environmental investigation agency

Ocean

Catch of the Day

The deadly impacts of cetacean bycatch in European waters

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ABOUT EIA

We investigate and campaign against environmental crime and abuse.

Our undercover investigations expose transnational wildlife crime, with a focus on elephants and tigers, and forest crimes such as illegal logging and deforestation for cash crops like palm oil. We work to safeguard global marine ecosystems by addressing the threats posed by plastic pollution, bycatch and commercial exploitation of whales, dolphins and porpoises. Finally, we reduce the impact of climate change by campaigning to eliminate powerful refrigerant greenhouse gases, exposing related illicit trade and improving energy efficiency in the cooling sector.

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Cover: Porpoise washed upon the beach tangled in fishing gear ©CSIP-ZSL

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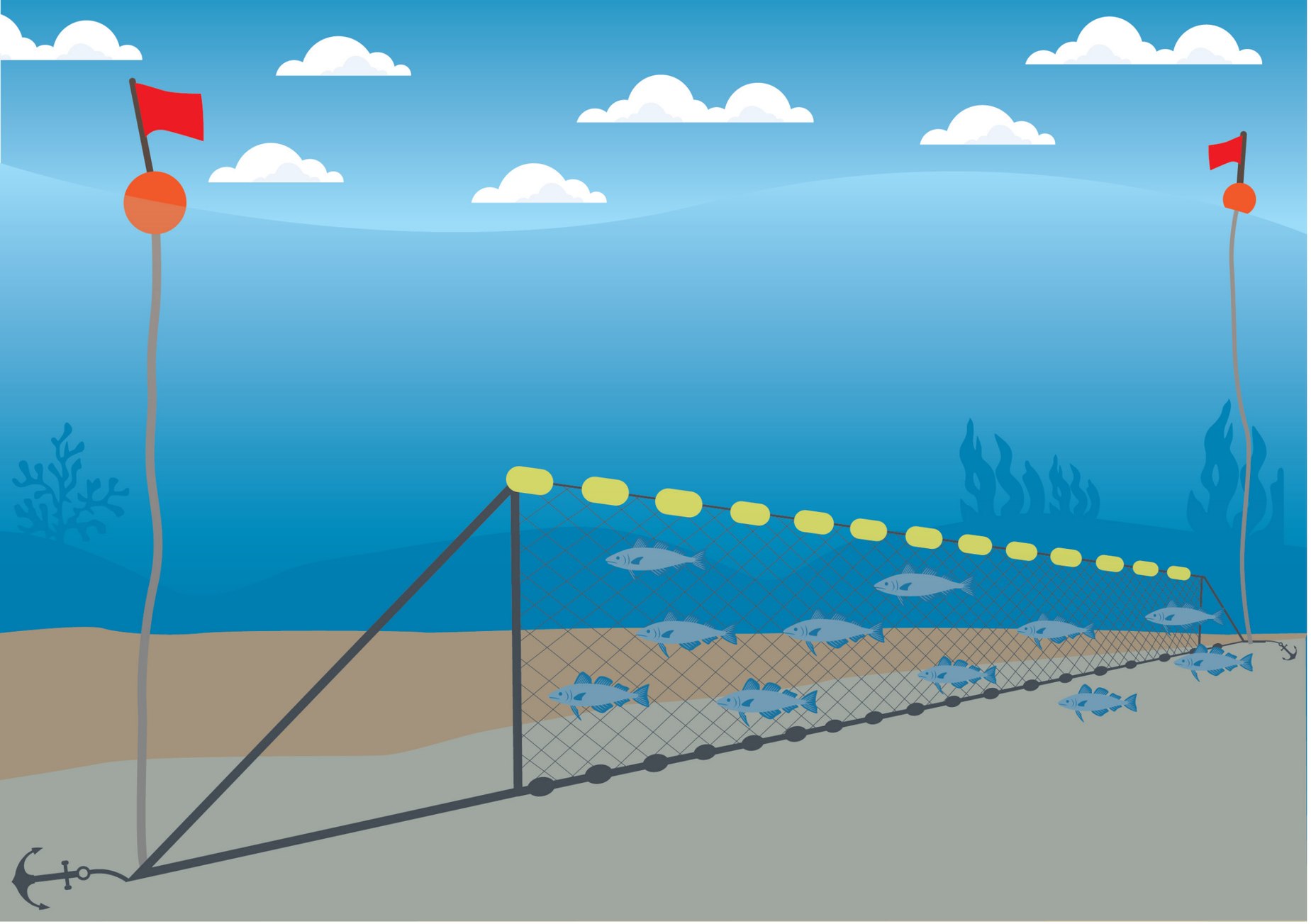

Figure 1. Illustration of a static gillnet.

An introduction to cetacean bycatch

For decades, cetacean entanglement and mortality in commercial and recreational fishing gear has been a major conservation challenge and welfare concern.[1]

Entanglement of non-target species is known as bycatch and this human-caused source of wildlife mortality contributes significantly to biodiversity loss, one of the most urgent contemporary environmental crises.[2]

Globally, one in four cetacean species (the collective term for whales, dolphins and porpoises) is threatened with extinction following the International Union for Conservation of Nature (IUCN) Red List Criteria.[3] Bycatch is the largest direct pressure on cetaceans, killing hundreds of thousands every year[4] and is a major cause of declines in cetacean populations,[5] leaving a number critically endangered or even extinct as a result.[6]

Bycatch events are not uniform in space or time due to the dynamic nature of both fishing operations and the behaviour of the cetacean species involved.[7] Different cetacean species are impacted by different fisheries in different ways because both fisheries and cetacean populations are complex and varied.[8]

Gillnets (static nets hanging in the water) (Figure 1) and driftnets (which hang in the water but are not anchored on the bottom) are globally recognised as having the biggest impacts on the widest range of toothed cetacean species throughout European waters.[9] Trawls, purse seines and longlines (all deployed from fishing vessels) impact these same toothed cetacean species while static (creel) pots pose an entanglement risk for minke and humpback whales.[10]

All cetaceans are vulnerable to bycatch because of their life history characteristics (late age of first reproduction and low calving rate), but toothed cetaceans may be less resilient than baleen whales.[11] Some baleen whale populations are recovering from historic whaling, but there are few such positive examples of recovery for toothed cetaceans from intensive exploitation (whether intentional or not). This is likely due to their advanced social and behavioural traits.[12]

In addition to their intrinsic worth, cetaceans are of immense ecological and socio-economic value. They play a vital role in maintaining food web structure and function, contributing to essential ecosystem services and supporting thriving and increasing tourism industries. Yet cetacean bycatch has been occurring for decades and quantifying the impacts of fisheries bycatch on cetaceans in European waters is challenging due to inadequate monitoring; for example, there are vast gaps in knowledge of the extent of cetacean bycatch in the Mediterranean and Black seas in particular.

Overview of European fisheries

Fisheries Statistics

A variety of fishing gear types are used throughout European waters, including entangling gillnets (such as set or drift nets, tangle nets and trammel nets), pelagic trawls, demersal trawls, demersal seines, dredges, set and drifting longlines and pots.

Gillnet fishing is widespread and most prevalent in coastal areas[13] and is responsible for the highest rates of cetacean deaths. The EU Fleet Register identifies 28,388 vessels using static gears, including gillnets and other entangling nets, in European waters.

The EU fleet is very diverse, with most boats being no more than 10m long and a small number of vessels exceeding 40m (see Table 1).[14] Vessels under 15m constitute the majority of vessels in the gillnet fleets of European nations.

Country	Fleet size	Small-scale vessels	Notes	Ref.
Iceland	~ 1,600	~820 are less than 10 m	Mainly for cod and lumpfish, fishery responsible for harbour porpoise bycatch	15
Italy	~11,926	8,404 small scale vessels: 70 per cent of fleet		16
Norway	5,712 vessels smaller than 27.9 m	96 per cent smaller than 14.9 m	Most of the vessels smaller than 14.9 m use gillnets	17
Spain	~8,657	71 per cent of vessels were under 12m in length	Polyvalent boats (using more than one type of fishing gear) for small-scale fishing accounts for nearly 48 per cent and just five per cent gillnets in the Spanish fleet	18
United Kingdom	~2,371	~1,636 were less than 10m	1,316 were fishing using pots/traps, 582 demersal trawls/seines, 265 hooks, 229 dredges, 209 drift or fixed nets and 112 other gears	19

Table 1. Some examples of fleet sizes of European fishing vessels

Recreational fishing represents approximately nine million fishers in Europe.[20] Despite recreational and small-scale fisheries often being considered "low impact fisheries" compared with other larger-scale fishing methods such as trawling and purse seining, they pose a largely unaccounted threat to cetaceans, with no monitoring or reporting. Recreational gillnet fishing occurs in Belgium, Denmark, Estonia, Finland, France, Germany, Latvia, Netherlands, Norway, Sweden and the UK.[21] The lack of inclusion of recreational fisheries in analysis mean that existing bycatch estimates may be negatively biased.[22]

Abandoned, lost and discarded fishing gear

In European seas, abandoned, lost and otherwise discarded fishing gear (ALDFG) accounts for roughly one-third of marine litter found, estimated to be more than 11,000 tonnes per year and fishing gear has been estimated to comprise an average of 27 per cent of beach litter in Europe.[23]

Gillnets and other fishing gears are made of synthetic materials (for example, nylon) with high breaking strength and durability. As a result, ALDFG continues catching marine wildlife for years,[24] contributing to pollution of the world's oceans and requiring considerable, complex and costly clean-up operations.

Cetacean bycatch limits

Evaluating the conservation implications of marine mammal bycatch largely relies on estimates of population abundance and bycatch numbers, which are needed for calculating biological reference points and for determining conservation status.

Bycatch rates are often difficult to assess because of data limitations resulting from inadequate cetacean population and bycatch monitoring. Further, management objectives are poorly defined.

Bycatch thresholds are an assessment tool used to contextualise cetacean bycatch. First applied in the US with the amendment of the Marine Mammal Protection Act (MMPA) in 1994, an increasingly standard approach is for thresholds to be set, above which population impacts are likely to occur.[25] The thresholds used under US law are Potential Biological Removals (PBRs).

Recently, guidance for best practice in estimating bycatch mortality has been developed.[26] Setting bycatch limits allows scientists to calculate a simple 'number of deaths' beyond which population impacts are likely to occur and that can be communicated to decision-makers to assist in the development of effective solutions. Generally, outside of the US there is a lack of quantitative bycatch reduction targets and, importantly, timelines to achieve these targets.

US legislation provides an objective and quantitative goal and a wider framework, which can be used to measure the success or failure of mitigation efforts and facilitates the generation of fishery-specific solutions to bycatch problems.[27]

US law requires Marine Mammal Take Reduction Plans (TRP) to be developed and implemented through Take Reduction Teams (TRTs). The TRP includes the need for regular Stock Assessment Reports and associated monitoring. TRTs develop TRPs to help recover and prevent the depletion of strategic marine mammal populations that interact with identified fisheries by putting measures in place to reduce take below identified PBR thresholds.

The immediate goal of TRPs is to reduce the incidental mortality or serious injury of marine mammals from commercial fishing to less than the PBR level within six months of their implementation. The long-term goal is to reduce the incidental mortality and serious injury of marine mammals from commercial fishing operations to insignificant levels, approaching a zero mortality and serious injury rate, considering the economics of the fishery, the availability of existing technology and existing state or regional fishery management plans, within five years.

Thresholds are typically complex statistical models populated with poor data and there is still much to learn about cetacean populations which would impact the results. For example, eDNA analysis revealed a population structure more complex than previously understood in the Southern South-East Alaska Inland Waters harbour porpoise population, highlighting the importance of considering genetic data for effective conservation.

The newly identified population structure was highlighted as a potential conservation problem following analysis because the estimated mortality and serious injury (7.4 individuals per year) from the South-East Alaska salmon drift gillnet commercial fishery exceeded the stock's PBR level (6.1 individuals per year).[28]

Discussions about the appropriateness of management units for harbour porpoises in European waters are ongoing. The International Council for the Exploration of the Sea (ICES) recently recognised the value of DNA sampling to assess fisheries bycatch impacts for some mixed populations.[29]

Establishing cetacean bycatch limits in European waters

Europe is decades behind in the development of such a detailed legislative approach as that in the US. Neither clear conservation objectives nor thresholds are well defined in law in any European country.

While Article 12 of the EU Habitats Directive requires *"Member States shall establish a system to monitor the incidental capture and killing of the animal species listed in Annex IV (a)* [which includes all cetaceans]. *In the light of the information gathered, Member States shall take further research or conservation measures as required to ensure that incidental capture and killing does not have a significant negative impact on the species concerned."* and Article 3 of the EU Technical Measures Regulation requires member states to *"ensure that incidental catches of sensitive marine species … that are a result of fishing, are minimised and where possible eliminated so that they do not represent a threat to the conservation status of these species"*, there are no agreed thresholds in law in the EU or elsewhere in Europe. The EU Marine Strategy Framework Directive (2008/56/EC) threshold values linked to the incidental catches of sensitive marine species are still to be adopted and concrete targets for this objective are not yet available.

The Agreement on the Conservation of Small Cetaceans of the Baltic, North-East Atlantic, Irish and North seas (ASCOBANS) defined 1.7 per cent of population size for the anthropogenic limit in the short term (which includes bycatch and other human-induced causes of mortality) and underlines the intermediate precautionary objective to reduce bycatch to less than one per cent of the best available population estimate.

ASCOBANS includes the explicit conservation objective to reduce bycatch to zero which was agreed by Parties. The 1.7 per cent threshold was a first step and is now widely considered to lack necessary precaution.[30] For example, in a comparison of statistical approaches to assess mortality limits for harbour porpoises in the Dutch continental shelf and the wider North Sea,[31] a fixed 1.7 per cent of the population estimate yielded a mortality limit 3-4 times higher than those from the management procedures of PBR and International Whaling Commission's (IWC) Catch Limit Algorithm (CLA). Even the more precautionary one per cent adopted by ASCOBANS resulted in a mortality limit more than twice that produced by the CLA and therefore cannot be expected to reliably achieve the stated conservation objective in the long-term.

Where the data allows, Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR) has used a modified version of PBR (mPBR) tuned to specific management objectives for use in assessments of the conservation implications of bycatch of European cetacean populations.[32]

Ideally, fisheries would operate without catching any cetaceans or other protected species. Indeed, this goal is stated in legislation in some parts of Europe. There will always be occasional incidents of bycatch, but these should be the exception and not considered the norm. Given the extent and amount of bycatch that currently exists in European waters, it seems that an incremental approach towards eliminating cetacean bycatch is needed.

The threshold should be a red line that is not exceeded. Below it, ongoing management measures are required to ensure the bycatch rate does not exceed the threshold and, to meet the legal and policy requirements, to continually reduce bycatch to zero.

The reality in Europe is that action to prevent bycatch typically begins only once the threshold has been exceeded. This is too late for a population concerned and is particularly troublesome where it was small to begin with (for example, Baltic Sea proper and Iberian porpoises). Such last-minute action is not in the interest of cetaceans and nor is it in the interests of fishers or the ecosystem upon which they rely.

Early intervention means the measures expected of fishers are likely to be more moderate and manageable, rather than waiting until the problem is large enough that measures implemented are likely to be stricter and may affect the livelihoods of fishers, as well as impacting cetacean populations.

Drop-outs

The number of porpoises or other loosely entangled cetaceans that drop out of static gillnets before being hauled onboard the fishing vessel has been estimated to vary between 18-50 per cent in different types of fisheries.[33] As a result, drop-out rates should be included in analysis of bycatch rates for all fisheries in European waters and particularly for gillnets. The North Atlantic Marine Mammal Commission (NAMMCO) provides advice on hunted small cetaceans that includes those lost during capture. The same should become standard with inclusion of bycatch drop-out for gillnet fisheries in calculations of cetacean bycatch rates. Better estimates of drop-out loss rates would improve bycatch model results.

Scientists have calculated that more than 30,000 harbour porpoises are bycaught in European waters each year. If an 18 per cent drop-out rate is included, an additional 5,400 porpoises die in gillnets and are currently unaccounted for. Including porpoises that drop-out of the net means that more than 35,000 porpoises die in nets every year. This is very concerning for gillnet fisheries and clearly demonstrates why drop-out rates (and recreational fisheries) should be included in analysis of bycatch rates for all gillnet fisheries in European waters.

Welfare implications

Understanding welfare implications of entanglement on individuals, including those that die trapped in the gear at sea, those hauled on-board the fishing vessel alive who suffered additional trauma during handling and release, as well as those that carry fishing gear, is required.

The individuals entangled can suffer acute and chronic physical injuries and sub-lethal effects that can lead to delayed mortality.[34] Almost nothing is known about survival rates of bycaught and released individuals. Evidence from strandings data demonstrates the fate of many thousands of cetaceans that fall or are cut out of fishing gear. This additional mortality, which is not observed or not reported, is known as 'cryptic mortality' and results from individuals that drop-out of the gear unobserved, those that go undetected because of lack of monitoring, those observed by fishers but not reported and those resulting from ghost fishing from ALDFG.[35]

Thus cetacean bycatch causes injuries and suffering to many more individuals than is currently recognised and accounted for. The EU Technical Measures Regulation 2019/1241 requires bycatch to be minimised and where possible eliminated. This requirement to minimise is not associated with conservation status, so does imply a requirement to reduce bycatch on welfare as well as conservation grounds.

Recently, ICES recommended that animals injured through bycatch be recorded.[36] Including individuals suffering after being bycaught would provide more realistic estimates of the number of individuals bycaught and bycatch rates.

Above: A Harbour porpoise stranded beside fishing gear. ©CSIP-ZSL

Levels of cetacean bycatch in European waters

In European waters, cetacean bycatch occurs at levels that are causing population declines.

A review of scientific literature has been conducted and this report identifies 15 cetacean populations, including five that are critically endangered, endangered or vulnerable, where fisheries bycatch thresholds have been exceeded in European waters (see Table 2; Figure 2). Of the 15 populations identified, 14 are toothed cetaceans — nine harbour porpoise, three bottlenose dolphin, one common dolphin and one sperm whale.

The most commonly bycaught cetacean species in European waters are harbour porpoises and common dolphins. While the International Council for the Exploration of the Sea (ICES) reported 9,299 harbour porpoises taken as bycatch in 2020,[52] this does not include porpoise bycatch in the Black Sea, which increases porpoise bycatch in European waters to about 30,000 individuals per year (not including those that drop-out). In 2020, more than 6,400 common dolphins were bycaught in the region based on ICES-compiled data. The bycatch threshold was 985 common dolphins, so bycatch is more than six times higher than the limit.

Of thirteen recognised harbour porpoise populations in European waters, eight have population-level impacts from bycatch (see Table 2, which includes the English Channel, which is not recognised as a porpoise population) and another, in Greenland, from direct hunting.[53]

The small porpoise populations that are endangered, such as those in the Baltic and Iberian seas, as well as Belt and Black seas, are of most concern. All these populations face other pressures but are declining primarily because of ongoing bycatch. The Irish, Celtic and Norwegian seas populations have been identified as having the highest bycatch rates in European waters.[54] Across the North-East Atlantic, gillnets, including bottom-set gillnets, tangle nets and drifting gillnets, are responsible for the vast majority of harbour porpoise bycatch.[55]

There is no estimate for the total number of cetaceans being killed in bycatch in European waters. Concerns have been repeatedly raised about levels of cetacean bycatch in European waters by expert bodies, such as the ICES Bycatch Working Group, ASCOBANS and the IWC's Scientific Committee. In 2024, the European Cetacean Society produced an open Letter of Concern on the need to prevent European harbour porpoise bycatch.

Region/sub-region	Cetacean populations impacted (fishery)	Population status	Bycatch threshold (or comment, where lacking)	Estimated annual mortality
Atlantic coast of Andalusia, Spain	Bottlenose dolphin	Least Concern	0	18[37]
Baltic Sea proper	Harbour porpoise (gillnets)	Critically Endangered	0	7[38]
Belt Sea	Harbour porpoise (gillnets)	Vulnerable	24	900[39]
Black Sea	Harbour porpoise (gillnets)	Endangered	Unknown	20,000[40]
Celtic & Irish Seas	Harbour porpoise (gillnets)	On OSPAR threatened and declining list	82	751[41]
English Channel (southern North Sea)	Harbour porpoise	On OSPAR threatened and declining list	Risk of localised depletion	Unknown[42]
Greater North Sea	Harbour porpoise	On OSPAR threatened and declining list	1,622	5,974[43]
Iberian Peninsula	Harbour porpoise	Endangered	0	Few hundreds[44]
Mediterranean Sea	Sperm whale	Endangered	Less than 10	Unknown[45]
Northeast Atlantic	Common dolphin (multiple gears)	Unfavourable-Inadequate (EU)	985	6,406[46]
Norwegian Sea	Harbour porpoise	On OSPAR threatened and declining list	700	1,580-1,642[47]
Portugal, Algarve	Bottlenose dolphin (bottom set-nets)	Least Concern	2.3 per cent of local population	33[48]
Scottish waters	Minke whale, poss. humpback whale (creel pot lines)	Least Concern	Risk of localised depletion	30 minke, six humpback whales[49]
Slovenia, Gulf of Trieste, northern Adriatic Sea	Bottlenose dolphin (artisanal)	Vulnerable	Risk of localised depletion	23 from 2002-20[50]
West Scotland & Ireland	Harbour porpoise	On OSPAR threatened and declining list	78	305[51]

Table 2. Cetacean populations where calculated bycatch thresholds have been exceeded in European waters

Left: Harbour porpoise showing clear fishing net entanglement indentations around their body. ©CSIP-ZSL

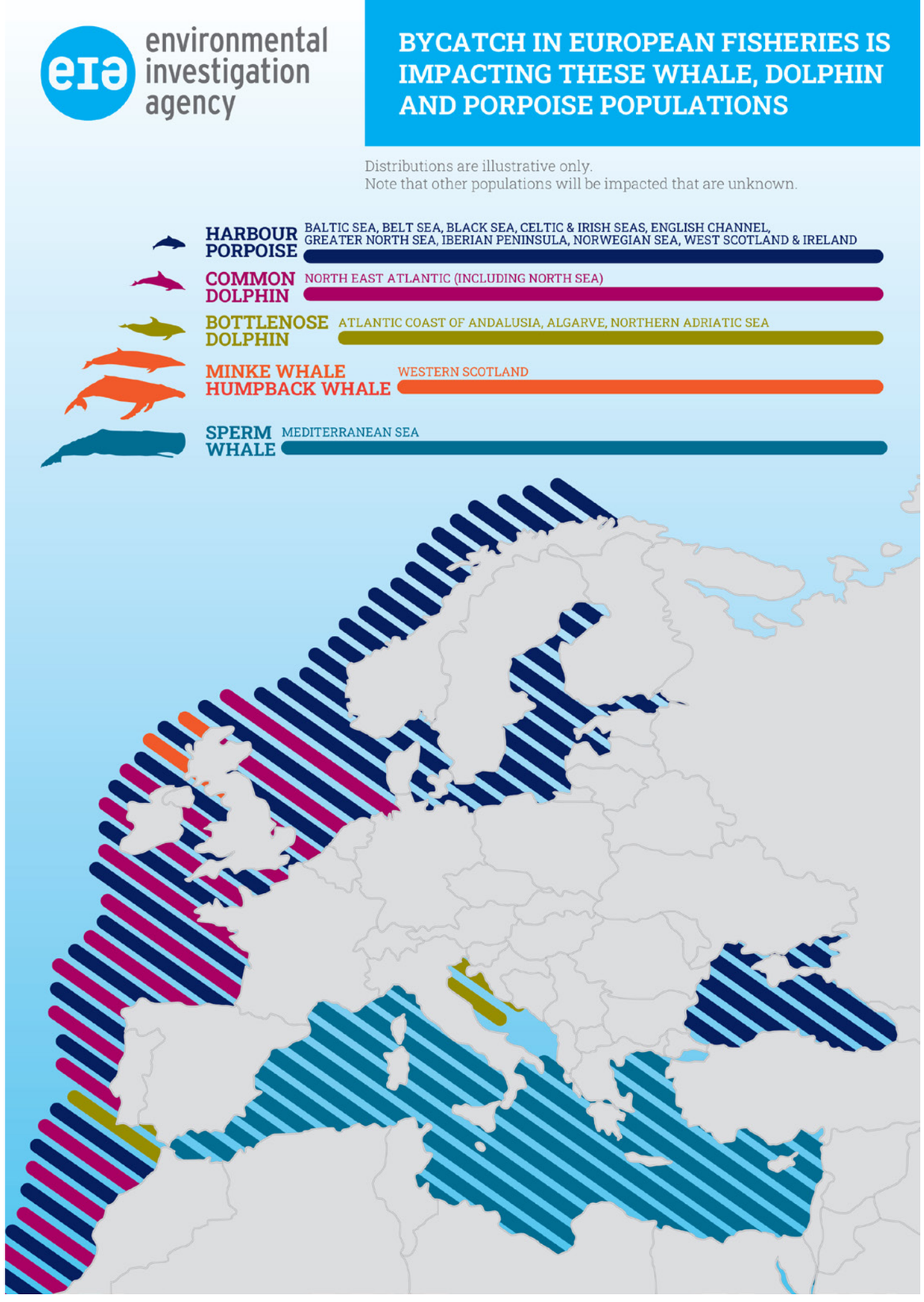

Figure 2. A map of European ocean basins which identifies cetacean populations where bycatch thresholds have been exceeded.

Bycatch risk for lesser-known cetacean species and populations

While species for which population-level impacts are occurring and known are listed in Table 2, other cetacean species are also recorded as bycaught in European waters. Bycatch thresholds cannot be determined for most cetacean populations due to the lack of monitoring and inability to calculate bycatch rates.[56]

Even low levels of bycatch can impact small populations of long-lived, late-to-mature, slow-reproducing species. For example, with a population of just 3,000-4,000 porpoises, the bycatch of every individual in the Iberian porpoise population is potentially catastrophic for the future of the population. Better monitoring is required to identify levels of cetacean bycatch in small or little-known populations, such as those found predominantly in deeper offshore waters.

Bycatch rates are only available for harbour porpoises and common dolphins, yet 40 per cent of bottlenose and 50 per cent of Risso's dolphins subject to post-mortem in 2022 showed evidence of bycatch.[57] PBR was calculated for Mediterranean cetacean species and was lower than 10 individuals for fin whales, sperm whales, Cuvier's beaked whales, long-finned pilot whales, common dolphins in the central Mediterranean and Aegean-Levantine Sea, 14 individuals for west Mediterranean common dolphins and 17 for Risso's dolphins.[58] Bycatch rates are very partial or not available for any Mediterranean cetacean populations.[59]

Cetacean strandings data can provide important indications as to the species, local extent and potential hotspots of bycatch. Strandings data can also provide an early warning system of novel impacts, including changes in bycatch patterns. Nevertheless, strandings data is incomplete and should not be seen as a substitute for dedicated monitoring onboard fishing vessels.

Some cetacean populations continue to suffer from substantial fisheries bycatch in European waters but where the population is sufficiently abundant that bycatch levels are below the threshold judged to be of conservation concern. For example, it is estimated that 78 humpback whales and 100 killer whales were entangled in Norwegian purse-seine fisheries over a 10-year period from 2011-20, when the target catch of herring shifted distribution into coastal fjords.[60]

These capture levels are considered below that which might cause a population decline although, as the authors point out, no account is taken of other potential sources of anthropogenic mortality. Despite this, the Norwegian Directorate of Fisheries issued a new rule stating that the wellbeing of any entrapped or entangled cetacean is to be prioritised over the catch and onboard personnel were given training in response to large whale entanglement.

To the best of our knowledge, the Precautionary Principle, outlined in Article 191 of the Treaty on the Functioning of the European Union, has not been applied in consideration of cetacean bycatch anywhere within Europe. Despite the Habitats Directive requirements (expanded on below) and the explicit conservation objective to reduce bycatch to zero being agreed by ASCOBANS Parties in 2000, cetacean bycatch levels continue to cause population-level impacts decades on in those populations identified in Table 2 and may well do so in others not yet known about.

Examples of implementation of cetacean bycatch legislation

Many European countries have legislation and policies specific to cetacean bycatch. In this section, progress towards preventing cetacean bycatch are reviewed for the European Union, UK and Norway.

European Union

EU Member States have a legal obligation to strictly protect cetaceans, to establish a system to monitor incidental capture and killing of cetaceans and to take adequate measures to protect them.

EU Member States are required to assess the status of species in relation to their abundance and mortality due to bycatch and report on whether populations are in good environmental status every six years.

EU fisheries are managed by the Common Fisheries Policy Regulation 1380/2013. EU Technical Measures Regulation 2019/1241 was introduced in 2019, replacing Regulation 2004/812 concerning incidental catches of cetaceans in fisheries.

This new regulation combines about 30 pieces of fisheries conservation legislation that determine the conditions under which fishers may fish, including management of cetacean bycatch. The Regulation requires Member States to adopt conservation measures to minimise and where possible eliminate bycatch.

Strengths and flaws in the Technical Measures Regulation have been identified.[61] Strengths include an explicit obligation to ensure bycatch of sensitive species is minimised and where possible eliminated (Article 3), which is consistent with the ASCOBANS aspiration towards zero bycatch. The regulation allows for the creation of real-time closures in conjunction with moving-on provisions as an additional measure for the protection of sensitive species (Article 19). Flaws include the lack of a dedicated observer scheme for monitoring cetacean bycatch and monitoring of a very small fraction of the European fleet (vessels over 15m). Recommendations have been made to improve monitoring suitability.[62] In addition, inconsistent application of measures exist in different regions of the EU. For example, the European Commission proposal to require the use of Acoustic Deterrent Devices (ADDs), or pingers, in the Black Sea and some other regions of Europe was not taken up.

The regulation imposes pinger usage for vessels over 12m only. The majority (75 per cent) of the EU active fleet is composed of vessels under 12 metres in length.[63] Analysis conducted when the UK was still a member of the EU identified that, in 2017, of 1,256 vessels using static nets in UK waters, only 24 (2.5 per cent) were obliged to deploy pingers by EU requirements, with a resulting reduction of bycatch from a best estimate of 1,150 to 948 porpoises that year.[64]

Current pinger implementations have a limited effect on reducing bycatch and, in some cases (depending on region and season), virtually no effect.[65] Indeed, current implementation plans limit pinger usage to a subset of the fleet that, in many instances, represents at best a small portion of the entire fishing fleet. The regulated pinger deployment schedule is not targeting the vessels and instances yielding the greatest bycatch risk.

There has been much criticism of the EU Member States' failure to adequately monitor and mitigate bycatch of small cetaceans in fisheries.[66] This is due to the diffuse management authority, a lack of overarching quantitative and legally binding conservation objectives and a lack of political will and attention.

In a report produced for the European Commission, the Scientific, Technical and Economic Committee for Fisheries (STECF) recommended more flexibility is required to use a wider range of mitigation measures (such as closed areas and gear modifications) to mitigate cetacean bycatch, in the full range of fisheries, vessel sizes, metiers and regions where bycatch occurs. Member States should be required to provide evidence that such mitigation measures are effective at reducing bycatch. STECF suggests that Member States' regional groups should be tasked with prescribing regional plans for pinger use and associated bycatch mitigation measures.[67]

Article 11 of the Common Fisheries Policy allows Member States' fishing in a specific area and protected under EU law to produce a Joint Recommendation of fisheries management measures to achieve the conservation objectives of the area. The Joint Recommendation is then adopted by the European Commission in a delegated act, if the Parliament and Council do not oppose. Negotiating Joint Recommendations among Member States sharing a fishing interest has proven a lengthy process and is prone to political trade-offs, leading to the adoption of a limited number of fisheries management measures that are weak and often the lowest common denominator in their protection measures.

In May 2020, the EU Biodiversity Strategy for 2030 was adopted as part of the European Green Deal. The Strategy aims to get Europe's biodiversity on the road to recovery by 2030 by protecting wildlife and combating the illegal wildlife trade. It specifically mentions the need to address the problem of bycatch of sensitive species through the necessary mitigation measures and by stepping up the collection of scientific data.

Implementation of an EU Action Plan to protect cetaceans from bycatch has been proposed by EIA and others.[68] A Fisheries Action Plan (COM(2023) 102 final), including measures on bycatch, was published by the Commission.[69] This Action Plan is a call to action for Member States to implement the political obligations under the Kunming-Montreal Global Biodiversity Framework and the Council Conclusions following the Biodiversity Strategy and to implement the legal obligations under the Habitats, Birds, and Marine Strategy Framework Directives, as well as Common Fisheries Policies.[70]

In particular, the Action Plan called on Member States to adopt measures by the end of 2023 to minimise bycatch of harbour porpoise in the Baltic Proper and the Black Sea, the Iberian Atlantic and the common dolphin in the Bay of Biscay. In early 2025, this requirement has not been met for any of these populations.

Right: Entangled harbour porpoise being hauled on board a fishing vessel. ©Dimitar Popov

Infringement procedures against Member States

There are significant gaps between what EU nature conservation laws require of Member States and what Member States are doing or, rather, failing to do. Member State implementation of bycatch measures has not been adequate to protect cetaceans.[71]

In July 2019, a legal complaint was formally submitted to the European Commission by conservation and welfare charities identifying the management failings of Member States and the required solutions to tackle cetacean bycatch. The complaint focused on the breaches of Article 12 of the Habitats Directive by 15 Member States. Two further documents requested 'emergency measures' under Articles 11(4) and 12 of the Common Fisheries Policy for the North-East Atlantic common dolphin and Baltic Proper harbour porpoise (see case studies below).

The Commission pursues legal action against Member States for failing to comply with their obligations under EU law. The infringement procedure begins with a request for information (a letter of formal notice) to the Member State concerned, which must be answered within a specified period, usually two months. If the Commission is not satisfied with the information and concludes that the Member State in question is failing to fulfil its obligations under EU law, the Commission may then send a formal request to comply with EU law (a reasoned opinion), calling on the Member State to inform the Commission of the measures taken to comply within a specified period of time, usually two months. If a Member State fails to ensure compliance with EU law, the Commission may then decide to refer the Member State to the Court of Justice of the European Union. Most cases are settled before being referred to the court. If the court finds that a country has breached EU law, the national authorities must take action to comply with the Court judgment.

Following submission of the NGO complaint, the European Commission began a series of infringement procedures against Member States for their lack of action to meet the legal requirements to monitor and prevent bycatch of cetaceans, seabirds and other protected species (Table 3).

The European Commission has initiated infringement procedures against eight Member States for failure to fulfil Habitats Directive obligations on cetacean bycatch monitoring and action. It has progressed from letters of formal notice to reasoned opinions with France and Spain for their failure to fulfil legal obligations to prevent bycatch of common dolphin, bottlenose dolphin and harbour porpoise, among other species, and against Sweden for its failure to fulfil legal obligations to prevent harbour porpoise bycatch in the Baltic Proper.

Country	Date	Action
Croatia	Feb 2025	Letter of formal notice
Sweden	Feb 2024	Reasoned opinion
Italy	Feb 2024	Letter of formal notice
Portugal	Nov 2023	Letter of formal notice
Bulgaria	July 2022	Letter of formal notice
France, Spain	July 2022	Reasoned opinion
Netherlands	Feb 2022	Letter of formal notice
France, Spain, Sweden	July 2020	Letter of formal notice

Table 3. Infringement procedures initiated by the European Commission for Member State failure to fulfil Habitats Directive obligations on cetacean bycatch monitoring and action

Examples of bycatch management in the EU

Few EU Member States have made any progress towards meaningfully preventing cetacean bycatch.

The following three case studies provide examples of various levels of action, none of which are currently adequate to meet legal requirements.

Right: Entangled bottlenose dolphin being hauled on board a fishing vessel. ©Dimitar Popov

Case Study 1: Baltic Proper harbour porpoises

The Baltic Proper harbour porpoise is a distinct population listed as Critically Endangered by the IUCN in 2008. The EU Biogeographical assessment concluded the Baltic harbour porpoise status is Unfavourable-Bad. Their population size is estimated to contain fewer than 216 mature porpoises and is suffering an ongoing decline, largely due to bycatch in static nets[72] taking place since the 1960s.[73]

In total, 98 per cent of the Baltic Proper porpoise population resides in Swedish waters during the summer reproductive period.[74] This population cannot sustain even one individual being killed in a year by human activities, yet between 3-7 porpoises are bycaught each year.[75] The onset of sexual maturity in female harbour porpoises of the German Baltic Sea and average age at death was calculated at 4.95 and 3.67 years, respectively.[76] As a result, most female porpoises in the Baltic die before they get the chance to reproduce.

Table 4 includes recent steps taken to improve bycatch measures to protect Baltic Proper harbour porpoises.

ICES special request advice in 2020 provided detailed recommendations to prevent porpoise bycatch.[77] As a result, Commission Delegated Regulation (EU) 2022/303 closed static net fisheries in some important harbour porpoise areas in the Baltic Proper, year-round or during biologically important times of the year, and mandated pingers to be used in static net fisheries in other areas, in accordance with the ICES advice.

The implemented measures do not meet the requirements provided in the ICES advice for closures or pinger use in all remaining static net fisheries within the porpoise range or meet the requirements of more recent relative bycatch risk maps that reinforce the ICES advice.[78] The Swedish, Finnish and German military navies vetoed large-scale pinger use.[79] The discussions in Baltfish have yet to render any alternative proposals of effective bycatch mitigation measures, leaving the Baltic Proper porpoise subpopulation without any directed bycatch mitigation measures in place in the majority of their range and further imperilling their future.

While progress has been made towards preventing harbour porpoise bycatch in some parts of the Baltic Proper, given the critically endangered status of the Baltic Proper porpoise there is a need for more urgent action. A recent NGO briefing on this issue identified measures.[80]

Timeline	Measure
July 2019	Emergency measures request by European NGOs
May 2020	ICES Special Request Advice
July 2020	Sweden receives Letter of Formal Notice
Feb 2022	Commission Delegated Regulation (EU) 2022/303
Feb 2023	EU Commission launches Fisheries Action Plan
Feb 2024	Sweden receives Reasoned Opinion

Table 4. Recent steps taken to improve bycatch measures to protect Baltic Proper harbour porpoises

Case Study 2: Bay of Biscay common dolphins

Common dolphins are considered as one large population with an abundance estimate of about 440,000 dolphins on the continental shelves and adjacent waters of the North-East Atlantic.[81]

The EU Biogeographical assessment concluded that North-East Atlantic common dolphin status is Unfavourable-Inadequate. Common dolphins have been shown to be declining in body condition and nutritional health, influencing their survival and reproductive success.[82] Undoubtedly, the combination of their declining health, in addition to decades of high levels of bycatch, is a serious concern for this population.

Common dolphin strandings associated with bycatch were first observed in the Bay of Biscay in 1989[83] and have intensified since 2016. The winter of 2023 saw the highest level of strandings ever recorded on the French coast.[84] Despite the large population size, bycatch levels are high enough to be making a population-level impact. Since 1990, it has been estimated that more than 110,000 common dolphins have been bycaught in the Bay of Biscay.

A variety of trawls, seines and nets have been positively correlated with common dolphin bycatch. The highest estimated bycatch of common dolphins is in set gillnets and trammel nets (70 per cent) in the Bay of Biscay and the Iberian Coast ecoregion.[85] Table 5 includes steps taken to improve bycatch measures to protect Bay of Biscay common dolphins.

ICES advice recommended a combination of temporal closures of all different types of fishing gear of concern of concern and application of pingers on pair trawlers to mitigate bycatch outside of closure period or an overall reduction in fishing effort.

It was an important turning point in March 2023 when the French Council of State ordered France to take measures to reduce bycatch through fishing closures within six months. Following the decision of the French court, a closure of high-risk gear for fishing vessels longer than 8m was introduced between 22 January and 20 February, from 2024-26, for common dolphins and other small cetaceans.

In September 2024, the regional group of the South-West Waters (Belgium, France, Portugal, the Netherlands, Spain) submitted a Joint Recommendation proposing management measures, including the use of pingers for all mid-water pelagic trawls and demersal twin trawls, a fishing closure from 22 January to 20 February and monitoring measures. STECF considered the measures proposed and concluded that they were less stringent than the measures advised by ICES. The Commission implemented the Joint Recommendation agreed through a delegated act to secure regional measures. The closure is expected to affect about 300 vessels.[89]

Due to the four-week closure of fisheries in Biscay in 2024, bycatch was reduced to the lowest level since 2015.[90] The spatial extent of the closure matched the area recommended by ICES, but the closure period was shorter than ICES had advised as necessary in order to achieve the quantitative objectives agreed by OSPAR.

ICES noted the need for longer-term measures and advised that emergency measures should be considered as a transition towards this. Sequential implementation of progressively more constraining management measures (in terms of effort reduction) over a five-year period could be used to achieve the management objectives proposed by ICES. The proposed time period would allow for the development and implementation of fishing gears that have a low bycatch risk to cetaceans and other protected species.[91] We are not aware of any efforts towards this end.

Focus has rightly been on common dolphins in the Bay of Biscay because of the sustained and unsustainable bycatch in a number of fisheries. However, common dolphins are also bycaught in high numbers in the wider region.

Some progress has been made towards preventing cetacean bycatch in the Bay of Biscay, although the measures are short-term in nature and no long-term solutions have yet been identified. More progress is needed, including the adoption of regional measures across all areas to improve the conservation of the common dolphin.[92]

Timeline	Measure
July 2019	Emergency measures request by European NGOs
May 2020	ICES Special Request Advice
July 2020	France and Spain receive Letter of Formal Notice
Dec 2020	Spanish bycatch Order[86]
2021	French Action Plan[87]
July 2022	France and Spain receive Reasoned Opinion
March 2023	French Council of State order closure
Feb 2023	EU Commission launches Fisheries Action Plan
January 2024	Spanish bycatch Order[88]
Sept 2024	Commission delegated regulation (2024/3089)

Table 5. Steps taken to improve bycatch measures to protect Bay of Biscay common dolphins

Case Study 3: Black Sea harbour porpoises

The Endangered Black Sea porpoise has a geographically isolated population of about 258,000 individuals who move seasonally between the Black Sea, Sea of Azov and Sea of Marmara.[93] The EU Biogeographical assessment concluded that harbour porpoise status is Unfavourable-Bad.

Hundreds of thousands of small cetaceans were hunted in the Black Sea annually during the 20th century and was banned in Bulgaria, Romania and the former USSR in 1966 and continued in Türkiye until 1983.[94] Hunting resulted in a dramatic decrease, potentially of 90 per cent, in porpoise population size in the region. Bycatch has replaced hunting as the main threat to porpoises, as well as to bottlenose dolphins (listed as endangered) and common dolphins (listed as vulnerable), particularly in bottom-set gillnets.

Data from various sources in Bulgaria, Romania, Türkiye and Ukraine resulted in the annual harbour porpoise bycatch in gillnets set for turbot in the Black Sea being between 11,826 and 16,200 individuals, which represents a conservative bycatch rate of 4.6-17.2 per cent and about 20,000 individuals for all fishing gear types.[95]

This shocking level of bycatch is among the highest in the world[96] and is likely to be the highest annual bycatch rate in Europe.

Bycatch was the main mortality factor for the harbour porpoise population in the Azov Sea, which has declined by 60 per cent from 2000-13.[97] Table 6 includes recent steps taken to improve bycatch measures to protect Black Sea harbour porpoises.

In Bulgaria, the Ministry of Environment and Water adopted an Order describing pingers models to be used within five Special Areas of Conservation. It purchased 100 porpoise alerting (PAL) wide-band pingers to be distributed to fishermen fishing turbot in these sites. It is expected to be completed as a pilot project in 2025.

The General Fisheries Commission for the Mediterranean (GFCM) Black Sea Working Group has completed a project to use PAL pingers in large-scale trials. Early indications are that they had positive results, with 70-90 per cent reduction of harbour porpoise bycatch.

A report is due out in 2025 and there is urgency for the GFCM to release the results of the pinger trials as soon as possible so appropriate fleet-wide measures can be implemented. Distribution of adequate numbers of pingers for the fleet fishing should be overseen by independent observers to ensure the pingers function correctly over their lifespan and the required reduction in bycatch rate is sustained.

Government data provided to ICES for analysis does not reflect the full situation in the region. ICES should accept cetacean bycatch data from non-government sources where these provide additional clarity about bycatch levels in the Black Sea fishing fleets .

Very limited progress has been made towards preventing cetacean bycatch in the Black Sea with some pinger trials taking place. However, the alarmingly high levels of bycatch that have followed decades of hunting that already dramatically reduced cetacean populations are now compounded by war.[98]

Timeline	Measure
July 2022	Bulgaria receives Letter of Formal Notice
Feb 2023	EU Commission launches Fisheries Action Plan
Mar 2023	Bulgaria adopts Order RD-215/19.03.2024

Table 6. Recent steps taken to improve bycatch measures to protect Black Sea harbour porpoises

Above, previous: A Common dolphin leaping through the ocean.

Left: Harbour porpoise showing clear fishing net entanglement indentations around their mouth. ©Nick Davison

Examples of bycatch management elsewhere in Europe

United Kingdom

Nature conservation is devolved in the UK and the most pressing cetacean bycatch issues are different in England and Wales than they are in Scotland.

Small cetaceans are mainly bycaught in England and Wales (see below).

By comparison, gillnet fishing is less common in Scotland and creel (pot) fishing causes entanglement, mainly of humpback whales, minke whales and basking sharks[99] as well as some small cetaceans, such as Risso's dolphins and orcas.[100]

Harbour porpoise populations in the Celtic and Irish seas, the English Channel and Greater North Sea are bycaught at levels that are impacting these populations and at some of the highest levels in European waters. A recent study identified that the risk to porpoises from static nets was spread over a relatively large area in the Celtic and Irish seas, while within the North Sea it was concentrated in certain smaller areas. Mindful of the extremely high bycatch levels in the Celtic and Irish seas, more than nine times the bycatch limit and more than three times in the North Sea, action is required in both areas.[101]

There are no quantitative assessments of bycatch rates for white-beaked dolphins off Northumberland in the North Sea, but non-lethal injuries, most likely due to fishing interactions, were observed in 15 per cent of dolphins examined.[102] Minke whales and possibly humpback whales are at risk of localised depletion in areas of the west coast of Scotland due to creel pot lines.

Bycatch monitoring

Using strandings data collected since 1990, bycatch was determined as the primary cause of death of harbour porpoises and common dolphins.[103] Risso's, white-beaked and bottlenose dolphins, beaked whales, orcas, minke whales and humpback whales are also recorded as being bycaught.[104] A total of 415 cetaceans stranded around Cornwall in the south-west of England, one of the most heavily fished areas of the UK, were subject to post-mortem to determine cause of death between 1990 and 2006 and 67 per cent of common dolphins, 61 per cent of harbour porpoises and 26 per cent of other species were determined to have died due to bycatch.[105] More recently, the overlap of porpoise distribution and gillnet effort indicated three main areas of concern — north-west of Shetland, south-east England from Essex to Sussex and south-west England, including the Celtic Shelf and South West Approaches.[106]

The UK Bycatch Monitoring Programme collects data from on-board fishing vessels. In addition, since November 2021, there has been a mandatory requirement under fishing vessel licence conditions for fishers to report marine mammal bycatch to the Marine Management Organisation (MMO).

This programme was set up in response to the US Marine Mammal Protection Act (MMPA) Import Provision Rule to satisfy monitoring requirements. In 2020, 703 harbour porpoises and 222 common dolphins were estimated to be bycaught in UK fisheries. That same year, 20 per cent of cetaceans that were stranded were bycaught, according to post-mortem examinations. Reports made by fishers amounted to one bycaught individual in 2021, two in 2022 and six in 2023. Although data are not available for corresponding years to directly compare data collected from the independent monitoring programmes onboard fishing vessels to the data collected by fishers, it is clear that data provided by fishers are inadequate for management purposes and does not meet the requirements of the US MMPA Rule.

Self-reporting rates are low and the use of such data typically results in negatively biased estimates of bycatch rates.[107] It is widely published that self-reported data are not representative[108] as fishers are focused elsewhere, do not observe cases of bycatch nor are not motivated to collect and report bycatch data. Data collected since this initiative begun demonstrates the requirement for higher levels of independent monitoring to take place.

Mitigation

On leaving the EU, the UK passed the Fisheries Act 2020 which contains a provision that "*incidental catches of sensitive species are minimised and, where possible, eliminated*" under the Article 4 Ecosystem Objective. CleanCatch is the Government-funded bycatch initiative.

England and Wales

The UK Marine Strategy has been implemented, which mentions cetacean bycatch commitments in general terms through the marine wildlife bycatch mitigation initiative.

The UK has yet to identify priority fisheries or put in place bycatch reduction targets and timeframes to be able to tackle the small cetacean bycatch issue in English and Welsh waters. Implementation of meaningful bycatch measures remain lacking, particularly in gillnets.

Scotland

More than 50 per cent of baleen whales examined under post-mortem in Scotland between 1990 and 2010 were diagnosed as entanglement cases.[109] More recently, the Scottish Creel Fishermen's Federation (SCFF) brought attention to the issue of humpback and minke whale and basking shark entanglement in the groundlines of ropes between creel pots set all around the Scottish coastline.

A team of scientists, conservation and welfare NGOs and SCFF collectively set up the Scottish Entanglement Alliance (SEA). SEA set about understanding the issue and discovered that entanglement rate suggests a risk of localised decline in minke whales around the west coast of Scotland.[110]

Early trials of weighted rope appear promising to reduce the number of entanglements in the lines between pots.[111] Key areas of high entanglement risk have been identified.[112] The IWC Scientific Committee made several recommendations to the Scottish Government in 2024 to progress this work through further engagement with fishers in a wider geographic area and socio-economic analysis and of implementation options. The weighted rope looks like a very promising solution to the issue in Scottish waters, although it is still early days.

Norway

Monitoring

Mandatory cetacean bycatch reporting has been a requirement in commercial fisheries in Norway since 2011. Bycatch of harbour porpoises, minke whales, orcas, belugas, blue whales and bottlenose dolphins have been recorded in Danish seines, purse seines, trawls, traps and gillnets.[113]

The highest estimated harbour porpoise bycatch in gillnets in Europe is in the Norwegian Sea.[114] Recent analysis from 2006-18 found that while all coastal gillnet fisheries were unsustainable in several of the past 13 years for harbour porpoise bycatch, they no longer are. There has been a gradual decline and subsequent consistently low monkfish fishing effort that started in 2010 which likely explained the decrease in harbour porpoise bycatches from 2014-17. As monkfish fishing efforts increased in 2018, so did harbour porpoise bycatch that year.[115]

Assessing population impacts relative to different threshold values using both the ASCOBANS 1.7 per cent limit (3,064 porpoises) and PBR (2,541 porpoises), the corresponding average yearly estimates for the past five years were 1,580 and 1,642 porpoises.[116] However, ASCOBANS 1.7 per cent has been disbanded and ICES typically uses a modified PBR approach. A Joint IMR/NAMMCO International Workshop on the Status of Harbour Porpoises in the North Atlantic calculated the PBR for Norwegian waters is about 700 and the current estimates of porpoise bycatch exceed this level.

The workshop further calculated that if bycatch in the period 2016-25 is equal to the average of the three past years of annual estimates, the decline will continue.[117] For this reason, the Norwegian Sea population of harbour porpoises has been included in Table 1.

Mitigation

Gillnet fisheries for cod from January to April have the largest fishing effort and most of this effort is concentrated on the cod spawning grounds in Vestfjorden, Lofoten.

The Norwegian Ministry of Fisheries made pinger use mandatory in the Vestfjord cod fishery from January 2021.[118] Preliminary analyses suggest that compliance is about 60 per cent and that harbour porpoise bycatch rates have been reduced by on average about 20 per cent.[119] Norway has also been investigating the use of sound to deter orcas and humpback whales from coastal purse seine fisheries targeting herring.[120]

Estimates suggest from 1,000 to more than 13,700 gillnets are lost in Norwegian waters each year. Norway is one of the few countries that has a programme in place to systematically record and retrieve lost fishing gear. Since 1983, more than 22,000 gillnets and associated buoy lines have been recovered.[121] Norway is making some progress towards preventing cetacean bycatch in gillnets by requiring the implementation of pingers in one area where bycatch levels are high and by removing ghost nets from the ocean. Yet ICES identified that the highest estimated bycatch of harbour porpoise is in gillnets in the Norwegian Sea.

Above: A bottom-set fishing net

Solutions

This section provides a summary as detailed reviews on cetacean bycatch solutions, particularly technical measures, have been conducted elsewhere.[122]

A number of regional funding programmes are investigating cetacean bycatch reduction. The main aim of these projects are to monitor and reduce mortality of incidental bycatch of sensitive species within European waters (such as CIBBRiNA and Marine Beacon) and the EU fleet operating in West African waters (REDUCE).

Fisheries management

Likely the most successful way to address fisheries bycatch is to consider its elimination as an integral part of wider fisheries reform or as an ecosystem-based approach to fisheries management.

On the ground, cetacean bycatch can be prevented by reducing fishing effort, switching to low-impact fishing gear and redesigning or altering fishing practices, for example, setting at a different time of day or avoiding places with high levels of bycatch species, although there are technological and economic limits to the effectiveness of such technical measures.[123]

Where technical solutions are shown to be effective to meet the legal requirements and non-impactful, these should implemented. However, there is an over reliance on the use of pingers to mitigate bycatch, given the concerns with disturbance, displacement and welfare — and that they are not proven to be effective for many species and only apply to certain gear types.[124] They may be financially challenging in small scale fishing fleets.[125] Many pinger trials take place in European fisheries, but these are rarely expanded to fleet-wide measures.

Particularly where populations are vulnerable and endangered and bycatch cannot exceed zero (for example, for the Baltic Sea proper and Iberian Peninsula porpoises), spatial closures, effort reductions (those using impacting gears) and alternative gears are required.

A wider range of effective mitigation measures such as closed areas and gear modifications should be considered standard to mitigate cetacean bycatch in the range of fisheries, vessel sizes, fishing gear types of concern and regions where bycatch occurs. Implementation of pingers and time-area fishing closures in inner Danish waters concomitantly were effective, with time-area fishing closures placed in high-quality porpoise habitat with the greatest bycatch risk and fishing activity being excluded during periods of increased energetic demand/stress (e.g. when females are lactating),[126] thus preventing the impacts of wide-scale deployment of noisy pingers.

The US has adopted 'consequence closures' to protect harbour porpoises from bycatch in sinking gillnets in the Gulf of Maine, where bycatch has been above PBR. Large areas will be closed to gillnet fishing unless bycatch rates remain below PBR, placing the burden on fishermen to improve their performance in complying with the conservation measures contained in a TRP[127] and providing a strong incentive to improve compliance.

An effective case was made for reductions in fleet size to prevent displacement of fishing gear from one area to another following implementation of decisions that involve area closures.[128] An exercise of modelling management strategies for the California Dungeness crab trap fishery indicated that reducing the amount of gear used would be more effective in reducing the rate of entanglement of humpback whales, in comparison to reactive closures of certain areas of the fishery.[129]

A negative economic impact should not be assumed with effort reduction. Reducing fishing effort has been shown to improve profitability and sustainability of the inshore and offshore trap fishery for American lobster in the north-east US fishery, as well as reduce entanglements of North Atlantic right whales.[130]

Acting early

Important lessons should be learnt from 36 years of research on Hector's dolphin and its subspecies Maui dolphin, an endemic species in New Zealand and one of the world's most threatened which is declining due to high levels of bycatch.

This research emphasised the importance of acting early, having clear management goals and ensuring that the area over which protection measures are applied is sufficiently large to be biologically relevant.[131]

Given that more than 110,000 common dolphins have been bycaught in the Bay of Biscay since 1990, there has been adequate time to implement measures that might have prevented the need for seasonal closures. Such measures might include reductions in fleet size and alternative fishing gear.

Alternative gears

Gillnets, both commercial and recreational, are responsible for more cetacean deaths in European waters than any other gear types.

There is an increasing recognition that a move away from gillnets to the use of alternative fishing gears is necessary to prevent cetacean bycatch, both regionally[132] and globally.[133] This can be achieved by changing to more selective fishing methods that do not catch cetaceans and would promote recovery of depleted fish and bycatch species and benefit sustainability, which could be an ecological and economic win.[134]

Deeply concerned by the negative impact of gill and trammel nets on the conservation status of many cetacean populations, the IWC Scientific Committee strongly encouraged Member States and others to invest in the development and adoption of alternative fishing gears to ensure sustainable fisheries and good conservation status of cetacean populations.[135]

Implementation of effective bycatch action plans

Management measures need to be of an appropriate scale in relation to the spatial and temporal pattern of bycatch risk to meet legal requirements. Measures need to be transparent, enforceable and effective to reduce bycatch to meet the policy conservation objectives.

To this end, national and regional action plans would be a valuable tool to be coordinated and implemented at an ocean basin level, enabling collaboration, transparency and timeframes for delivery of objectives.

ICES provides detailed scientific bycatch advice on protected species to national and regional governments and regulatory bodies. This advice includes the scientific requirements to monitor and prevent cetacean bycatch. ICES has access to the regions' leading bycatch experts, holds a data repository and conducts ongoing analysis of sampling scheme requirements and bycatch rates where data are available.

As ICES did for the Baltic porpoise and Biscay common dolphin, it would be well placed to provide robust scientific bycatch action plans for other cetacean populations. Currently there is no requirement for ICES advice to be implemented into management measures.

Bycatch monitoring

Existing monitoring measures and obligations have been reviewed.[136] Most recently, ICES developed appropriate sampling schemes for cetaceans and other protected species to inform appropriate bycatch monitoring systems, at the request of EU's Directorate-General for Environment and identified best practice design of PET (protected, endangered, threatened) bycatch sampling programmes.[137]

Only a few Member States have dedicated species bycatch monitoring programmes in place, e.g. Estonia, Denmark and Spain.[138] There are no national cetacean bycatch monitoring programmes in the EU (or elsewhere in Europe) that meet the legal requirements of the Habitats Directive.[139]

Just 3.3 per cent of Europe's fishing fleet is monitored for protected species bycatch.[140] It is typically larger vessels that are monitored, rather than small-scale coastal vessels where cetacean bycatch is as likely to occur and makes up the majority of the fishing fleet.

For cetacean species with very low bycatch rates, monitoring efforts would need 50-100 per cent coverage to obtain precise estimates (Coefficient of Variance (CV) <30 Per cent).[141] ICES identified European protected species that had insufficient bycatch monitoring coverage and recommended monitoring coverage for common dolphins and harbour porpoise in a range of gear types.[142] ICES completed a review of current EU monitoring programmes and proposed criteria that monitoring programmes should fulfil.[143]

For all those populations identified in Table 2, accurate bycatch monitoring data are needed, but this should not be accepted as an excuse for inaction. Cetacean bycatch monitoring needs to be prioritised in European waters, alongside bycatch prevention measures.

Right: A stranded cetacean with a tail fluke showing entanglement indentations. ©CSIP-ZSL

Conclusion

Despite binding legal requirements, all European coastal states have failed to adequately protect cetacean populations from bycatch in their waters.

Considerable knowledge gaps and a lack of quantitative bycatch recovery targets remain, yet scientific advice has been clear about the negative impact of cetacean bycatch for decades and cetacean bycatch remains as problematic as it ever has throughout European waters.

Measures adopted for cetaceans are not sufficient to mitigate bycatch effectively. A poor implementation of measures and lack of adequate government attention exists. The failure to act reflects a lack of political will to tackle cetacean bycatch. Implementing adequate bycatch measures and ensuring robust enforcement of existing legislation would save many thousands of cetaceans in European waters every year.

Measures to reduce bycatch have been limited and not always directed at the most problematic fisheries. As well as inadequate bycatch monitoring and measures, there is missing bycatch data from recreational fisheries and drop-outs.

With several populations already considered endangered because of bycatch, we risk losing populations unless governments act. European Commission legal action has encouraged some efforts by a few EU Member States, but urgent deadlines in the EU Fisheries Action Plan have been missed. In order to make necessary progress, implementation of effective measures to prevent bycatch should be prioritised and, until robust measures are implemented, legal action should be progressed at pace.

Governments invest substantial resources in supporting fisheries to harvest and market fish products, with comparatively small allocations to understanding and preventing protected species bycatch. Bycatch prevention and monitoring requires adequate government attention, reformed fisheries management and resources, if this issue is to be effectively tackled.

The widespread issue of human encroachment and consumption patterns tend to be overlooked, even when they are pervasive enough to seriously affect cetacean populations.[144]

Future fisheries must operate on principles that minimise impacts on marine life, adapt to climate change and allow regeneration of depleted biodiversity, while supporting and enhancing the health, wellbeing and resilience of people and communities.[145]

Best practice in bycatch prevention must become the norm. The concept of fisheries sustainability must be broadened to include full consideration of bycatch, as well as prevention and mitigation related to ALDFG.

Addressing the problem of harbour porpoise bycatch in static net fisheries is a priority in all European waters. To prevent potential extinction of some sub-populations of harbour porpoises, most immediately in the Black Sea, Baltic Proper, Belt Sea and the Iberian Peninsula, effective and urgent interventions are necessary.

Recommendations

Implementation of the existing bycatch legislation in Europe requires enforcement.

All European nations should identify and implement concurrent monitoring and effective measures to prevent cetacean bycatch including quantitative bycatch reduction targets and timelines. Monitoring and trials must continue but not at the expense of continuing bycatch.

We make the following specific and urgent recommendations:

- European legislation should be fully implemented by **governments** to adequately monitor and prevent cetacean bycatch in all fisheries where it is occurring
- **Scientists** should include drop-out rates in analysis of bycatch rates for all gillnet fisheries in European waters as standard
- **Governments** should require adequate levels of dedicated monitoring be imposed
- Pinger usage should be independent of vessel size and based on demonstrated effectiveness at reducing cetacean bycatch for the fishery concerned
- The **European Commission** should impose strict deadlines for Member States to submit Joint Recommendations that are sufficient to implement existing bycatch legislation. Where Joint Recommendations are not timely, the Commission should use its powers to apply emergency measures, including spatial closures
- The **European Commission** should continue infringement procedures and should pursue new infringements against other Member States that are not fully implementing the Habitats Directive to prevent cetacean bycatch
- Further closures should be implemented without delay in **Germany, Sweden, Finland and Poland** to protect the Baltic harbour porpoise in its entire range. Failing immediate action, the **European Commission** has clear grounds to progress infringement procedures against these Member States, including taking Sweden to court for not implementing the ICES advice in full
- The **European Commission** should progress infringement procedures against Member States fishing in the Bay of Biscay since ICES advice is not followed in full
- **Governments** should implement effective long-term measures to protect common dolphins from bycatch in key fisheries (including but not limited to gillnets and pair-trawlers) beyond the Bay of Biscay where bycatch routinely occurs
- The **European Commission** should request ICES advice on urgent and effective measures to prevent cetacean bycatch in the Black Sea
- Harbour porpoises and other cetaceans in the Black Sea are in urgent need of bycatch solutions that should be facilitated by **GFCM**
- The **UK and devolved governments** should review and implement adequate monitoring levels, quantifiable targets for reductions in bycatch levels, timeframes and clear conservation outcomes. This may be most effectively achieved through dedicated legislation
- Dispersing **government** funds widely to UK researchers might be a more productive approach to stimulate innovative and timely bycatch solutions
- The **Office of Environmental Protection** should conduct a review of existing bycatch measures against the Fisheries Act 2020 requirements
- Given the high levels of porpoise bycatch in Norwegian waters, the **Government** should implement further measures to continually reduce bycatch
- **Governments** should implement longer-term strategies that consider structural changes to the relevant fishing fleets to minimise cetacean bycatch, including a transition from gillnets to alternative fishing gears with less deleterious bycatch impacts
- Development of robust scientific bycatch action plans by the **ICES** for those cetacean populations identified in Table 2 for which a plan would be beneficial, including all the harbour porpoises populations (other than in the Baltic Proper, where advice exists)
- ICES recommendations on bycatch monitoring should be implemented by **governments** without delay
- A significant proportion of national and regional **government** bycatch funding, including from EU sources, should focus on effective solutions at the fleet level, including implementing the outcomes of such ICES population-based advice.

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