J.J., Henríquez, A., Iñíguez, M., Khan, J., Landrau-Giovanetti, N., Rinaldi, C., Rinaldi, R., Rodríguez-Ferrer, G., Suttly, L., Ward, N., Luksenburg, J.A. 2014. Distribution, feeding habits and morphology of killer whales *Orcinus orca* in the Caribbean Sea. *Mammal Review*. 44(3–4): 177–189.
- Bosch, A., O'Neill, B., Sigge, G.O., Kerwath, S.E., Hoffman, L.C. 2015. Heavy metals in marine fish meat and consumer health: a review. *Journal of the Science of Food and Agriculture*. 96(1): 32–48.
- Brashares, J., Arcese, P., Sam, M., Coppolillo, P., Sinclair, A. and Balmford, A. 2004. Bushmeat Hunting, Wildlife Declines, and Fish Supply in West Africa. *Science*, 306, 5699: 1180–83.

- Brashares, J., Golden, C.D., Weinbaum, K.Z., Barrett, C.B., and Okello, G.V. 2011. Economic and geographic drivers of wildlife consumption in rural Africa. *Proceedings National Academy of Sciences*, 103(34) 13931–13936. <http://doi.org/10.1073/pnas.1011526108>.
- Brito, C. & N. Vieira. 2009. Captures of “toninhas” in Angola during the 20th century. International Whaling Commission, Scientific Committee, SC/61/SM18. Madeira, Portugal, June 2009.
- Brito, C. & I. Carvalho. 2013. Blackfish off Cape Verde Islands: the need for future effort to assess distribution, abundance and interactions with human activities. 1–8. In: *Atas do colóquio internacional Cabo Verde e Guiné-Bissau: percursos do saber e da ciência*. Instituto de Investigação Científica Tropical.
- Brownell, R., Nowacek, D.P. & Ralls, K. 2008. Hunting cetaceans with sound: a worldwide review. *Journal of Cetacean Research and Management*, 10(1): 81–88.
- Brum, S., DaSilva, V.M.F., Rossoni, F. & Castello, L. 2015. Use of dolphins and caimans as bait for *Calophrys macropterus* (Lichtenstein, 1819) (Siluriforme: Pimelodidae) in the Amazon. *Journal Applied Ichthyology*, 31(4): 675–680.
- Butterworth, A., Brakes, P., Vail, C.S., & Reiss, D. 2013. A veterinary and behavioral analysis of dolphin killing methods currently used in the “drive hunt” in Taiji, Japan. *Journal Applied Animal Welfare Science*, 16(2): 184–204.
- Caballero, S., Trujillo, F., Ruiz-García, M., Vianna, J.A., Marmontel, M., Santos, F.R., & Baker, C.S. 2010. Population structure and phylogeography of tucuxi dolphins (*Sotalia fluviatilis*). In: *Biology, evolution and conservation of river dolphins within South America and Asia*. M. Ruiz-García & J. Shostell (eds.), Wildlife protection, destruction and extinction, Nova Sciences Publishers: 285–297.
- Cardenas, J., Gibbons, J., Oporto, J. Stutzin-Ambieto, M. 1987. Impacto de la pesquería de centolla y centollón sobre las poblaciones de mamíferos marinos de Magallanes, Chile. *Ambiente y Desarrollo*, 3(1,2): 111–119.
- Cardiff, E. 2014. Brazil plans to stop killing pink dolphins. June 4, 2014. (available at: [www.onegreenplanet.org](http://www.onegreenplanet.org))
- Castro, C., Cardenas, D., & Kaufman, G. 2018. Marine mammals used as bait with improvised Fish Aggregating Devices in Ecuador. International Whaling Commission, Scientific Committee, SC/67B/SM/06. Bled, Slovenia. April 2018.
- CBD. 2016. Decision XIII/8. Sustainable use of biodiversity: bushmeat and sustainable wildlife management, CBD/COP/DEC/XIII/8, Cancun, Mexico, December 2016.
- Cerchio, S., Razafindrakoto, Y. & Rosenbaum, H. 2009. Coastal dolphin hunting in the southwest of Madagascar: status of populations, human impacts and conservation actions. International Whaling Commission Scientific Committee, SC/61/SM15. Madeira, Portugal, June 2009.
- Cerchio, S., Andrianarivelo, N., Andrianantenaina, B., and Cordi, V. 2014. Ecology, Status, Fisheries Interactions and Conservation of Coastal Indian Ocean Humpback Dolphins and Indo-Pacific Bottlenose Dolphins on the West Coast of Madagascar. Project Final Report to the International Whaling Commission August 15, 2014. 41.
- Cerchio, S. Andrianarivelo, N., & Andrianantenaina, B. 2015. Ecology and Conservation Status of Indian Ocean Humpback Dolphins (*Sousa plumbea*) in Madagascar. *Advances in Marine Biology*, 72: 163–199.
- Ceta Base 2018. Taiji Drive Hunt. Available at: <http://www.cetabase.org/taiji/drive-results>. Last accessed 6th April 2018.
- Chatham House 2017. The 10<sup>th</sup> International Forum on Illegal, Unreported and Unregulated Fishing. 19. (available at: <http://www.chathamhouse.org/sites/default/files/publications/research/10th%20International%20IUU%20Fishing%20Forum%20Summary.pdf>).
- CITES. 2011. CITES and bushmeat – Joint meeting of the CBD Liaison Group on Bushmeat and the CITES Central Africa Bushmeat Working Group, Nairobi, Kenya. 7–10 June 2011.
- Citizen Reporter. 2014. Locals carve up dead whale on Palm Beach, KZN (video). South Africa. 25 August 2014. (available at: <http://bit.ly/2GQfvlv>).
- Chance, K. 2018. Whalers kill 3 more orcas in St. Vincent. *IWitnessNews*, April 19, 2018.
- China Cetacean Alliance. 2015. OCEAN THEME PARKS: A Look Inside China's Growing Captive Cetacean Industry.
- Clapham, P.J. & Van Waerebeek, K. 2007. Bushmeat and bycatch: the sum of the parts. *Molecular Ecology*, 16: 2607–2609.
- CMS. 2015. Report of the Third Southeast Asian Marine Mammal Symposium. Southeast Asian Marine Mammal Symposium (SEAMAM). CMS Technical Series No. 32. UNEP/CMS Secretariat, Bonn, Germany. 643.
- CMS. 2017. Aquatic wild meat. Report prepared by the Aquatic Mammals Working Group of the Scientific Council and the CMS Secretariat, for CoP12, Manila, Philippines, 23–28 October 2017. (available at: <http://bit.ly/2nHcZsZ>).
- Collins, T. 2015. Re-assessment of the conservation status of the Atlantic humpback dolphin, *Sousa teuszii* (Kükenthal, 1892), using the IUCN Red List Criteria. *Advances in Marine Biology*, 72: 47–77.
- Collins, T., Boumba, R., Thonio, J., & Parnell, R. 2010. The Atlantic humpback dolphin (*Sousa teuzii*) in Gabon and Congo: cause for optimism or concern. International Whaling Commission, Scientific Committee. SC/62/SM9. Agadir, Morocco, June 2010.
- COMHAFAT. 2016. Rapport de la Réunion Préparatoire pour les rencontres Internationales sur la Conservation pour l'année 2016. Rabat, Maroc. 22 Juillet 2016. 30.
- Conservation India. 2017. Poached Gangetic dolphin, Malda, West Bengal. 30 December 2017. (available at: <http://bit.ly/2ENE5pr>).
- CIMMC & NMFS. 2008. Cook Inlet Beluga Whale Subsistence Hunt Management. Cook Inlet Marine Mammal Council and National Marine Fisheries Service. (available at: <http://alaskafisheries.noaa.gov/sites/default/files/brochure1208.pdf>).
- Corkeron, P. 2009. Marine mammals' influence on ecosystem processes affecting fisheries in the Barents Sea is trivial. *Biology Letters*, 5: 204–6. 10.1098/rsbl.2008.0628.
- Cosentino, M. & S. Fisher. 2016. The utilization of aquatic bushmeat from small cetaceans and manatees in South America and West Africa. *Frontiers in Marine Science*, 3: 163.
- Cosentino M., Frey S. & Fisher S. 2016. The utilization of aquatic bushmeat from small cetaceans in West Africa. International Whaling Commission, Scientific Committee, SC/66b/SM/01. Bled, Slovenia. June 2016.
- COSEWIC. 2004. Assessment and update status report on the beluga whale *Delphinapterus leucas* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. ix + 70.
- Crespo, E., Olavarria, C., Dellabianca, N., Iñiguez, M., Ridoux, V. & Reeves, R. 2017. *Cephalorhynchus commersonii*. The IUCN Red List of Threatened Species 2017: e.T4159A50351788. Downloaded on 19 December 2017.
- Cruz, M., Machete, M., Menezes, G., Rogan E., and Silva, M. 2018. Estimating common dolphin bycatch in the pole-and-line tuna fishery in the Azores. *PeerJ* 6:e4285. (available at: <http://doi.org/10.7717/peerj.4285>).
- Culik, B. 2004. Review of Small Cetaceans: Distribution, Behaviour, Migration and Threats. Marine Mammal Action Plan / Regional Seas Reports and Studies no. 177. UNEP CMS (ed.), Bonn, 91.
- Cunha, H., da Silva, V.M., Santos, T.E.C., Moreira, S.M., do Carmo, N.A.S. & Sole-Cava, A.M. 2015. When you get what you haven't paid for: molecular identification of “Douradinha” fish filets can help end the illegal use of river dolphins as bait in Brazil. *Journal of Heredity*, 106 (Suppl 1): 565–572.
- Curci, A. & Brescia, M. 2015. Un salto fuor d'acqua: Un resto di delfino di età tardo-antica dal condotto fognario di Classe (Ravenna). *Annali dell'Università degli Studi di Ferrara Museologia Scientifica e Naturalistica*, 11(2): 115–118. (available at: <http://dx.doi.org/10.15160/1824-2707/987>).
- Daniels, A., Gutiérrez, M., Fanjul, G., Guereña, A., Matheson, I. & Watkins, K. 2016. Western Africa's missing fish: The impacts of illegal, unreported and unregulated fishing and under-reporting catches by foreign fleets. Overseas Development Institute. London, United Kingdom. 45.
- Da Silva, V. & A. Martin. 2010. Status, threats, conservation initiatives and possible solutions for *Inia geoffrensis* and *Sotalia fluviatilis* in Brazil. 123–144. In: Trujillo, F., Crespo, E., van Damme, P., & Usma, J.S. (eds). The Action Plan for South American River Dolphins 2010–2020. WWF, Fundación Omacha, WCS, WDCC, Solamac. Bogotá, D.C., Colombia. 249.
- da Silva, V.M.F., Martin, A.R., & do Carmo, N.A.S. 2011. Boto bait – Amazonian fisheries pose a threat to elusive dolphin species. *IUCN Species Magazine of the Species Survival Commission*. 53: 10–11.
- da Silva, V.M.F., Nunes, C.G., de Araujo, L.F.B., Batista, J.S., Cunha, H. & Martin, T. 2018a. The use of Amazonian dolphins (*Inia* and *Sotalia*) as bait for the piracatinga fishery. SC/M18/SAW10. Workshop on the Poorly Documented Takes of Small Cetaceans of South America, including in-depth review of the hunting of boto (*Inia geoffrensis*) for the piracatinga (*Calophrys macropterus*) fishery 19–21 March 2018. Santos, Brazil.
- da Silva, V., Freitas, C.; Dias, R.; Martin, A. 2018b. Both cetaceans in the Brazilian Amazon show sustained, profound population declines over two decades. *PLoS ONE* 13(5): e0191304. (available at: <http://doi.org/10.1371/journal.pone.0191304>).
- Dayaratne, P. & L. Joseph. 1993. A study on dolphin catches in Shri Lanka, Bay of Bengal Programme BOBP/REP/56, Madras, India, 47.
- Daily Mirror Sri Lanka. 2017. Nine fishermen arrested for killing 12 dolphins. 5 March 2017.
- Debrah, J., Ofori-Danson, P.K. & Van Waerebeek, K. 2010. An update on the catch composition and other aspects of cetacean exploitation in Ghana. International Whaling Commission, Scientific Committee. SC/62/SM10. Agadir, Morocco, June 2010.

- de March, B. & L. Postma 2003. Molecular genetic stock discrimination of belugas (*Delphinapterus leucas*) hunted in Eastern Hudson Bay, northern Quebec, Hudson Strait and Sanikiluaq (Belcher Islands), Canada and comparisons to adjacent populations. *Arctic*, 56: 111–124.
- DFO. 2016. Update to the proportion of Eastern Hudson Bay harvested and implications for harvest allocations in Nunavik. Canadian Science Advisory Secretariat - science advisory report 2016/043.
- DFO. 2018. Harvest advice for eastern and western Hudson Bay Beluga (*Delphinapterus leucas*). DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2018/008.
- Doğan News Agency. 2015. Dead baby dolphin found spearfished, burnt, cut in Turkey's Bodrum province. *Hürriyet Daily*. January 26, 2015. (available at: <http://bit.ly/2E8BNjQ>).
- Doherty, P.D., Alfaro-Shigueto, J., Hodgson, D.J., Mangel, J.C., Witt, M.J. & Godley, B.J. 2014. Big catch, little sharks: Insight into Peruvian small-scale longline fisheries. *Ecology and Evolution*, 4(12): 2375–2383.
- Dolar, M., Leatherwood, S.J., Wood, C.J., Alava, M.N.R., Hill, C.L. & Aragonés, L.V. 1994. Directed fisheries for cetaceans in the Philippines. *Report of the International Whaling Commission*, 44: 439–449.
- Dolar, M., Perrin, W.F., Arnold, A., Yaptinchay, S.P., Arifin, S., Jaamin, H.J., Santos, M.D., Alava, M.N. & Suliansa, S.B. 1997. Preliminary investigation of marine mammal distribution, abundance, and interactions with humans in the southern Sulu Sea. *Asian Marine Biology*, 14: 61–81.
- DOP/IMAR. 2008. Programa de Observação para as Pescas dos Açores "POPA" Manual do Observador. (available at: [www.horta.uac.pt/projetos/popa/downloads/relat2008.pdf](http://www.horta.uac.pt/projetos/popa/downloads/relat2008.pdf)).
- Environmental Investigation Agency. 2014. Endangered belugas and the growing threats of climate change, Arctic shipping and industrialization – why Arctic nations should implement a ten-year moratorium on increased Arctic shipping. 24.
- Environmental Investigation Agency. 2015. Dangerous diet: Japan fails in its duty of care over toxic whale and dolphin meat. 16.
- Emont, J. 2017. A whaling way of life under threat. *New York Times*. 3 August 2017.
- Endo, T. & K. Haraguchi. 2010. High mercury levels in hair samples from residents of Taiji, a Japanese whaling town. *Marine Pollution Bulletin*, 60(5): 743–747.
- Endo, T., Haraguchi, K. & Sakata, M. 2002. Mercury and selenium concentrations in the internal organs of toothed whales and dolphins marketed for human consumption in Japan. *Science of the Total Environment*, 300: 15–22.
- Endo, T., Yong-Un, M., Baker, C.S., Funahashi, N., Lavery, S., Dalebout, M.L., Lukoschek, V. & Haraguchi, K. 2007. Contamination level of mercury in red meat products from cetaceans available from South Korea markets. *Marine Pollution Bulletin*, 54: 669–677.
- Endo, T., Hayasaka, M., Hisamichi, Y., Kimura, O. & Haraguchi, K. 2013. Carbon and nitrogen stable isotope ratios and mercury concentration in the scalp hair of residents from Taiji, a whaling town. *Marine Pollution Bulletin*, 69: 116–121.
- Estes, J., Terborgh, J., Brashares, J.S., Power, M.E., Berger, J., Bond, W.J. & Carpe, S.R. 2011. Trophic Downgrading of Planet Earth. *Science*, 6040: 301–306.
- Fa, J., Peres, C.A., & Meeuwin, J. 2002. Bushmeat exploitation in tropical forests: an intercontinental comparison. *Conservation Biology*, 16: 232–237.
- FAO. 2015. Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication. Rome. 34.
- FAO. 2018. The State of World Fisheries and Aquaculture 2018 - Meeting the sustainable development goals. Rome. Licence: CC BY-NC-SA 3.0 IGO
- FEROP (Far East Russian Orca Project). 2018. Russian orcas homepage. (available at <http://www.russianorca.com/index.php?lang=en&mode=>).
- Fielding, R. 2010. Artisanal whaling in the Atlantic: a comparative study of culture, conflict, and conservation in St. Vincent and the Faroe Islands. PhD Thesis, Louisiana State University, Dept. of Geography and Anthropology. 446.
- Fielding, R., 2013. Whaling futures: a survey of Faroese and Vincentian youth on the topic of artisanal whaling. *Society & Natural Resources*, 26 (7): 810–826.
- Fielding, R. 2018. The Wake of the Whale; Hunter Societies in the Caribbean and North Atlantic. Harvard University Press. Cambridge, Massachusetts. ISBN 9780674986374. 352.
- Fielding, R., & Evans, D. W. 2014. Mercury in Caribbean dolphins (*Stenella longirostris* and *Stenella frontalis*) caught for human consumption off St. Vincent, West Indies. *Marine Pollution Bulletin*, 89(1–2): 30–34.
- Fiskeribladet, 2017. Vil fangste spekkhogger og knolhval. 14 November 2017. (available at: <http://fiskeribladet.no/nyheter/?artikkel=56743>).
- Flores, P., Trujillo, P. & Rocha-Campos, C.C. 2008. The status of “piracatinga” fishery using Amazon botos as bait in South America. International Whaling Commission, Scientific Committee, SC/60/SM17. Santiago, Chile, June 2008.
- Fontaine, M., Snirc, A., Frantzis, A., Koutrakis, E., Ozturk, B., Ozturk, A.A. & Austerlitz, F. 2012. History of expansion and anthropogenic collapse in a top marine predator of the Black Sea estimated from genetic data. *Proceedings of the National Academy of Sciences*, 109 (38): E2569–E2576.
- Frizzell, S. 2017. Nunavik beluga hunt quota gets bump, but it's complicated – Biopsy pilot project will help understand how well whale hunters can distinguish between beluga stocks. *CBC News Canada*, June 2, 2017.
- Frost, K. & Suydam, R. 2010. Subsistence harvest of beluga or white whales (*Delphinapterus leucas*) in northern and western Alaska, 1987–2006. *Journal of Cetacean Research and Management*, 11(3): 293–299.
- Fruet, P., Porter, L., Scheidat, M., Zerbini, A. (convener). 2018. Workshop on the poorly documented takes of small cetaceans in South America: Including in-depth review of the hunting of the Amazon River Dolphin (*Inia geoffrensis*) for the piracatinga (*Calophrys macropterus*) fishery. 19th – 21st March 2018, Novotel Santos, City of Santos, São Paulo State, Brazil. See also International Whaling Commission, Scientific Committee, SC/67B/REP/01. Bled, Slovenia, April 2018.
- Gazetta del Sud. 2014. Dolphin meat seized from ship near Rome – banned mammal filets found in port of Civitavecchia. 24 January 2014. (available at: <http://bit.ly/2unS582>).
- Gibbins, S. 2017. Killing of orcas in front of tourists could spell end of whaling for island nation. *National Geographic*, 6 April 2017.
- Gillespie, A. 2001. Small cetaceans, international law and the International Whaling Commission. *Melbourne Journal of International Law*, 2: 257: 257–300.
- GINR. 2012. Beluga and narwhal numbers are recovering in Greenland. Website of the Greenland Institute of National Resources. (available at: <http://bit.ly/2E4M3cR>).
- Goetschel, A. 1998. Legal analysis of IWC competence to manage small cetaceans. Analysis by order of the Swiss Coalition for the Protection of Whales.
- Gonzalez-Pestana, A., Kouri, J.C., and Velez-Zuazo, X. Shark fisheries in the Southeast Pacific: A 61-year analysis from Peru. *F1000Research*, 3:164. doi: 10.12688/f1000research.4412.1.
- Gore, M., Kiani, M.S., Ahmad, E., Hussain, B., Ormond, R.F., Siddiqui, J., Waqas, U. & Culloch, R. 2012. Occurrence of whales and dolphins in Pakistan with reference to fishers' knowledge and impacts. *Journal of Cetacean Research and Management*, 12: 235–247.
- Grandjean, P., Murata, K., Budtz-Jorgensen, E. & Weihe, P. 2004. Cardiac autonomic activity in methylmercury neurotoxicity: 14-year follow-up of a Faroese birth cohort. *Journal of Pediatrics*, 144(2): 169–176.
- Grandjean, P., Bellinger, D., Bergman, A., Cordier, S., Davey-Smith, G., Eskenazi, B., Gee, D., Gray, K., Hanson, M., Van Den Hazel, P., Heindel, J.J., Heinzow, B., Hertz-Picciotto, I., Hu, H., Huang, T. T., Jenson, T.K., Landrigan, P.J., McMillan, I.C., Murata, K., Ritz, B., Schoeters, G., Skakkebaek, N.E., Skerfving, S., & Weihe, P. 2007. The Faroes Statement: Human health effects of developmental exposure to chemicals in our environment. *Basic & Clinical Pharmacology & Toxicology*, 102 (2): 73–75.
- Gregoire, L. 2016. Wonky numbers, narwhal quota cuts anger Nunavut community. *Nunatsiaq News*, 9 December 2016.
- Government of St. Lucia. 2013. Whaling traditions and policies in St. Lucia. (available at [www.govt.lc/media.govt.lc/www/resources/publications/WhalingTraditionsandPolicies.pdf](http://www.govt.lc/media.govt.lc/www/resources/publications/WhalingTraditionsandPolicies.pdf)).
- Guissamulo, A. 2008. Ecological studies of bottlenose and humpback dolphins in Maputo Bay, southern Mozambique. PhD Thesis, Dept. Zoology and Entomology, University of Kwazulu-Natal, South Africa, 226.
- Gullan, A. 2018. *pers. comm.* to N. Hodgins, Whale and Dolphin Conservation, 25th January.
- Hall, A. 2018. Mercury in Cetaceans. International Whaling Commission, Scientific Committee, SC/67B/E/08. Bled, Slovenia, April 2018.
- Hammill, M., Mosnier, A., Gosselin, J.F., Matthews, C.J.D., Marcoux, M., and Ferguson, S.H. 2017. Management approaches, abundance indices and total allowable harvest levels of belugas in Hudson Bay. DFO Canadian Science Advisory Secretariat Research Document 2017/062. iv + 43 p.
- Hammond, P.S., Bearzi, G., Bjørge, A., Forney, K.A., Karkzmariski, L., Kasuya, T., Perrin, W.F., Scott, M.D., Wang, J.Y., Wells, R.S. & Wilson, B. 2012. *Tursiops truncatus*. The IUCN Red List of Threatened Species 2012: e.T22563A17347397, <http://dx.doi.org/10.2305/IUCN.UK.2012.RLTS.T22563A17347397.en>. Downloaded on 03 April 2018.
- Hazevoet, C. & F. Wenzel. 2000. Whales and dolphins (Mammalia, Cetacea) of the Cape Verde Islands, with special reference to the humpback whale *Megaptera novaeangliae* (Borowski, 1781). *Contributions to Zoology*, 69 (3): 197–211.



- Heide-Jørgensen, M., Hansen, R.G., Fossett, S., Nielsen, N.H., Borchers, D.L., Stern, H., Witting, L. 2017. Rebuilding beluga stocks in West Greenland. *Animal Conservation*, 20: 282–293.
- Herrera-Trujillo, O. 2017. Creation of an action plan for the conservation of freshwater mammals in Venezuela, *Oryx*, 51(1): 16.
- Hjarsen, T. 2005. The big four – a WWF update on Greenland's efforts with regards to species conservation and nature protection. WWF Denmark (ed.), 72.
- Hobbs, R., Rugh, D.H. & Demaster, D.P. 2000. Abundance of belugas, *Delphinapterus leucas*, in Cook Inlet, Alaska, 1994–2000. *Marine Fisheries Review*, 62(3): 37–45.
- Hollatz, C., Vilaca, S.T., Redondo, R.A.F., Marmontel, M., Baker, C.S. & Santos, F.R. 2011. The Amazon River system as an ecological barrier driving genetic differentiation of the pink dolphin (*Inia geoffrensis*). *Biological Journal of the Linnean Society*, 102(4): 812–827.
- Holliday, S., Johns, R., Ryle, J., and Thornton, A. 1996. The continuing global war against small cetaceans. 3<sup>rd</sup> Report. Environmental Investigation Agency, London, 48.
- Hooper, J. 2013. Italian prosecutors investigate claims of restaurants serving dolphin. *The Guardian*. December 16, 2013. (available at: <http://bit.ly/2l787oN>).
- Hovelsrud, G., McKenna, M. & Huntington, H.P. 2008. Marine mammal harvests and other interactions with humans. *Ecological Applications*, 18(2) Suppl. Pgs: S135–S147.
- Huntington, H. 2001. Report of the Workshop on Bering-Chukchi belugas. Seattle, Washington, 15–17 November 2001. Report 36.
- Hurtubise, J. 2016. Evolution of subsistence and commercial Inuit fisheries in the Territory of Nunavut, Canada. Marine Affairs Technical Report No. 14. Marine Affairs Program, Dalhousie University (ed.), 75.
- Hürriyet Daily News. 2015. Endangered dolphin killed by shotgun in Istanbul's Bosphorus. *Hürriyet Daily*. 29 May 2015.
- Hürriyet Daily News. 2017. Investigation started into fishermen who shot dead dolphins in Turkey's Zonguldak. *Hürriyet Daily*. 26 April 2017.
- Ilangakoon, A. 2012. A review of cetacean research and conservation in Sri Lanka. *Journal Cetacean Research & Management*, 12(2): 177–183.
- Ilangakoon, A., Miththapala, A.D. & Ratnasooriya, W.D. 2000a. Sex ratio and size range of small cetaceans in the fisheries catch on the west coast of Sri Lanka. *Vidyodaya Journal of Science*, 9: 25–35.
- Ilangakoon, A., Ratnasooriya, W.D. & Miththapala, S. 2000b. Species diversity, seasonal variation and capture methods of small cetaceans on the west coast of Sri Lanka. *Vidyodaya Journal of Science*, 9: 37–51.
- Iriarte, V. & M. Marmontel. 2013. Insights on the use of dolphins (boto, *Inia geoffrensis* and tucuxi, *Sotalia fluviatilis*) for bait in the piracatinga (*Calophysus macropterus*) fishery in the western Brazilian Amazon. *Journal Cetacean Research and Management*, 13(2): 163–173.
- Isobe, T., Ochi, Y., Ramu, K., Yamamoto, T., Tajima, Y., Yamada, T.K., Amano, M., Miyazaki, N., Takahashi, S. & Tanabe, S. 2009. Organohalogen contaminants in striped dolphins (*Stenella coeruleoalba*) from Japan: present contamination status, body distribution and temporal trends (1978–2003). *Marine Pollution Bulletin*, 58: 396–401.
- IUCN. 2016. Amazon river dolphins in Brazil continue to be killed for fish bait. IUCN SSC Cetacean Specialist Group. 3 October 2016. (available at: <http://bit.ly/2ewMFip>).
- IWC. 2018a. Bycatch. (available at: <http://iwc.int/bycatch>).
- IWC. 2018b. Small cetaceans. (available at: <http://iwc.int/smallcetacean>).
- IWC SC. 2013. Report of the Scientific Committee Annual Meeting.
- IWC SC. 2014. Report of the Scientific Committee Annual Meeting.
- IWC SC. 2018. Report of the Scientific Committee Annual Meeting. Annex M.
- Jaaman, S., Lah-Anyi, Y.U. & Pierce, G.J. 2005. Incidental catches of marine mammals in fisheries was investigated in Sabah and Sarawak waters, East Malaysia. Proceedings of the ICES Annual Science Conference 2005, Aberdeen Exhibition and Conference Centre (AECC), UK. CM 2005/X:07.
- Jaaman, S., Lah-Anyi, Y.U. & Peirce, G.J. 2008. Directed fisheries for dolphins and dugong in Sabah, East Malaysia: Past and presence. *Borneo Science*, 23:1–20.
- Jackson, L. 2017. Meanwhile in Kiribati, the dolphins come out to play. *Huffington Post*. 1 February 2017.
- Japan Fisheries Agency. 2000–2016. Japan Progress report on small cetacean research – with statistical data for the calendar years 2010–2016, Documents H12-H28 by the Fisheries Research Agency of Japan. (available at: [http://www.jfa.maff.go.jp/j/whale/w\\_document/index.html](http://www.jfa.maff.go.jp/j/whale/w_document/index.html)).
- Kahn, B. 2002. Alor Rapid Ecological Assessment – Visual and acoustic cetacean surveys and evaluation of traditional whaling practices, fisheries interactions and nature-based tourism potential: October 2001 and May 2002 Survey Periods. Alor Rapid Ecological Assessment Report for WWF - Wallacea and TNC Coastal and Marine Program/Indonesia. 36. (available at: <http://bit.ly/2zupuljV>).
- Kajiwara, N., Kamikawa, S., Ramu, K., Ueno, D., Yamada, T.K., Subramanian, A., Lam, P.K.S., Jefferson, T.A., Prudente, M., Chung, K-H., & Tanabe, S. 2006. Geographical distribution of polybrominated diphenyl ethers (PBDEs) and organochlorines in small cetaceans from Asian waters. *Chemosphere*, 64: 287–295.
- Kasuya, T. 1985. Effect of exploitation on reproductive parameters of the spotted and striped dolphins off the Pacific coast of Japan. *The Scientific Reports of the Whale Research Institute*, 36: 107–138.
- Keeley, G. 2007. Outrage as fishermen slaughter killer whales. *The Telegraph*. 15 April 2007.
- Khan, A. & Sesay, S. 2015. Seafood insecurity, bush meat consumption, and public health emergency in West Africa: did we miss the early warning signs of an Ebola epidemic? *Maritime Studies*, 14 (3).
- Kiani, M. & K. Van Waerebeek. 2015. A review of the status of the Indian Ocean humpback dolphin (*Sousa plumbea*) in Pakistan. *Advances in Marine Biology*, 72: 201–28.
- Kim, D., Sohn, H., An, Y-R., Park, K.J., Kim, H.W., Ahn, S.E. & An, D.H. 2013. Status of the cetacean bycatch near Korean waters. *Korean Journal of Fisheries and Aquatic Sciences*, 46(6): 892–900.
- Kiseleva, A., Nichols, J., Hough, A., and Hønneland, G. 2016. Public Certification Report Faroese Pelagic Organisation North East Atlantic blue whiting fishery. DNV-GL. 227.
- Kishiro, T. & T. Kasuya. 1993. Review of Japanese dolphin drive fisheries and their status. *Report of the International Whaling Commission*, 43: 439–452.
- Kumarran, R. 2012. Cetaceans and cetacean research in India. *Journal Cetacean Research and Management*, 12(2): 159–172.
- Kurrigram, A. & A. Roy. 2018. Two dolphins caught from Dhorla River. *Dhaka Tribune*. 24 June 2018. (available at: <http://bit.ly/2lRkt6q>).
- Lahvis, G., Wells, R.S., Kuehl, D.W., Stewart, J.L., Rhinehart, H.L. & Via, C.S. 1995. Decreased lymphocyte responses in free-ranging bottlenose dolphins (*Tursiops truncatus*) are associated with increased concentrations of PCBs and DDT in peripheral blood. *Environmental Health Perspectives*, 103 (Suppl. 4): 67–72.
- Lal Mohan, R.S. 1985. Some observation on marine mammals and marine birds. Marine Living Resources of the Union Territory of Lakshadweep – An Indicative Survey with Suggestions for Development. *CMFRI Bulletin*, 43:195–199.
- Lantz, A. & C. Gunasekera. 1955. Commercial utilization of dolphins (porpoises) in Ceylon. Department of Fisheries, Bulletin. No. 3, 15.
- Lavigne, D. 2003. Marine mammals and fisheries: the role of science in the culling debate. In *Marine Mammals: Fisheries Tourism and Management Issues*. N. Gales et al. (eds.), CSIRO publications.
- Leeney, R., Dia, I.M., & Dia, M. 2015. Food, pharmacy, friend? bycatch, direct take and consumption of dolphins in West Africa. *Human Ecology*, 43(1): 105–118.
- Legarda, L. 2014. 2 dwarf sperm whales, 21 dolphins killed by dynamite fishing off Siargao. Press statement. March 26, 2014. (available at: <http://lorenlegarda.com.ph/2-dwarf-sperm-whales-21-dolphins-killed-by-dynamite-fishing-off-siargao-loren/>).
- Leonel, J., Taniguchi, S., Sasaki, D.K., Cascaes, M.J., Dias, P.S., Botta, S., Santos, M.C. de O., & Montone, R.C. 2012. Contamination by chlorinated pesticides, PCBs and PBDEs in Atlantic spotted dolphin (*Stenella frontalis*) in western South Atlantic. *Chemosphere*, 86: 741–746.
- Lescrauwaet, A., & Gibbons, J. 1994. Mortality of small cetaceans and the crab bait fishery in the Magallanes area of Chile since 1980. *Report International Whaling Commission (Special Issue)*, 15(2): 485–494.
- Lewison, R. & Moore, J. 2012. Improving interview-based assessments of sea turtle and marine mammal bycatch in West Africa: Putting fishing activity into a socio-economic context. Project report, San Diego State University and Southwest Fisheries Science Center, National Oceanic and Atmospheric Administration. 81.
- Liyanage, M. 2017. Two men transporting killed dolphins arrested. *Daily News Sri Lanka*. 17 July 2017.
- Lo, C., Chin, L., Chu, C., Wang, Y., Chan, K. & Yang, W. 2013. Rapid immune colloidal gold strip for cetacean meat restraining illegal trade and consumption: Implications for conservation and public health. *PLoS ONE*, 8(3): e6704.
- Loch, C., Marmontel, M. & Simoes-Lopes, P.C. 2009. Conflicts with fisheries and intentional killing of freshwater dolphins (Cetacea: Odontoceti) in the Western Brazilian Amazon. *Biodiversity Conservation*, 18: 3979–3988.

- Lonsdale, J. 2013. New rules but same old cruelty in Faroe Islands whaling. Environmental Investigation Agency Blog. 2 August 2013.
- Lowry, L., O’Corry-Crowe, G., & Goodman, D. 2012. *Delphinapterus leucas* (Cook Inlet subpopulation). The IUCN Red List of Threatened Species 2012: e.T61442A17691385. (available at: <http://dx.doi.org/10.2305/IUCN.UK.2012.RLTS.T61442A17691385.en>). Downloaded on 20 March 2018.
- Lowry, L., Laidre, K. & Reeves, R. 2017a. *Monodon monoceros*. The IUCN Red List of Threatened Species 2017: e.T13704A50367651. (available at: <http://dx.doi.org/10.2305/IUCN.UK.2017-3.RLTS.T13704A50367651.en>). Downloaded on 27 February 2018.
- Lowry, L., Reeves, R., Laidre, K., & Karkzmarski, L. 2017b. *Delphinapterus leucas*. The IUCN Red List of Threatened Species 2017: e.T6335A50352346. (available at: <http://dx.doi.org/10.2305/IUCN.UK.2017-3.RLTS.T6335A50352346.en>). Downloaded on 27 February 2018.
- Lusseau, D. & M. Newman. 2004. Identifying the role that animals play in their social networks. *Proceedings Royal Society London B (Suppl.) Biological Sciences*, 271: S477–S481
- Masters, J. 2012. CRFM Statistics and Information Report - 2010. 65.
- Masters, J. 2014. CRFM Statistics and Information Report - 2012. 70.
- MacLeod, C. 2009. Global climate change, range changes and potential implications for the conservation of marine cetaceans: a review and synthesis. *Endangered Species Research*, 7:125–136.
- Mahoney, B. & K. Shelden. 2000. Harvest history of belugas, *Delphinapterus leucas*, in Cook Inlet, Alaska. *Marine Fish Review*, 62(3): 124–133.
- Maigret, J. 1994. Marine mammals and fisheries along the West African coast. *Report International Whaling Commission (Special issue 15)*, 307–316.
- Mangel, J. 2012. Interactions of Peruvian small scale fisheries with threatened marine vertebrate species. PhD Thesis, Biological Sciences. University of Exeter. 169.
- Mangel, J., Alfaro-Shigueto, J., van Waerebeek, K., Caceres, C., Bearhop, S., Witt, M.J. & Godley, B.J. 2010. Small cetacean captures in Peruvian artisanal fisheries: High despite protective legislation. *Biological Conservation*, 143: 136–143.
- Mares. 2016. Three fishermen on trial for killing dolphins for shark bait. August 18, 2016. (available at: <http://bit.ly/2GOxFEE>).
- Marsh, H. 2013. Additional letter to Japanese government regarding dolphin and small whale hunts. Presidential Letters. Society for Marine Mammalogy.
- Mc Laughlin, K. 2017. Italian fishermen shoot dolphins, blaming them for wrecking their livelihoods because they are ‘eating too many fish. *The Daily Mail*. 24 March 2013.
- Meehan, R., Belikov, S., Desportes, G., Ferguson, S.H., Kovacs, K.M., Laidre, K.L., Stenson, G.B., Thomas, P.O., Ugarte, F., and Vongraven, D. 2017. Marine Mammals. In: *State of the Arctic Marine Biodiversity Report*. Conservation of Arctic Flora and Fauna (CAFF) International Secretariat, Akureyri, Iceland, 149–173.
- Meltzer, H. 2017. Excitement turns to horror as cruise passengers witness orcas harpooned off Caribbean island. *The Telegraph*. 7 April 2017. (available at: <http://bit.ly/2KSo2ok>).
- Minh, T., Prudente, M.S., Tanabe, S., Nakata, H., Miyazaki, N., Jefferson, T.A. & Subramanian, A. 2000. Recent contamination of persistent chlorinated endocrine disruptors in cetaceans from the North Pacific and Asian coastal waters. *Water Science & Technology*, 42 (7–8): 231–240.
- Mintzer, V.J., Martin, A.R., da Silva, V.M.F. Barbour, A.B., Lorenzen, K. & Frazer, T.K. 2013. Effect of illegal harvest on apparent survival of Amazon River dolphins (*Inia geoffrensis*). *Biological Conservation*, 158: 280–286.
- Mintzer, V.J., Schminck, M., Lorenzen, K., Frazer, T.K., Martin, A.R. & da Silva, V.M.F. 2015. Attitudes and behaviors toward Amazon River dolphins (*Inia geoffrensis*) in a sustainable use protected area. *Biodiversity Conservation*, 24(2): 247–269.
- Mintzer, V.J., Diniz, K. & Frazer, T.K. 2018. The use of aquatic mammals for bait in global fisheries. *Frontiers in Marine Science*, 5:191: 1–26.
- Mishral, A. 2011. Dolphin poaching goes unabated. *The Times of India*. 14 April 2011.
- Miyashita, T. & T. Kasuya. 1988. Distribution and abundance of Dall’s porpoises off Japan. *The Scientific Reports of the Whale Research Institute*. 39: 121–150.
- MMC. 2018. Letter from Peter Thomas, Director, Marine Mammal Commission to Chief, Marine Mammal and Sea Turtle Conservation Division Office of Protected Resources National Marine Fisheries Service, March 19, 2018. (available at <http://www.mmc.gov/wp-content/uploads/18-03-19-Chief-Marine-Mammal-Sea-Turtle-Conservation-Division-Final-2017-SARs.pdf>).
- Morissette, L., Kaxchner, K., & Gerber, L.R. 2010. ‘Whales eat fish?’ Demystifying the myth in the Caribbean marine ecosystem. *Fish and Fisheries*, 11(4): 388–404.
- Morissette, L., Christensen, V., & Pauly, D. 2012. Marine mammal impacts in exploited ecosystems: would large scale culling benefit fisheries? *Plos One*, 7(9): e43966
- Mosbergen, D. 2014. Dolphin killed with arrow off Gulf Coast is latest in string of violent deaths. *Huffington Post*. 6 December 2014.
- Mosquera-Guerra, F., Trujillo, F., Parks, D., Oliveira-da-Costa, M., Usma, S., Willems, D., Maldonado, R., Amoroch, D., Berg, K., Armenteras-Pascual, D., Van Damme, P., Sainz, L., Franco, N., Mantilla-Meluk, H., Carvajal-Castro, J., Cambell, E., Cordova, L., Echeverria, A., Caballero, S., and Marmontel, M. 2018. Presence of mercury in river dolphins (*Inia* and *Sotalia*) in the Amazon and Orinoco basins: evidence of a growing threat for these species. International Whaling Commission, Scientific Committee, SC/67B/E/06. 30. Bled, Slovenia, April 2018.
- Mundo Azul. 2016. A short history of dolphin killing in Peru. (available at: <http://bit.ly/2FRqXze>).
- Mustika, P. 2006. Marine mammals in the Savu Sea (Indonesia): indigenous knowledge, threat analysis and management options. Thesis, School of Tropical Environment Studies and Geography, James Cook University, Australia.
- Mustika, P. 2011. Towards sustainable dolphin watching tourism in Lovina, Bali, Indonesia. PhD Thesis. James Cook University, Townsville, Australia, 239.
- Mustika, P.L., Purnomo, F.S. & Northridge, S. 2014. A pilot study to identify the extent of small cetacean bycatch in Indonesia using fisher interview and stranding data as proxies. Updated Report to the International Whaling Commission, Denpasar. 61.
- Mymrin, N.I., The Communities of Novoe Chaplino, Sireniki, Uelen & Yanrakinnot, & Huntington, H.P. 1999. Traditional knowledge of the ecology of beluga whales (*Delphinapterus leucas*) in the Northern Bering Sea, Chukotka, Russia. *Arctic*, 52(1): 62–70.
- NOAA/NMFS.2008. Record of Decision Cook Inlet Beluga Whale. Subsistence Harvest Final Supplemental Environmental Impact Statement. National Oceanic Atmospheric Administration, National Marine Fisheries Service. (available at: <http://alaskafisheries.noaa.gov/sites/default/files/rod0808.pdf>).
- NAMMCO. 2011a. Manual on hunting of small cetaceans in Greenland. 27.
- NAMMCO. 2011b. Report of the NAMMCO Expert Group Meeting to Assess Hunting Methods for Small Cetaceans. Copenhagen, Denmark. 15–17 November 2011. 40.
- NAMMCO. 2016a. Beluga. (available at: <http://nammco.no/topics/beluga/>).
- NAMMCO.2016b. Instruction Manual on Pilot Whale Hunting. (available at: <http://nammco.no/wp-content/uploads/2016/10/manual-on-pilot-whaling-english-version.pdf>).
- NAMMCO. 2018. Report of the Global Review of Monodontids. 13–16 March 2017, Hillerød Denmark. See also International Whaling Commission, Scientific Committee, SC/67B/INFO/18. Bled, Slovenia, April 2018.
- Nanayakkara, R., Herath, J., and de Mel, R.K. 2014. Cetacean Presence in the Trincomalee Bay and Adjacent Waters, Sri Lanka. *Journal of Marine Biology*, Article ID 819263, <http://doi.org/10.1155/2014/819263>.
- Nielsen, M. 2009. Is climate change causing the increasing narwhal (*Monodon monoceros*) catches in Smith Sound, Greenland? *Polar Research*, 28: 238–245.
- Nielsen, M. & Meilby, H. 2013. Quotas on narwhal (*Monodon monoceros*) hunting in East Greenland: trends in narwhal killed per hunter and potential impacts of regulations on Inuit communities. *Human Ecology*, 41: 187–203.
- NMFS. 2003. Subsistence harvest management of Cook Inlet beluga whales. Final Environmental Impact Statement. National Marine Fisheries Service. Anchorage, AK, USA. 179.
- NOAA. 2012. Recent dolphin deaths in the northern Gulf of Mexico still a concern and mystery. National Oceanic and Atmospheric Administration. (available at: <http://bit.ly/2KuzYBv>).
- NOAA. 2013. NOAA Fisheries denies application to import 18 beluga whales for public display. National Oceanic and Atmospheric Administration, Public statement. 6 August 2013.
- NWMB. 2013. Marine Mammal Struck and Loss in Nunavut - Workshop Summary, March 19th-21st 2013, Iqaluit NU. Nunavut Wildlife Management Board. 72.
- O’Barry, R. 2017. Indonesian campaign update. Ric O’Barry’s Dolphin Project Blog. (available at: <http://bit.ly/2saW7jh>).
- O’Barry, R. Undated. Dolphin meat trade. Ric O’Barry’s Dolphin Project Blog. (available at: <http://bit.ly/2EkjSPB>).
- O’Barry, L. 2018. Mass slaughter in the Solomon Islands. Ric O’Barry’s Dolphin Project Blog. (available at: <http://dolphinproject.com/blog/mass-slaughter-in-the-solomons/>).

- OceanCare. 2016a. Briefing on aquatic bushmeat for CMS Standing Committee 45. 9–10 November 2016. Bonn, Germany. (available at: [http://oceancare.org/wp-content/uploads/2016/07/Statement\\_Manati\\_Meeresschildkr%C3%B6ten\\_CMS\\_AquaticBushmeat\\_EN\\_2016.pdf](http://oceancare.org/wp-content/uploads/2016/07/Statement_Manati_Meeresschildkr%C3%B6ten_CMS_AquaticBushmeat_EN_2016.pdf))
- OceanCare. 2016b. Peru bans dolphin killing harpoon and landing of shark fins. 19 December 2016. (available at: <http://www.oceancare.org/en/peru-bans-dolphin-killing-harpoon-and-landing-of-shark-fins/>)
- OceanCare. 2017a. Aquatic wild meat and the sustainable development goals. OceanCare, Wädenswil, Switzerland. (available at: [http://www.oceancare.org/wp-content/uploads/2017/03/Briefing\\_Aquatic\\_Wild\\_Meat\\_SDG\\_170530.pdf](http://www.oceancare.org/wp-content/uploads/2017/03/Briefing_Aquatic_Wild_Meat_SDG_170530.pdf)).
- OceanCare. 2017b. Dolphin hunting and shark fishing in Peru – Fact Sheet.
- OceanCare. 2018. Celebrating Africa Day of Seas and Oceans with the launch of a new Partnership for aquatic species. Media Release, Abidjan/Wädenswil, 26 July 2018.
- Oremus, M.; Leqata, J. & Baker, C. 2015. Resumption of traditional drive hunting of dolphins in the Solomon Islands in 2013. *Royal Society Open Science*, 2 (5): 140524.
- Oremus, M. & C. Garrigue. 2015. Phylogenetic identification and population differentiation of bottlenose dolphins (*Tursiops spp.*) in Melanesia, as revealed by mitochondrial DNA. *Marine Mammal Science*, 31(3): 1035–1056.
- Palmer, M. 2017. Taiji town wants more dolphins to kill. *Huffington Post*. 24 May 2017. (available at: [http://www.huffingtonpost.com/entry/taiji-town-wants-more-dolphins-to-kill\\_us\\_5925d11ae4bodfb1ca3a1089](http://www.huffingtonpost.com/entry/taiji-town-wants-more-dolphins-to-kill_us_5925d11ae4bodfb1ca3a1089)).
- Panicker, D. 2017. Cetacean diversity and distribution in the Lakshadweep Islands, India. Final report to the Rufford Foundation. 16.
- Panrak, P. 2016a. Navy seizes Vietnamese fishing boat, arrests 18. *Pattaya Mail*. 11 April 2016.
- Panrak, P. 2016b. Navy seizes 5 more Vietnamese dolphin boats. *Pattaya Mail*. 12 April 2016.
- Panrak, P. 2016c. Navy seizes 2 more Vietnamese fishing boats. *Pattaya Mail*. 3 June 2016.
- Parsons, E. 2004. The potential impacts of pollution on humpback dolphins, with a case study on the Hong Kong population. *Aquatic Mammals*, 30(1): 18–37.
- Perrin, W. 2002. Problems of marine mammal conservation in Southeast Asia. *Fisheries Science*, 68 (Sup 1): 238–243.
- Perry, C. & A. Thornton. 2000. Towards extinction: The exploitation of small cetaceans in Japan. A report by the Environmental Investigation Agency, London, 28.
- Pershing, A. et al. 2010. The impact of whaling on the ocean carbon cycle: why bigger was better. *PLoS ONE*, 5(8): 1–9.
- Perveen, F., Mehmood, S.A., Ahmed, S. & Reman, Z.U. 2011. Biological status of Indus River Dolphin (*Platanista Minor Owen*) in Indus River, Northern Pakistan. *Journal Life Science*, 5: 39–47.
- Prime Minister's Office. 2011. Whaling in the Faroe Islands – in brief. Prime Minister's Office of the Faroe Islands, January 2011.
- Porter, L. & H. Lai. 2017. Marine mammals in Asian societies; trends in consumption, bait, and traditional use. *Frontiers in Marine Science*, 4(47): 1–8.
- Portocarrero Aya, M., Ferrer, A., Lasso, C.A. & Ruiz-García, M. 2010. Status, distribution and conservation of the river dolphins *Inia geoffrensis* and *Sotalia spp.* in Venezuela. In: The Action Plan for South American River Dolphins 2010–2020. F. Trujillo et al. (eds). WWF, Fundación Omacha, WDS, WDCS, Solamac. Bogotá, D.C., Colombia. 249.
- Prideaux, M. 2016. Aquatic Bushmeat: A local issue with global responsibility. OceanCare (ed.), Wädenswil, Switzerland, 20.
- Quintana-Rizzo, E. 2011. Harpooning and entanglement of wild dolphins in the Pacific coast of Guatemala. *Latin American Journal Aquatic Mammals*, 9 (2): 179–182.
- Reeves, R., Smith, B.D., Crespo, E.A. & Notarbartolo, G. 2003. Dolphins, whales and porpoises: 2002–2010 Conservation Action Plan for the World's Cetaceans. IUCN/SSC Cetacean Specialist Group. Gland, Switzerland and Cambridge, United Kingdom. 17.
- Reeves, R., & Brownell, B. 2009. Report of the assessment workshop on Indo-Pacific bottlenose dolphins (*Tursiops aduncus*) with the Solomon Islands as a case study. IUCN/SSC Cetacean Specialist Group. Gland, Switzerland. 65.
- Richard, P., & Pike, T. 1993. Small whale co-management in the Eastern Canadian Arctic: a case history and analysis. *Arctic*, 46(2): 138–143.
- Richman, N. 2012. Researching the Ganges river dolphin in Bangladesh: a PhD to remember. (available at: <http://bit.ly/2HCSGVn>).
- Ripple, W., Abernethy, K., Betts, M.G., Chapron, G., Dirzo, R., Galetti, M., Levi, T., Lindsey, P.A., Macdonald, D.W., Machovina, B., Newsome, T.M., Peres, C.A., Wallach, A.D., Wolf, C. & Young, H. 2016. Bushmeat hunting and extinction risk to the world's mammals. *Royal Society Open Science*, 3(10): 160498.
- Robards, M. & Reeves, R. 2011. The global extent and character of marine mammal consumption by humans: 1970–2009. *Biological Conservation*, 144: 2770–2786.
- Robinson, R.A., Crick, H.Q.P., Learmonth, J.A., Maclean, I.M.D., Thomas, C.D., Bairlein, F., Forchhammer, M.C., Francis, C.M., Gill, J.A., Godley, B.J., Harwood, J., Hays, G.C., Huntley, B., Hutson, A.M., Pierce, G.J., Rehflasch, M.M., Wims, D.W., Santos, M.B., Sparks, T.H., Stroud, D.A. & Visser, M.E. 2009. Travelling through a warming world: climate change and migratory species. *Endangered Species Research*, 7: 87–99.
- Rogers, S. 2014. Nunavik's new beluga management system promises more flexibility. *Nunatsiqa News*. 16 September 2014.
- Roman, J. & McCarthy, J. 2010. The whale pump: marine mammals enhance primary productivity in a coastal basin. *PLoS ONE*, 5(10):1–8.
- Roman, J., Estes, J.A., Morissette, L., Smith, C., Costa, D., McCarthy, J., Nation, J.B., Nicol, S., Pershing, A. & Smetacek, V. 2014. Whales as marine ecosystem engineers. *Frontiers in Ecology & the Environment*, 12(7): 377–385.
- Roman, J., Fisher, S., Schteinberg, R. & Galletti, B. 2017. Role of Cetaceans in Ecosystem Functioning: Defining Marine Conservation Policies in the 21st Century. 28th International Congress for Conservation Biology. Society for Conservation Biology. Cartagena, Colombia. July 2017.
- Romero, A., Agudo, A.I. & Green, S.M. 1997. Exploitation of cetaceans in Venezuela. International Whaling Commission, Scientific Committee, SC/48/SM40. Report of the International Whaling Commission 47: 735–746. Aberdeen, United Kingdom, June 1996.
- Romero, A., Ignacio, A.A., Green, S.M., & di Sciara, G.N. 2001. Cetaceans of Venezuela: their distribution and conservation status. NOAA Technical Report NMFS 151, A Technical Report of the Fishery Bulletin. 61.
- Rose, N., Farinato, R. & Sherwin, S. 2009. The case against marine mammals in captivity. Report of the Humane Society United States & World Society for Protection of Animals (eds.). 84.
- Ross, G. 2006. Review of the conservation status of Australia's smaller whales and dolphins. Report by the Australian Government. 123.
- Salinas, C., Cubillos, J.C., Gomez, R., Trujillo, F. & Caballero, S. 2014. "Pig in a poke (gato por liebre)": The "mota" (*Calophysus macropterus*) Fishery, Molecular Evidence of Commercialization in Colombia and Toxicological Analyses.
- Sands, C. 2017. Breaking: Orca family slaughtered in Indonesia. Ric O'Barry's Dolphin Project Blog. 5 November 2018. (available at: <http://dolphinproject.com/blog/breaking-orca-family-slaughtered-in-indonesia/>).
- Sands, C. 2018. Indonesia's illegal dolphin slaughter to end. Ric O'Barry's Dolphin Project Blog. 7 January 2018. (available at: <http://dolphinproject.com/blog/indonesias-illegal-dolphin-slaughter-to-end/>).
- Sathasivam, K. 2004. Direct hunting and the demand for dolphin meat. In: *Marine Mammals of India*. Sangam Books Ltd, Telangana, India, 135.
- Schuhbauer, A., Chuenpagdee, R., Cheung, W.L., Greer, K., and Sumaila, U. 2017. How subsidies affect the economic viability of small-scale fisheries. *Marine Policy*, 82: 114 DOI: 10.1016/j.marpol.2017.05.013.
- Segniabeto G. & K. Van Waerebeek. 2010. A note on the occurrence and status of cetaceans in Togo. International Whaling Commission, Scientific Committee. SC/62/SM11. Agadir, Morocco, June 2010.
- Segniabeto, G., van Waerebeek, K., Bowessidjaou, J.E., Ketoh, K., Kpatcha, T.K., Okoumassou, K., & Ahoedo, K. 2014. Annotated checklist and fisheries interactions of cetaceans in Togo, with evidence of Antarctic minke whale in the Gulf of Guinea. *Integrative Zoology*, 9(1):1–13.
- Sejersen, F. 2001. Hunting and management of beluga whales (*Delphinapterus leucas*) in Greenland: Changing Strategies to Cope with New National and Local Interests. *Arctic*, 54(4): 431–443.
- Shelden, K.; Hobbs, R.; Sims, C.; Vate Brattström, L.; Mocklin, J.; Boyd, C. and B. Mahoney. 2017. Aerial surveys, abundance, and distribution of beluga whales (*Delphinapterus leucas*) in Cook Inlet, Alaska, June 2016. National Oceanic and Atmospheric Administration, National Marine Fisheries Services, Alaska Fishery Science Center Processed Rep. 2017-09, 62.
- Shadbolt, T. et al. 2015. Breaking the ice: International trade in narwhals, in the context of a changing Arctic. TRAFFIC & WWF (eds.) Toronto, Ontario, Canada. 126.
- Shpak O., & Glazov, D. 2013. Update report on the white whale (*Delphinapterus leucas*) live captures in the Okhotsk Sea, Russia. International Whaling Commission, Scientific Committee. SC/65b/SM14. Bled, Slovenia, May 2014.

- Sinha, R., & Kannan, K. 2014. Ganges river dolphin: An overview of biology, ecology, and conservation status in India. *AMBIO*, 43: 1029–1046
- Sinha, R. et al. 2010. The conservation action plan for the Gangetic dolphin 2010–2020. National Ganga River Basin Authority, Ministry of Environment & Forests, Government of India (ed.). Report 46.
- Singleton, B., & Fielding, R. 2017. Inclusive hunting: examining Faroese whaling using the theory of socio-cultural viability. *Maritime Studies*, 16(6).
- Simmonds, M. 2012. Cetaceans and Marine Debris: The Great Unknown. *Journal of Marine Biology*, 10.1155/2012/684279.
- Sloth, B. 2009. Report on whaling in the Faroe Islands. Ocean Care and Fondation Franz Weber (eds.). 27.
- Smith, C. 2002. Bigger is better: the role of whales as detritus in marine ecosystems. In *Whales, Whaling, and Marine Ecosystems*, J. Estes (ed.), University of California Press. 418.
- Smith, C. & A. Baco. 2003. Ecology of whale-falls at the deep sea floor. *Oceanography and Marine Biology: an Annual Review*, 41: 311–354.
- Smith, B.D., Jefferson, T.A., Leatherwood, S., Ho, D.T., Thuoc, C.V. & Quang, L.H. 1997. Investigations of marine mammals in Vietnam. *Asian Marine Biology*, 14: 145–172.
- Smith, L.V., McMinn, A., Martin, A., Nicol, S., Bowie, A.R., Lannzuel, D. & van der Merwe, P. 2013. Preliminary investigation into the stimulation of phytoplankton photophysiology and growth by whale faeces. *Journal of Experimental Marine Biology and Ecology*, 446: 1–9.
- Smith, C.R., Glover, A.G., Truede, T., Higgs, N.D. & Amon, D.J. 2015. Whale-fall ecosystems: recent insights into ecology, paleoecology and evolution. *Annual Review of Marine Science*, 7:571–596.
- Sohou, Z., Dossou-Bodjrenou, Tchibozo, Chabi-Yaoure, F., Sinsin, B. & van Waerebeek, K. 2013 Biodiversity and status of cetaceans in Benin, West Africa: an initial assessment. *West African Journal Applied Ecology*, 21: 121–34.
- Squires, N. 2001. Dolphin killings anger Australia's wildlife watchers. *The Telegraph*. 21 October 2001.
- Squires, N. 2017. Italian Fishermen blame dolphins for stealing their fish and squid. *The Telegraph*. 22 March 2017.
- Statistics Greenland. 2017. Greenland in Figures 2017. 90.
- Statistics Greenland. 2012. Greenland in Figures 2012. 40.
- St. Clair-Hughes, A. 2017. Investigation of population abundance, distribution, and population linkage of Indo-Pacific Bottlenose Dolphins (*Tursiops aduncus*) on the North and South of Zanzibar using mark-recapture and acoustic methods. Minor Dissertation Marine Research Institute, Department of Biological Sciences, University of Cape Town, South Africa. 66.
- Stensland, S & P. Berggren. 2007. Behavioural changes of nursing female Indo-Pacific bottlenose dolphins in response to boat based tourism. *Marine Ecology Progress Series*, 332: 225–234.
- Stephenson, S., Mooers, A., & Attaran, A. 2014. Does Size Matter? The ICRW and the Inclusion of Small Cetaceans. *Transnational Environmental Law*, 3(2), 241–263. doi:10.1017/S2047102514000107.
- Strand, J. Larsen, M.M. & Lockyer, C. 2005. Accumulation of organotin compounds and mercury in harbour porpoises (*Phocoena phocoena*) from the Danish waters and West Greenland. *Science of the Total Environment*, 350: 59–71.
- Sui, C. 2014. Why Taiwan's illegal dolphin meat trade thrives. *BBC News*. 3 April 2014.
- Takekawa, D. 1996a. The method of dolphin hunting and the distribution of teeth and meat: dolphin hunting in the Solomon Islands 2. *Senri Ethnological Studies*, 42: 67–80.
- Takekawa, D. 1996b. Ecological knowledge of Fanalei villagers about dolphins: dolphin hunting in the Solomon Islands 1. *Senri Ethnological Studies*, 42:55–65.
- Takekawa, D. 2000. Hunting method and the ecological knowledge of dolphins among the Fanalei villagers of Malaita, Solomon Islands. *SPC Traditional Marine Resource Management and Knowledge Information Bulletin*, 12: 3–11.
- Tavera, G. et al. 2010. Distribution and conservation status of the Bolivian river dolphin *Inia boliviensis* (d'Orbigny 1832). In: *The Action Plan for South American River Dolphins 2010–2020*. F. Trujillo et al. (eds). WWF, Fundación Omacha, WDS, WDCS, Solamac. Bogotá, D.C., Colombia. 249.
- Telesetsky, A. 2013. Fishing moratoria and securing TURFs: creating opportunities for future marine resource abundance in the face of scarcity in Western Africa. *Georgia Journal of International and Comparative Law*, 42 (1): 35–67.
- Tele News Network. 2013. Gangetic dolphin meat sold openly in Dibrugarh. *The Times of India*. 23 August 2013.
- Tonay, A., & Öztürk, A. 2012. Historical records of cetacean fishery in the Turkish seas. *Journal of the Black Sea/Mediterranean Environment*, 18(3): 388–399.
- TRAFFIC India. 2017. Silent cries of the Ganges River Dolphin: poaching for oil threatens India's national aquatic animal. *TRAFFIC Newsletter* 27: 24–27.
- Trujillo, F., Portocarrera, M. & Gomez-Salazar, C. 2010. Conservation status of river dolphins *Inia geoffrensis* and *Sotalia fluviatilis* in the Amazon and Orinoco River Basins in Colombia. In: *The Action Plan for South American River Dolphins 2010–2020*. F. Trujillo et al. (eds). WWF, Fundación Omacha, WDS, WDCS, Solamac. Bogotá, D.C., Colombia. 249.
- Tun, T. 2006. Preliminary assessment of cetacean catches in coastal waters near Myeik and Dawai in South-eastern Myanmar. Report submitted to the Department of Fisheries, Myanmar. Wildlife Conservation Society and Convention on Migratory Species (eds.). 37.
- UNEP WCMC. 2018. CITES trade database for all products of narwhals and belugas 1976–2016. Accessed 15 March 2018.
- UNESCO. 2015. Marine Hunters of Chukotka. In: *Climate Change Adaptation: Traditional Knowledge of Indigenous Peoples Inhabiting the Arctic and Far North*. 2–25.
- United Nations. No Date. Sustainable Development 17 Goals to Transform our World. (available at: <http://www.un.org/sustainabledevelopment/poverty/>).
- Uwagbae, M., & Van Waerebeek, K. 2010. Initial evidence of dolphin takes in the Niger Delta region and a review of Nigerian cetaceans. International Whaling Commission, Scientific Committee, SC/62/SM1. Agadir, Morocco, June 2009.
- Vail, C. 2005. Socio-economic assessment of marine mammal utilization in the Wider Caribbean Region: captivity, viewing and hunting. Doc. UNEP(DEC)/CAR WG.27/INF.6 for the UNEP Regional Workshop of Experts on the Development of the Marine Mammal Action Plan for the Wider Caribbean Region. 13.
- Van Waerebeek, K., & Reyes, J. 1990. Catch of small cetaceans at Pucusana Port, Central Peru, during 1987. *Biological Conservation*. 51: 15–22.
- Van Waerebeek, K., & Reyes, J. 1994. Post-ban small cetacean takes off Peru: a review. Peruvian Centre for Cetacean Research. International Whaling Commission, Scientific Committee. SC/46/SM16. Report International Whaling Commission (Special Issue 15). 503–519.
- Van Waerebeek, K., Diallo, M.M., Djiba, A. & Ndiaye, E. 2000. A survey of the conservation status of cetaceans in Senegal, The Gambia and Guinea-Bissau. WAF CET – 1 Report. UNEP/CMS Secretariat, Bonn, Germany.
- Van Waerebeek, K., Alfaro-Shigueto, J., Montes, D., Onton, K., Santillan, L., Van Bresse, M.F. & Vega, D. 2002. Fisheries related mortality of small cetaceans in neritic waters of Peru in 1999–2001. Peruvian Centre for Cetacean Research. International Whaling Commission, Scientific Committee, SC/54/SM10. Shimonoeki, Japan, May 2002.
- Van Waerebeek, K., Barnett, L., Camara, A., Bamy, I.L., Cham, A., Diallo, M.M., Djiba, A., Ndiaye, E., & Ould-Bilal, A.O.S. 2003. Conservation of cetaceans in The Gambia and Senegal 1999–2001, and status of the Atlantic humpback dolphin. WAF CET-2 Report, UNEP/CMS, Bonn, Germany. 55.
- Van Waerebeek, K., Barnett, L., Camara, A., Cham, A., Diallo, M., Djiba, A., Jallow, A.O., Ndiaye, E., Ould-Bilal, A.O.S. & Bamy, I.L. 2004. Distribution, status, and biology of the Atlantic humpback dolphin, *Sousa teuszii* (Kükenthal, 1892). *Aquatic Mammals*, 30 (1): 56–83.
- Van Waerebeek, K., Ofori-Danson, P.K. & Debrah, J. 2009. The cetaceans of Ghana, a validated faunal checklist. *West African Journal of Applied Ecology*, 15:61–90.
- Van Waerebeek, K., Debrah, J.S., & Ofori-Danson, P.K. 2014. Cetacean landings at the fisheries port of Dixcove, Ghana in 2013–14: a preliminary appraisal. International Whaling Commission, Scientific Committee, SC/65b/SM17. Bled, Slovenia, May 2014. 4.
- Van Waerebeek, K., Ofori-Danson, P.K., Debrah, J., Collins, T., Djiba, A. & Ould-Bilal, A.S.O. 2016. On the status of the common bottlenose dolphin *Tursiops truncatus* in western Africa, with emphasis on fisheries interactions, 1947–2015. International Whaling Commission, Scientific Committee. SC/66b/SM/19. Bled, Slovenia, June 2016.
- Van Waerebeek, K., Uwagbae, M., Segniabeto, G., Bamy, I.L. & Ayissi, I. 2017. New records of Atlantic humpback dolphin in Guinea, Nigeria, Cameroon and Togo underscore fisheries pressure and generalized marine bushmeat demand. *Revue d'Ecologie*, 72 (2):192–205.
- Wade, P.R., Reeves, R.R., and Mesnick, S.L. 2012. Social and behavioural factors in cetacean responses to overexploitation: are odontocetes less “resilient” than mysticetes? *Journal of Marine Biology*, Article ID 567276, 15.
- Watanabe, Y. 2013. Beluga hunting practices of the indigenous people in Kamchatka: Characterization of Sea Mammal Hunting in Northeastern Asia. *Senri Ethnological Studies*, 84: 177–194.
- WDC. 2007. Greenland announces beluga and narwhal quotas. 11 July 2007. (available at [www.whales.org](http://www.whales.org)).

WDC. 2013. Investigation launched following claims that restaurants in Italy are serving dolphin meat. 18 December 2013. (available at: <http://us.whales.org/news/2013/12/investigation-launched-following-claims-that-restaurants-in-italy-are-serving-dolphin>).

WDC. 2015. River dolphin killed by poachers in India. 4 March 2015. (available at: <http://bit.ly/2HXDWZ>)

WDC. 2017. Fishermen blamed for dolphin shootings in Italy. 23 March 2017. (available at <http://bit.ly/2Er3Lek>).

Weihe, P. & Joensen, H. 2008. Recommendation to the Government of the Faroe Islands concerning the pilot whale. Open letter to the Prime Minister, the Minister of Health, and the Minister of Trade and Industry, Landslaegen. 7 August 2018.

Weihe, P. & Joensen, H. 2012. Dietary recommendations regarding pilot whale meat and blubber in the Faroe Islands. *International Journal Circumpolar Health*, 71: 18594.

Weihe, P., Grandjean, P., Debes, F. & White, R. 1996. Health implications for Faroe Islanders of heavy metals and PCBs from pilot whales. *Science of the Total Environment*, 186: 141–148.

Weir, C. 2010. A review of cetacean occurrence in West African waters from the Gulf of Guinea to Angola. *Mammal Review*, 40: 2–39.

Weir, C. & G. Pierce. 2012. A review of the human activities impacting cetaceans in the eastern tropical Atlantic. *Mammal Review*, 43: 258–274.

Wells, R. 2012. Letter to Japanese Government regarding dolphin and small whale hunts. Presidential Letters. Society for Marine Mammalogy.

Whimp, G. 2008. Cetaceans and citations: a survey of the English literature on the role of cetaceans in South Pacific island cultures. *Tuhinga*, 19: 169–184.

Whittaker, M. 2013. Stranded pilot whales “Put out of their Misery” or killed for their meat by locals in Iceland? *Whale & Dolphin Conservation*. 12 September 2013. (available at: <http://bit.ly/2DYW5eR>).

Williams, R. & D. Lusseau. 2006. A killer whale social network is vulnerable to targeted removals. *Biology Letters*, 2(4): 497–500.

Woody, T. 2016. China’s marine park boom is driving the capture of whales and dolphins. *Captive Take Part’s Big Issue* Vol. 9.

World Food Programme. 2018. What is food security? (available at: <http://www.wfp.org/node/359289>). Accessed 14 May 2018.

Yatawara, D. 2016. On a dolphin vigil – As fishermen in Mirissa resort to harpooning these lovable aquatic creatures. *Sunday Observer Sri Lanka*. 20 March 2016.

Yogui, G. *et al.* 2010. Levels of persistent organic pollutants and residual pattern of DDTs in small cetaceans from the coast of São Paulo, Brazil. *Marine Pollution Bulletin*, 60: 1862–1867.

Yousuf, K.S.S.M., Anoop, A.K., Anoop, B. & Afsal, V.V. 2009. Observations on incidental catch of cetaceans in three landing centres along the Indian coast. *Marine Biodiversity Records*, 2, E64.

## PHOTO CREDITS

COVER: LONG-BEAKED COMMON DOLPHINS, STEPHNEA; 1: JEREMY BISHOP; 4: PABLO HEIMPLATZ; 6: JAI MANSSON; 7: ROB LOTT/WDC; 10: LONG-FINNED PILOT WHALES, ANDREW SUTTON; 11: ERIK CHRISTENSEN; 15: SHORT-BEAKED COMMON DOLPHINS, NICOLA HODGINS/WDC; 17: STEFAN AUSTERMÜHLE/MUNDO AZUL; 18: STRIPED DOLPHIN, NICOLA HODGINS/WDC; 20: ATLANTIC SPOTTED DOLPHINS, NALU PHOTO; 21: COREWAM; 27: TALIA COHEN; 30: EARTHVIEW PRODUCTIONS; 37: PABLO HEIMPLATZ; 38: COMMON BOTTLENOSE DOLPHINS, PIXABAY; 39: DOLPHINPROJECT.NET; 43: NICOLA HODGINS/WDC; 53: SHORT-FINNED PILOT WHALES, ANDREW SUTTON

## **ANIMAL WELFARE INSTITUTE**

900 Pennsylvania Avenue, SE  
Washington, DC 20003  
United States of America  
[awi@awionline.org](mailto:awi@awionline.org)  
[www.awionline.org](http://www.awionline.org)

## **PRO WILDLIFE**

Kidlerstrasse 2  
D- 81371 Munich  
Germany  
[mail@prowildlife.de](mailto:mail@prowildlife.de)  
[www.prowildlife.de](http://www.prowildlife.de)

## **WHALE & DOLPHIN CONSERVATION**

Brookfield House  
38 St. Paul's Street  
Chippenham, SN15 1LJ  
United Kingdom  
[info@whales.org](mailto:info@whales.org)  
[www.whales.org](http://www.whales.org)