

Bycatch: A Serious Threat for Cetaceans in Europe

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“Bycatch is definitely the most serious threat for some populations of cetaceans, such as Baltic and Black Sea harbour porpoises and Bay of Biscay common dolphins. Unless we take immediate action, we may not be able to see those cetaceans in the near future.”
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Introduction

Because oceans have so much to offer, humans have come to exploit them in many ways. One of the most important, yet most harmful, being fisheries. As the world population is set to exceed 9 billion by the mid-21st century, an unprecedented demand for food is putting pressure on all kinds of resources, including marine life. Humans have been fishing at sea since ancient times, but never on the scale observed in the last few decades. Around the world, roughly 80 million tons of marine fish are caught annually while the production of aquaculture has also steadily increased (FAO, 2018). In European waters 4.1 million tons of marine fish were caught in 2019¹.

Marine living resources contribute to the food security of the growing world population. Fisheries are also one of the world's most important activities, both economically and socially, with more than 40 million people engaged in fisheries, either part-time or full-time, in 2016 (FAO, 2018). This demonstrates that it is an intensive practice which has resulted in the overexploitation of some 33% of fish stocks and is, therefore, well beyond the sustainable level (FAO, 2018).

Fisheries impact not only affects target species (e.g. fish and cephalopods) but many other species both directly (e.g. discards and bycatch) and indirectly (e.g. species at higher trophic levels relying on target catch). Bycatch or incidental catch of vulnerable species including sea turtles, seabirds, sharks, rays and cetaceans has become a central conservation and welfare concern for fishing industries, resource managers, conservation organizations and scientists worldwide, including in all European countries (Reeves, *et al.*, 2013; Dolman *et al.*, 2016; Read *et al.*, 2017). Bycatch also poses an economic problem for fishers as their fishing gear can be damaged or lost, which results in loss of time and money (Leaper and Calderan, 2018).

A welfare and conservation issue

As mammals, cetaceans surface to breathe air. If caught in fishing gear they cannot do this and eventually suffocate and die. Some bycaught animals are released from nets alive, but the majority die, sometimes subsequently washing up on shore with missing flukes, tails and fins, because fishers have cut them off to minimize damage to their nets. Other bycaught cetaceans escape, burdened by entangled nets or lines for long periods which makes diving and feeding difficult or impossible, and eventually leads to animals starving to death or dying as a result of other effects (Lysiak *et al.*, 2018). See Figure 1.

Due to the demographic characteristics of cetaceans, which include slow population growth and low fecundity, bycatch is a serious threat for populations. However, another important effect of bycatch is the impact on animal welfare to both the bycaught animal and to other conspecifics (Dolman and Brakes, 2018). For example, when a nursing mother is bycaught and then unable to nurture her calf who will subsequently experience negative welfare before starving to death, or when an entire social structure is altered by the loss of individuals. The long, slow deaths of larger whales towing nets is also a severe welfare concern (Lysiak *et al.*, 2018).



Figure 1: A sperm whale entangled with a driftnet in the Mediterranean. © A. Dede

¹ <https://ec.europa.eu/eurostat/web/products-eurostat-news/-/EDN-20201016-3>

A complex problem

Bycatch of cetaceans is a worldwide problem involving many kinds of fishing activities, varying in scale, fleet size and gears used, as well as many different target and bycaught species (Read *et al.*, 2006; Reeves *et al.*, 2013). Research on bycatch has increased over the last two decades, but accurate assessment at the current population level is lacking (Soykan *et al.*, 2008) which makes it more challenging to determine the true scale of the problem.

In Europe, five types of fishing gears are particularly identified as having a cetacean bycatch associated with them. These are mid-water or pelagic trawls that are towed along either by one or a pair of vessels, static fishing gear (e.g. bottom-set gillnets), driftnets, seine nets and pot lines (Evans, 2020).

In the Mediterranean Sea, driftnets that target large pelagic fish, such as swordfish and tuna, have been instrumental in catching large numbers of cetaceans, as well as sea turtles and seabirds (Öztürk, 2015). To reduce the rate of mortality, driftnets of any length were banned across the entire basin from 2002. However, illegal use of driftnets continues, resulting in the bycatch of cetaceans such as common dolphins (*Delphinus delphis*), striped dolphins (*Stenella coeruleoalba*), Risso's dolphins (*Grampus griseus*) and sperm whales (*Physeter macrocephalus*) (Baulch *et al.*, 2014). Bycatch across small-scale fisheries also poses a risk to various coastal species, however this problem has not been studied in detail.



Figure 2: A bycaught harbour porpoise in a turbot net in the Black Sea. © A. M. Tonay



Figure 3: A stranded bottlenose dolphin with a piece of rope tangled around its tail. © A. M. Tonay

In the Black Sea intensive dolphin fisheries were finally banned in 1983, but cetacean populations have been slow to recover and this is particularly true for Black Sea harbour porpoises (*Phocoena phocoena relicta*) which are victims of bycatch in turbot (*Scophthalmus maximus*) bottom set nets (Birkun and Frantzis, 2008). See Figure 2. In 2014, a survey funded by the Directorate-General for Maritime Affairs and Fisheries (DG MARE) in the western part of the Black Sea (the waters off Bulgaria, Romania and a part of Ukraine) estimated the abundance of harbour porpoises in that area as roughly 30,000 animals, while bycatch estimates reached over 4,500 (Birkun *et al.*, 2014). This represents 15% of the population, which is highly unsustainable, though the scale of bycatch may have been overestimated due to inappropriate sampling. Illegal, unreported and unregulated (IUU) fishing also prevails in the basin, especially for turbot, for which no reliable data are available. Marine animals remain under threat from ghost nets: nets that fishers abandon during bad weather or to escape from relevant authorities (see Box below).

Bottom set nets, used widely along the coasts by small-scale vessels which comprise more than 80% of the Mediterranean and Black Sea fishing fleets (FAO, 2020), represent the main source of interactions between cetaceans and fishing gear. Existing data indicates low mortality of coastal species, with the possible exception of the Black Sea. However, the high number of small boats working across many ports, represents a high number of set nets deployed each day. The lack of solid data determining the abundance, population structure and threats to Black Sea dolphins and porpoises, combined with a lack of monitoring, makes it difficult to measure past and current impacts on coastal cetaceans.

In the North East Atlantic, even though the bycatch of several species, such as harbour porpoises (*Phocoena phocoena*), has been monitored and mitigation measures have been tested, major knowledge gaps exist regarding cetacean bycatch throughout the region (ICES, 2018ab). In the UK, where monitoring and mitigation measures for gillnet fisheries are implemented (Read *et al.*, 2017), the estimate of bycatch for harbour porpoises reached 1,250 for vessels over 12m using pingers (see below), and 1,482 for those without pingers (Northridge *et al.*, 2017). The bycatch risk assessment for the North Sea and Celtic Sea ecoregion indicated 1.1- 2.4% of the abundance estimate of 57,491 porpoises based on data from the SCANS III survey in 2016 (ICES, 2018b). This high bycatch level, despite the mitigation measures implemented, raises a significant conservation concern.

In the Bay of Biscay and the English Channel, thousands of cetaceans, primarily common dolphins, strand ashore every year (Peltier *et al.*, 2016). In the first three months of 2017 and 2019, 865 and 1,100 stranded dolphins were found, respectively, on the coasts of the Bay of Biscay, of which roughly 90% were common dolphins (see Figure 4). A high proportion of these animals exhibited typical bycatch marks². It is assumed that most of this bycatch takes place in pelagic sea bass (*Dicentrarchus labrax*) and albacore tuna (*Thunnus alalunga*) fisheries, but other fisheries working in the area may also be involved and monitoring is clearly insufficient. Relevant authorities need to address adverse cetacean/fisheries interactions and to take immediate action to mitigate mass bycatch. The International Council for the Exploration of the Sea (ICES), which acts as an adviser to the European Union (EU) in matters related to the Marine Strategy Framework Directive (MSFD)³ and the Birds⁴ and Habitats⁵ Directives, has recently stated that to reduce common dolphin bycatch in the Bay of Biscay there should be temporal closures and that when fishing is taking place, pair trawlers should use pingers (ICES, 2020).



Figure 4: A common dolphin with net mark, stranded on the French coast of the Bay of Biscay. © H. Peltier/Observatoire PELAGIS.

Legislation for cetacean bycatch

There are several legal frameworks in Europe that tackle the issue of bycatch as informed by scientific evidence (Dolman *et al.*, 2016). The EU Common Fisheries Policy aims to ensure fishing and aquaculture remain environmentally, economically and socially sustainable. The Habitats Directive and MSFD are in force to protect cetaceans, requiring all member states to monitor and mitigate bycatch in European waters. European Council Regulation (EC) No. 812/2004 consisted of two main components to help address this issue; monitoring (from at least 10% of vessels with an overall length of 15m or over as defined in Annex III) and mitigation (those vessels of 12m or more with acoustic deterrent devices (ADDs) or ‘pingers’ as identified in Annex I). Many countries worked hard to comply with this regulation while some had not necessarily taken the same steps. Compliance by EU member states in northern Europe varied (Read *et al.*, 2017) and had not been fully achieved before the Regulation was repealed in 2019. Cetacean bycatch is now addressed by Regulation (EU) 2019/1241 on the conservation of fisheries resources and the protection of marine ecosystems through technical measures (European Parliament, 2019).

The Code of Conduct for Sustainable Fisheries has set guidelines under the UN Food and Agriculture Organization to address massive fish consumption and aims to ensure economically, socially and environmentally sustainable use of marine living resources globally (FAO, 2015). Several international and intergovernmental organizations, such

² <https://www.observatoire-pelagis.cnrs.fr/actualites-240/actualites/article/les-mortalites-de-petits-cetaces?lang=fr>

³ https://ec.europa.eu/environment/marine/eu-coast-and-marine-policy/marine-strategy-framework-directive/index_en.htm

⁴ https://ec.europa.eu/environment/nature/legislation/birdsdirective/index_en.htm

⁵ https://ec.europa.eu/environment/nature/legislation/habitatsdirective/index_en.htm

as ICES, International Whaling Commission (IWC), as well as agreements and conventions such as the Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and contiguous Atlantic Area (ACCOBAMS), the Agreement on the Conservation of Small Cetaceans of the Baltic, North East Atlantic, Irish and North Seas (ASCOBANS) (under the Convention on the Conservation of Migratory Species [CMS] umbrella), and the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR) have established specific articles, resolutions and guidelines that acknowledge the seriousness of bycatch and aim to reduce its effect as high priority (e.g. ACCOBAMS, 2004; ASCOBANS 2015a).

Even if all member states comply with the regulations and adopt coherent and coordinated measures, IUU fishing activities will regrettably continue in European waters (Baulch *et al.*, 2014; Öztürk, 2015). With limited data available to determine how IUU fishing impacts cetaceans and other protected marine species in terms of bycatch, it is urgent to halt the practice.

The endangered Baltic harbour porpoise is also threatened by bycatch, resulting in a new agreed conservation action to urgently address its situation and also that of the Iberian harbour porpoise at the last Conference of Parties to the CMS (CMS, 2020). ICES (2020) advises that a combination of spatial-temporal closures and the use of pingers in static nets fisheries should be implemented to reduce harbour porpoise bycatch in the Baltic Proper. ICES also advises that all fisheries of concern should be closed.

Monitoring and mitigation measures

Regulation (EU) 2019/1241 aims to ensure that incidental catches of marine mammals, marine reptiles, seabirds and other non-commercially exploited species do not exceed levels provided for in EU legislation and international agreements that are binding on the EU. Member states are required to put in place technical measures in support of this and mitigation measures to minimize and, where possible, eliminate the catching of such species by fishing gear.

Recently, countries including Canada, the United States of America, Australia, New Zealand, Denmark, the United Kingdom, the Netherlands and Germany, and regional fisheries management organizations have started using Remote Electronic Monitoring systems (REMs). REM includes integrated on-board systems of cameras, gear sensors, video storage and GPS to record images of fishing activities with associated sensors and exact positions. Although developed to monitor various parameters of fishing activities, REM can be used for monitoring bycatch of protected species, such as cetaceans (ASCOBANS, 2015b). Because this system is costly for fishers to deploy, it needs the joint support of fishers, industries and managing authorities to achieve better management.

Strandings of cetaceans exhibiting signs of bycatch are indicative of bycatch levels (Peltier *et al.*, 2016) and sound the alert to a larger problem. However, it is important to note that stranding data regularly underestimates incidences of bycatch mortality. To mitigate or reduce cetacean bycatch, it is effective to incorporate fishery schemes including temporal and spatial closures of relevant fisheries, reducing soak time, changing the deployment depth of the nets, and reducing the number of boats in hotspot areas. However, these measures are not appealing for fishers, because they often represent a potential economic loss.

Gear modification including the use of ADDs, which were compulsory for a limited number of vessels under Regulation (EC) No. 812/2004 and are required in certain cases under Regulation (EU) 2019/1241 as well, can be deployed on fishing nets to emit sounds that alert cetaceans to the presence of nets. These small battery-operated devices are placed 200-500m apart on the nets, necessitating a sufficient quantity of pingers to function effectively. Although individual pingers are inexpensive, larger quantities are costly to deploy and replace. They have been tested for harbour porpoises but are not necessarily effective against other species such as bottlenose dolphins (*Tursiops truncatus*) (Dawson *et al.*, 2013).

Collaboration with fishers and fishing communities needs to be encouraged through awareness raising campaigns, education and outreach, and coordinated policy at a local, national and international level. These concerted actions are essential among EU and neighbouring non-EU countries which share the same marine resources.

Conclusion

Although monitoring efforts and mitigation measures have increased in recent years, bycatch remains a major concern for cetacean conservation and animal welfare in European waters. The absence of data of both sufficient quantity and quality hinders the definition of clear management targets. Fisheries in European waters are highly diverse and limited studies make strategic decisions difficult. Therefore, it is recommended that a risk-based regional approach in all aspects of fisheries is adopted to achieve effective monitoring and mitigation of cetacean bycatch. While no magic solution exists for such a complex issue, the responsibility of cetacean conservation falls upon the European states who need to seek solutions through collaboration with all stakeholders – fisheries, industries and scientists, including those of neighbouring non-EU countries.

Ghost nets

'Ghost nets' are fishing gear abandoned in seas. Fishing gear can be lost accidentally during rough weather, but it can also be abandoned deliberately. The main impacts of abandoned or lost fishing gear are: continued catches of fish and other animals such as marine mammals (including cetaceans), sea turtles and seabirds which are trapped and die; alterations of the sea-floor environment; navigation hazards which can cause accidents and damage boats. Abandoned, Lost or otherwise Discarded Fishing Gear (ALDFG) makes up around 10% (640,000 tonnes) of all marine litter (Macfadyen *et al.*, 2009). There have been some efforts to retrieve these nets, but much more effort is needed.

Recommended actions

Policy

- Conservation needs should be coordinated at a local, national and international level especially where neighbouring EU and non-EU countries share marine resources.
- Measures need to be brought in to stop all IUU fishing.

Management measures

- There should be effective monitoring of fisheries with bycatch.
- Ghost gear recovery programmes should be elaborated and implemented.
- Collaboration should be encouraged between all stakeholders in order to find solutions.
- Emergency measures, such as temporal and spatial closures for fishing, should be taken when mass bycatch is detected.

Science

- Effective bycatch mitigation measures should be developed urgently.
- Improved data gathering regarding the scale of the problem particularly for the common dolphin in the Bay of Biscay, the Baltic Proper harbour porpoise and the Black Sea harbour porpoise. This requires accurate abundance estimates as well as bycatch data.

Public

- Ask fish retailers to question their providers to try to ensure that sources are sustainable and do not pose a risk to cetaceans.

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