

## Bycatch of protected and potentially vulnerable marine vertebrates – review of national reports under Council Regulation (EC) No. 812/2004 and other information

### Advice summary

ICES summarizes the bycatch of marine vertebrates in 2017 as reported by EU Member States under Council Regulation (EC) No. 812/2004 and other mechanisms. Despite the insufficient information available on total and monitored fishing effort for many areas and métiers to provide reliable bycatch estimates, ICES evaluated the bycatch risk for harbour porpoise (*Phocoena phocoena*) and grey seal (*Halichoerus grypus*) in the Celtic Seas and Greater North for 2017. ICES found that the bycatch risk for the harbour porpoise subpopulation in the Celtic Seas assessment unit (including also the eastern Bay of Biscay Shelf) might exceed internationally adopted thresholds of acceptability. ICES has advised on other areas and species in previous years. Seabirds and elasmobranchs are bycaught in most ecoregions. Seabirds are mainly taken in nets and longlines. The estimated bycatch rates of 22 seabird and 49 elasmobranch species enable the highlighting of species, areas, and métiers where bycatch may be of particular concern.

### Request

Based on Work Package I, section 1.1.3. of the Administrative Agreement between the EU and ICES, the EU requests ICES to:

- 1) Provide information regarding the impact of fisheries on the ecosystem including marine mammals, seabirds and habitats impacts (including incidental catches). This should include information on the location of habitats sensitive to particular fishing activities;
- 2) Give warnings of any serious threats from fishing activities alone or in conjunction with any other relevant activity to local ecosystems or species as soon as ICES is aware of such threats;

This advice section covers only aspects of impacts on marine mammals, seabirds, and other marine vertebrates. Information relating to habitats will be advised separately. ICES advice in 2017 and 2018 (ICES, 2017a, 2018a) analysed bycatch in further areas and for more species than those described here.

### Elaboration on the advice

In 2017, there were at least 46 incidents of bycatch (observed days-at-sea with bycatch) of marine mammals recorded in the Council Regulation (EC) 812/2004 (EU, 2004) annual reports from EU Member States. Five species of cetaceans were reported as bycatch: 74 common dolphins (*Delphinus delphis*), 15 harbour porpoises (*Phocoena phocoena*), five long-finned pilot whales (*Globicephala melas*), four bottlenose dolphins (*Tursiops truncatus*), and two striped dolphins (*Stenella coeruleoalba*). Furthermore, five grey seals (*Halichoerus grypus*) were reported (Table 1). In addition to the national reports, ICES announced a data call. This resulted in bycatch records of 44 harbour porpoises, 34 harbour seals (*Phoca vitulina*), 14 grey seals, four harp seals (*Pagophilus groenlandicus*), three common dolphins, two ringed seals (*Pusa hispida*), one striped dolphin, one bottlenose dolphin, one long-finned pilot whale, and one Delphinidae (Table 1).

At least 178 incidents of seabird bycatch were recorded through the ICES data call, amounting to 528 specimens of at least 22 species, along with 15 turtles of two species (*Caretta caretta* and *Dermodochelys coriacea*) (Table 2). Turtle bycatch was only reported in the Western Mediterranean longline fishery.

ICES estimates that the percentage mortality of harbour porpoise population in 2017 in nets in the Greater North Sea was between 0.33% and 0.59% (corresponding to 1175–2126 individuals per annum), and in the Celtic Seas in nets and trawls between 0.29% and 0.80% (240–653 individuals per annum). The estimated bycatch mortality of harbour porpoise subpopulation in the Celtic Seas assessment unit (including also the eastern Bay of Biscay Shelf) ranged between 2.12% and 5.57% (536–1409 individuals per annum). The latter estimates exceed the 1.7% limit for total anthropogenic removal set by ASCOBANS (ASCOBANS, 2016).

ICES estimates that the percentage mortality of the grey seal population in 2017 in the Celtic Seas and Greater North Sea ecoregions due to bycatch was estimated at 1.5–2.9%. However, ICES considers that this estimate comes with a caveat because of biased sampling that will likely lead to an upward bias in total estimates when extrapolated to area and fleet level. Despite these estimates of bycatch mortality rates, grey seal abundance appears to be steadily increasing (OSPAR, 2017; ICES, 2019a).

ICES estimates that the calculated confidence intervals around seabird bycatch rates in several areas (Icelandic waters [27.5.a.2], Western Mediterranean [GFCM areas 1, 5, and 6], North Sea [27.4.a], Baltic Sea [27.3.d.29–30 and 32], Bay of Biscay [27.8.a–b], and the Celtic/Irish Sea [27.7]) were wide due to limited monitoring effort. In 2017, the highest bycatch rates were obtained for gannet (*Morus bassanus*) in set longlines, the great cormorant (*Phalacrocorax carbo*) in set gillnets, common eider (*Somateria mollissima*) in set gillnets, and Balearic shearwater (*Puffinus mauretanicus*) in set gillnets and trammelnets.

ICES provides advice on serious threats posed by fishing activities to elasmobranchs threatened with extinction. In particular, bycatch of angel shark (*Squatina squatina*) in static net fisheries in the Celtic Sea (divisions 7.f and 7.j) is highlighted. The common skate complex (*Dipturus batis*) is widespread as bycatch throughout the ICES area and in the Mediterranean, with high bycatch rates from bottom trawls and seines in the northern North Sea (Division 4.a; bycatch rate up to 6.0) and bottom trawls and static nets in the western English Channel and Celtic Sea (divisions 7.e–h and 7.j; bycatch rate up to 68.9). Static nets in the latter areas also account for most recorded bycatches of porbeagle shark (*Lamna nasus*). Bycatch of the spiny butterfly ray (*Gymnura altavela*) occurred in pelagic trawls in Division 8.c and in nets in the Mediterranean. Endangered species of deepwater sharks, as defined under the Council Regulation (EU) 2016/2285 (EU, 2016a) are widespread bycatch in the deepwater bottom trawls in subareas 6–9, static nets in Biscay (Subarea 8), and longlines in the Azores (Subdivision 10.a.2). In the Mediterranean Sea the kitefin shark (*Dalatias licha*), the sandy ray (*Leucoraja circularis*), and the gulper shark (*Centrophorus granulosus*) are all bycaught in bottom trawlers (Table 12 in ICES, 2019b).

## Suggestions

Information available from monitoring and reported to ICES through the EU Member States' Reg. 812/2004 reports, ICES data call, and other additional and relevant sources is limited and mainly targets certain areas, métiers, and vessel types. Increased sampling effort is especially required on smaller vessels, which make up the majority of the European fleet and that likely account for a significant proportion of the bycatch. In addition, the consistency of bycatch monitoring and reporting at a regional scale is required for ICES to provide reliable advice on the impact of fisheries on protected and potentially vulnerable species.

ICES reiterates that the Regional Coordination Groups (RCGs) coordinating the implementation of EU MAP should continue to adapt the at-sea sampling designs required to include data on frequency of protected species bycatch events in all relevant fisheries. In order to prioritize areas where additional monitoring is needed the RCGs can consult ICES (2018b, 2019b, 2019c).

The numbers and temporal dynamics of stranded bycaught animals recorded in the Bay of Biscay (Peltier *et al.*, 2016) suggest that a dedicated bycatch observer/Remote Electronic Monitoring programme is required for the relevant fisheries in this area.

Seasonal or monthly bycatch estimates are preferable for seabirds given the patterns of distribution/abundance with the time of year. ICES considers that access to monthly fishing effort data is an important prerequisite for meaningful estimations of seabird bycatch rates.

As the bycatch risk for harbour porpoise and other species is generally evaluated at a spacial scale that may or may not be representative of population structure, population-level impacts may not be adequately estimated. Therefore, ICES suggests that, where possible, any bycatch risk on Protected, Endangered and Threatened Species (PETS) should be evaluated based on natural population units.

## Basis of the advice

### Background

Reports required by Council Regulation (EC) No. 812/2004 (EU, 2004) for 2017 were received from 15 of the 17 EU Member States (MS) affected by that Regulation in that year (one report was provided directly to ICES rather than to the European Commission). Lithuania and Spain did not report. The quality and scope of the information provided in the annual reports continues to be variable, with some MS simply repeating the information provided in previous years.

In 2018 ICES announced a data call\* asking for data on fishing effort, monitoring effort, and protected species (marine mammals, seabirds, reptiles, and fish) bycatch incidents in 2017. The data obtained through the data call involves countries beyond the EU and most often contains additional data than the Reg. 812/2004 reports. Of the 24 countries contacted, 20 responded to the data call. Many countries continue to submit data late (one-third) and the quality of the data submissions is variable.

The elasmobranch data mostly stem from on-board catch sampling programmes conducted by MS that target fish species rather than other vertebrates. Raising procedures (extrapolation) for bycatch estimation of fish are generally different than for other biota. The data call sought data on all fish species which are protected under existing legislation or were subject to zero-TAC or quota. Some of these species are subject to catch advice by ICES or other advisory bodies.

### Methods

#### Marine mammal bycatch risk

Minimum and maximum bycatch was estimated for grey seal and harbour porpoise for two ecoregions; the Celtic Seas (divisions and subdivisions 6.a, 6.b.2, 7.c.2, 7.f–h, 7.j.2, 7.j.1, and 7.k.2) and Greater North Sea (divisions and subdivisions 4.a–c, 7.d–e, and 3.a.20 and 21; Table 3). Bycatch mortality was also assessed in the eastern Bay of Biscay shelf (divisions 8.a–b; Table 3). The gear types assessed in the bycatch risk estimates were netting (GNS, GTR, GND), bottom trawling (OTB, OTT, PTB), and pelagic trawling (OTM, PTM). The bycatch data used in the bycatch risk estimates spanned 2015–2017. The analysis utilized the fishing effort and monitoring data submitted by MS. The estimate of the 95% confidence intervals around harbour porpoise and grey seal bycatch rates were used to generate maximum and minimum bycatch mortality based on the fishing effort data. The results were set in the context of regional abundance of the harbour porpoise (Hammond *et al.*, 2017; Rogan *et al.*, 2018) and grey seal (OSPAR, 2017).

#### Seabird bycatch rates

There were two basic inclusion criteria: (1) a given species is of high conservation concern, and (2) availability of a reasonable level of monitoring data (if the species was not considered to be of high conservation concern). Based on these criteria, 367 data records were used to calculate monthly (or pooled) bycatch rates with 95% confidence intervals (by bootstrapping) to provide a measure of the uncertainty around the bycatch estimated rate (Table 4). The temporal resolution of the estimates is based on data availability.

#### Elasmobranch bycatch rates

Bycatch rates, the numbers of specimens per observed day-a-sea in a particular métier, were calculated. For 2019, to respond to the request for threats from fishing activities, ICES advice is confined to species threatened with extinction *sensu stricto* based on Nieto *et al.* (2015).

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\* WGBYC-2019 Data call 2018 for data related to bycatch of protected species. Accessible at: <https://www.ices.dk/sites/pub/Publication%20Reports/Forms/DispForm.aspx?ID=35135>.

## Additional information

### Bycatch data certainty

In general, all bycatch estimates are affected by the distribution and “quality” of monitoring effort and need to be interpreted with caution. Sampling is not always representative, and bias may be introduced from various sources. Importantly, monitoring of larger vessels and data collection using fisheries observers (i.e. as part of the Data Collection Framework, DCF; EU, 2016b) dominate the dataset. An exercise comparing dedicated versus DCF monitoring effort in North Atlantic fishing grounds, highlighted the trivial number of dedicated PETS monitoring days in 2017 (ICES, 2019b). In the North Sea, there were just 22 days of dedicated monitoring compared to 1829 under the DCF. ICES has reported previously on the downward bias in PETS bycatch rates from data collected in non-dedicated vs. dedicated observer schemes (ICES 2017b, 2018b).

### Mitigation

In 2017, information on mitigation measures, their implementation and compliance, is reported by MS (under Council Regulation (EC) No. 812/2004 (EU, 2004), and is reviewed by ICES, together with mitigation studies on protected species bycatch published in the peer-reviewed scientific literature. Compliance with the “pinger” requirements of Regulation 812/2004 (use of acoustic deterrent devices to mitigate against cetacean bycatch) is difficult to gauge from the submitted reports. There has been little progress in the mitigation of bycatch of cetacean and other marine mammals. For seabirds, research has demonstrated a number of potentially useful bycatch mitigation techniques. The effectiveness of bycatch mitigation measures vary among fishing métiers, geographical areas, and bycatch species. Further development of mitigation measures, trials to test their effectiveness, and research to identify bycatch hotspots, are still needed to reduce the bycatch of protected species in many fisheries.

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**Annex**

**Table 1** Total number of marine mammals and observed bycatch rates (number of specimens/days-at-sea observed) in 2017 reported by EU Member States in their Council Regulation (EC) No. 812/2004 (EU, 2004) reports and obtained through the ICES data call. Bycatch numbers and rates are grouped by gear type and fishing area. The number of incidents is defined as observed days-at-sea with bycatch.

Species	Subarea	Level 3 métier	Reported			Database			
			Observed days-at-sea	Total number incidents	Total number specimens	Observed days-at-sea	Total number of incidents	Total number of specimens	Bycatch rate (number of specimens/days-at-sea observed)
<i>Phocoena phocoena</i>	27.3.b.23	Nets	36	1	2	17	1	2	0.12
	27.8.a	Bottom trawls	123	1	1	123	1	1	0.01
	27.8.b	Nets	221	4	4	221	4	4	0.02
	27.8.b	Pelagic trawls	9	1	1	9	1	1	0.12
	27.7.g	Bottom trawls	97	1	1	97	1	1	0.01
	27.7.f	Nets	62	3	4	62	3	4	0.06
	27.3.a.20	Nets	15	1	1	15	1	1	0.07
	27.7.e	Nets	131	1	1	131	1	1	0.01
	27.5.a.2***	Nets	-	-	-	131	37	44	0.34
<i>Subtotal</i>			<i>694</i>	<i>13</i>	<i>15</i>	<i>806</i>	<i>50</i>	<i>59</i>	
<i>Delphinus delphis</i>	27.10.a.2^	Rods and lines				1576	1	1	0.0006
	27.8.a	Nets	169	1	1	169	1	1	0.01
	27.8.b	Nets	221	5	5	221	5	5	0.02
	27.8.a	Pelagic trawls	45	6	49	45	6	49	1.10
	27.8.b	Pelagic trawls	9	6	8	9	6	8	0.94
	27.9.a*	Seines	40	1	3	40	1	2	0.05
	27.7	Bottom trawls				117	1	1	0.01
	27.7.g	Bottom trawls	216	2	3	216	2	2	0.01
	27.7.h	Bottom trawls	200	1	1	200	1	1	0.005
	27.7.f	Nets	62	1	1	62	1	1	0.02
	27.7.h	Nets	28	1	1	28	1	1	0.04

Species	Subarea	Level 3 métier	Reported			Database			
			Observed days-at-sea	Total number incidents	Total number specimens	Observed days-at-sea	Total number of incidents	Total number of specimens	Bycatch rate (number of specimens/days-at-sea observed)
	27.7.j	Nets				179	1	1	0.01
	27.7.e	Nets	131	2	2	131	2	2	0.02
<i>Subtotal</i>			1121	26	74	2993	29	75	
<i>Globicephala melas</i>	27.10.a.2^	Longlines				1226	1	1	0.0008
	27.8.c	Pelagic trawls	86	1	5	86	1	5	0.058
<i>Subtotal</i>			86	1	5	1312	2	6	
<i>Tursiops truncatus</i>	37.7**	Bottom trawls		1	1				
	37.7	Longlines				20	1	1	0.05
	37.17	Pelagic trawls	173	1	3	173	1	3	0.02
<i>Subtotal</i>			173	2	4	193	2	4	
<i>Stenella coeruleoalba</i>	37.7	Pelagic trawls		1	2	6	1	2	0.33
	37.6	Bottom trawls				253	1	1	0.004
<i>Subtotal</i>				1	2	259	2	3	
<i>Delphinidae</i>	37.7	Bottom trawls				181	1	1	0.005
<i>Subtotal</i>						181	1	1	0.005
<i>Halichoerus grypus</i>	27.3.d.32	Nets				8	1	2	0.25
	27.3.d.29	Pelagic trawls				13	1	1	0.08
	27.3.d.28.1	Traps				13	1	1	0.08
	27.3.d.32	Traps				12	2	3	0.25
	27.7.f	Nets	62	1	1	62	1	1	0.02
	27.7.j	Nets				179	2	2	0.01
	27.6.a	Pelagic trawls	29	1	1	29	1	1	0.03
	27.7.b	Pelagic trawls	7	1	1	7	1	1	0.14
	27.7.e	Nets				68	1	1	0.01
	27.7.e	Nets	131	2	2	131	2	2	0.02

Species	Subarea	Level 3 métier	Reported			Database			
			Observed days-at-sea	Total number incidents	Total number specimens	Observed days-at-sea	Total number of incidents	Total number of specimens	Bycatch rate (number of specimens/days-at-sea observed)
	27.5.a.2***	Nets				131	4	4	0.03
<i>Subtotal</i>			229	5	5	653	17	19	
<i>Phoca vitulina</i>	27.5.a.2***	Nets				131	19	34	0.26
<i>Subtotal</i>						131	19	34	
<i>Pusa hispida</i>	27.5.a.2***	Nets				131	2	2	0.02
<i>Subtotal</i>						131	2	2	
<i>Pagophilus groenlandicus</i>	27.5.a.2***	Bottom trawls				377	1	1	0.003
	27.5.a.2***	Nets				131	2	3	0.02
<i>Subtotal</i>						508	3	4	
<b>TOTAL</b>			<b>2303</b>	<b>48</b>	<b>105</b>	<b>7161</b>	<b>127</b>	<b>207</b>	

\* Animals released alive were not included in the database, but mentioned in the report.

\*\* Mentioned in the report, but data not entered in the database.

\*\*\* Not an EU Member State; no 812/2004 report submitted, but data added to the database.

^ Incidents from the Azores (Division 10.a) not included in the 812/2004 report from Portugal.



**Table 2** Summary of the numbers of seabird and turtle bycatch specimens by ICES subarea and métier, recorded in the data submitted to ICES from EU Member States through the data call.

Species	Subarea	Level 3 métier	Observed days-at-sea	Fishing effort (days-at-sea)	Total number of incidents	Total number of specimens	Bycatch rate (number of specimens/days-at-sea observed)
<i>Uria aalge</i>	27.3.b.23	Nets	17	2,446	2	3	0.176
<i>Phalacrocorax carbo</i>	27.3.b.23	Nets	17	2,446	1	1	0.059
<i>Somateria mollissima</i>	27.3.b.23	Nets	17	2,446	1	1	0.059
<i>Alca torda</i>	27.3.b.23	Nets	17	2,446	1	3	0.176
<i>Aythya fuligula</i>	27.3.b.23	Nets	17	2,446	1	1	0.059
<i>Aythya marila</i>	27.3.c.22	Nets	15	52,419	1	8	0.523
<i>Phalacrocorax carbo</i>	27.3.d.29	Nets	23	13,302	4	8	0.348
<i>Somateria mollissima</i>	27.3.d.29	Nets	23	13,302	4	13	0.565
<i>Mergus spp.</i>	27.3.d.30	Nets	25	26,017	2	13	0.520
<i>Unspecified Marine Bird</i>	27.3.d.30	Nets	25	26,017	1	1	0.040
<i>Phalacrocorax carbo</i>	27.3.d.30	Nets	25	26,017	13	29	1.160
<i>Somateria mollissima</i>	27.3.d.30	Nets	25	26,017	2	7	0.280
<i>Mergus merganser</i>	27.3.d.30	Nets	25	26,017	5	8	0.320
<i>Clangula hyemalis</i>	27.3.d.30	Nets	25	26,017	1	2	0.080
<i>Aythya fuligula</i>	27.3.d.30	Nets	25	26,017	1	1	0.040
<i>Somateria mollissima</i>	27.3.d.30	Traps	14	11,437	1	1	0.071
<i>Mergus spp.</i>	27.3.d.32	Nets	8	8,861	2	8	1.000
<i>Phalacrocorax carbo</i>	27.3.d.32	Nets	8	8,861	9	29	3.625
<i>Somateria mollissima</i>	27.3.d.32	Nets	8	8,861	3	3	0.375
<i>Mergus merganser</i>	27.3.d.32	Nets	8	8,861	3	9	1.125
<i>Podiceps cristatus</i>	27.3.d.32	Nets	8	8,861	2	3	0.375
<i>Aythya marila</i>	27.3.d.32	Nets	8	8,861	1	1	0.125
<i>Clangula hyemalis</i>	27.3.d.32	Nets	8	8,861	1	2	0.250
<i>Anas platyrhynchos</i>	27.3.d.32	Nets	8	8,861	2	2	0.250
<i>Phalacrocorax carbo</i>	27.3.d.32	Traps	12	6,920	5	5	0.417
<i>Mergus merganser</i>	27.3.d.32	Traps	12	6,920	1	1	0.083
<i>Uria aalge</i>	27.8.a	Nets	169	30,069	2	4	0.024
<i>Phalacrocorax carbo</i>	27.8.a	Nets	169	30,069	1	2	0.012
<i>Uria aalge</i>	27.8.b	Nets	221	20,688	3	3	0.014
<i>Puffinus mauretanicus</i>	27.8.b	Nets	221	20,688	2	4	0.018
<i>Morus bassanus</i>	27.9.a	Nets	21	118,720	1	1	0.048
<i>Larus michahellis</i>	27.9.a	Nets	21	118,720	1	2	0.095
<i>Larus argentatus</i>	27.6.a	Bottom trawls	271	1,574	1	1	0.004
<i>Uria aalge</i>	27.7.f	Nets	62	-	8	10	0.160
<i>Morus bassanus</i>	27.7.g	Bottom trawls	97	4,425	1	1	0.010
<i>Uria aalge</i>	27.7.j	Nets	179	1,375	1	3	0.017
<i>Morus bassanus</i>	27.4.a	Bottom trawls	290	1,832	6	16	0.055
<i>Uria aalge</i>	27.4.c	Nets	5	1,757	1	2	0.400
<i>Gavia stellata</i>	27.4.c	Nets	5	1,757	1	4	0.800

Species	Subarea	Level 3 métier	Observed days-at-sea	Fishing effort (days-at-sea)	Total number of incidents	Total number of specimens	Bycatch rate (number of specimens/days-at-sea observed)
<i>Uria aalge</i>	27.7.d	Nets	28	10,624	1	1	0.036
<i>Larus argentatus</i>	27.7.d	Pelagic trawls	21	3,152	1	1	0.049
<i>Uria aalge</i>	27.7.e	Nets	131	12,563	3	4	0.031
<i>Phalacrocorax carbo</i>	27.7.e	Nets	131	12,563	2	2	0.015
<i>Larus argentatus</i>	27.5.a.2	Longlines	132	13,372	1	35	0.265
<i>Fulmarus glacialis</i>	27.5.a.2	Longlines	132	13,372	9	69	0.523
<i>Morus bassanus</i>	27.5.a.2	Longlines	132	13,372	3	24	0.182
<i>Larus fuscus</i>	27.5.a.2	Longlines	132	13,372	1	5	0.038
<i>Uria aalge</i>	27.5.a.2	Nets	131	12,813	13	55	0.420
<i>Cephus grylle</i>	27.5.a.2	Nets	131	12,813	6	20	0.153
<i>Uria lomvia</i>	27.5.a.2	Nets	131	12,813	1	1	0.008
<i>Somateria mollissima</i>	27.5.a.2	Nets	131	12,813	13	62	0.473
<i>Gavia immer</i>	27.5.a.2	Nets	131	12,813	1	1	0.008
<i>Phalacrocoracidae</i>	27.5.a.2	Nets	131	12,813	6	10	0.076
<i>Fulmarus glacialis</i>	27.5.a.2	Nets	131	12,813	2	3	0.023
<i>Morus bassanus</i>	27.5.a.2	Nets	131	12,813	3	3	0.023
<i>Clangula hyemalis</i>	27.5.a.2	Nets	131	12,813	2	2	0.015
<i>Alca torda</i>	27.5.a.2	Nets	131	12,813	1	1	0.008
<i>Puffinus mauretanicus</i>	37.7	Longlines	8	3115,17	1	1	0.125
<i>Larus audouinii</i>	37.1, 37.5, 37.6	Longlines	570	7789	3	5	0.009
<i>Larus michahellis</i>	37.1, 37.5, 37.6	Longlines	570	7789	2	2	0.003
<i>Puffinus mauretanicus</i>	37.1, 37.5, 37.6	Longlines	570	7789	3	3	0.005
<i>Puffinus yelkouan</i>	37.1, 37.5, 37.6	Longlines	570	7789	1	2	0.003
<i>Caretta caretta</i>	37.17	Pelagic trawls	173	12,556	3	3	0.017
<i>Caretta caretta</i>	37.22	Nets	426	401,221	1	1	0.002
<i>Caretta caretta</i>	37.1, 37.5, 37.6	Longlines	570	7789	8	10	0.017
<i>Dermochelys coriacea</i>	37.1, 37.5, 37.6	Longlines	570	7789	1	1	0.002

**Table 3** Estimates of bycatch mortality of grey seal and harbour porpoise in the Celtic Sea, North Sea, and Bay of Biscay in the context of the best current abundance estimate in these areas.

Species	Area	Métier	Fishing effort (2017)	Estimate of bycatch rate (number of specimens/days-at-sea observed)		Estimate of bycatch		Best estimate of abundance	% bycatch mortality using lower 95% CI estimate of bycatch	% bycatch mortality using upper 95% CI estimate of bycatch
				Lower 95% CI	Upper 95% CI	Lower 95% CI	Upper 95% CI			
<i>Halichoerus grypus</i>	Celtic Sea (5.b.2, 6.a, 6.b.2, 7.c.2, 7.f-h, 7.j.2, 7.j.1, and 7.k.2)	Nets (GNS, GTR)	9572	0.0106	0.0294	101	282	111504	0.09	0.25
		Midwater trawls (PTM, OTM)	4691	0.0005	0.0094	2	44		0.00	0.04
		Bottom trawl (OTB, OTT, PTB)	56438	0.0247	0.0381	1392	2149		1.25	1.93
	TOTAL				1689	3173	1.51		2.85	
	North Sea (4.a-c, 7.d-e, and 3.a)	Nets (GNS, GTR, GND)	49853	0.0039	0.0140	193	697		0.17	0.63
		TOTAL								
	Biscay East-Shelf (8.a and 8.b)	Nets (GNS, GTR, GND*)	51648	0.0040	0.0143	205	740	-	-	-
		Bottom trawl (OTB, OTT, PTB)	7485	0.0003	0.0237	2	178		-	-
TOTAL					207	918				

Species	Area	Métier	Fishing effort (2017)	Estimate of bycatch rate (number of specimens/days-at-sea observed)		Estimate of bycatch		Best estimate of abundance	% bycatch mortality using lower 95% CI estimate of bycatch	% bycatch mortality using upper 95% CI estimate of bycatch	
				Lower 95% CI	Upper 95% CI	Lower 95% CI	Upper 95% CI				
<i>Phocoena phocoena</i>	Celtic Sea (6.a, 6.b.2, 7.c.2, 7.f-h, 7.j.2, 7.j.1, and 7.k.2)	Nets (GNS, GTR)	9572	0.0240	0.0492	230	471	81860	0.28	0.58	
		Bottom trawl (OTB, OTT, PTB)	56438	0.0002	0.0032	10	182		0.01	0.22	
	TOTAL							0.29	0.80		
	North Sea (4.a-c, 7.d-e, and 3.a)	Nets (GNS, GTR, GND*)	49853	0.0236	0.0426	1175	2126	359428	0.33	0.59	
		TOTAL							0.33	0.59	
	Celtic Sea assessment unit (7.e-h)	Nets (GNS, GTR, GND*)	16216	0.0204	0.0413	331	669	25281	1.31	2.65	
			Biscay East-Shelf (8.a and 8.b)	51648	0.0040	0.0143	205		740	0.81	2.93
	Total						536	1409		2.12	5.57

**Table 4** Bycatch rates (number of specimens/days-at-sea observed) for selected seabird species, areas, and gears. In order to obtain representative observed effort, a number of months or areas were combined. One country uploaded decimals for observed days-at-sea.

Species	Month	Subarea	Level 4 métier	Days-at-sea observed	Individuals	Incidents	Low rate (95% CI)	High rate (95% CI)
<i>Cepphus grylle</i>	3,4,6,7	27.5.a.2	GNS	126	20	6	0.10	0.25
<i>Clangula hyemalis</i>	3	27.5.a.2	GNS	43	2	2	0.01	0.17
<i>Fulmarus glacialis</i>	4	27.5.a.2	GNS	74	3	2	0.01	0.12
<i>Fulmarus glacialis</i>	1,2,3,5,7,10	27.5.a.2	LLS	89	69	9	0.60	0.98
<i>Larus audouinii</i>	4,5,6	37.1, 37.5, 37.6	LLD	39	5	3	0.04	0.30
<i>Morus bassanus</i>	4	27.5.a.2	GNS	74	3	3	0.01	0.12
<i>Morus bassanus</i>	5	27.5.a.2	LLS	23	24	3	0.67	1.55
<i>Morus bassanus</i>	6	27.4.a	OTB,PTB	151	16	6	0.06	0.17
<i>Phalacrocoracidae</i>	3,6,7	27.5.a.2	GNS	52	10	6	0.09	0.35
<i>Phalacrocorax carbo</i>	4,5,6,7,8,9,10,11	27.3.d.29,30,32	GNS	36	49	21	1.01	1.80
<i>Puffinus mauretanicus</i>	7,8	27.8.b	GNS,GTR	8	4	2	0.14	1.27
<i>Puffinus mauretanicus</i>	5,8	37.1, 37.5, 37.6	LLD	107	3	3	0.01	0.08
<i>Somateria mollissima</i>	4,5,10	27.3.d.29,30	GNS	14	19	5	0.82	2.12
<i>Somateria mollissima</i>	3,4,5,6,7	27.5.a.2	GNS	131	62	13	0.36	0.61
<i>Uria aalge</i>	1,2,3,5,10,11,12	27.7.e,f,j	GNS	57	14	11	0.14	0.42
<i>Uria aalge</i>	11	27.8.a,b	GNS	14	6	4	0.15	0.90
<i>Uria aalge</i>	3,4,5	27.5.a.2	GNS	122	55	13	0.34	0.59

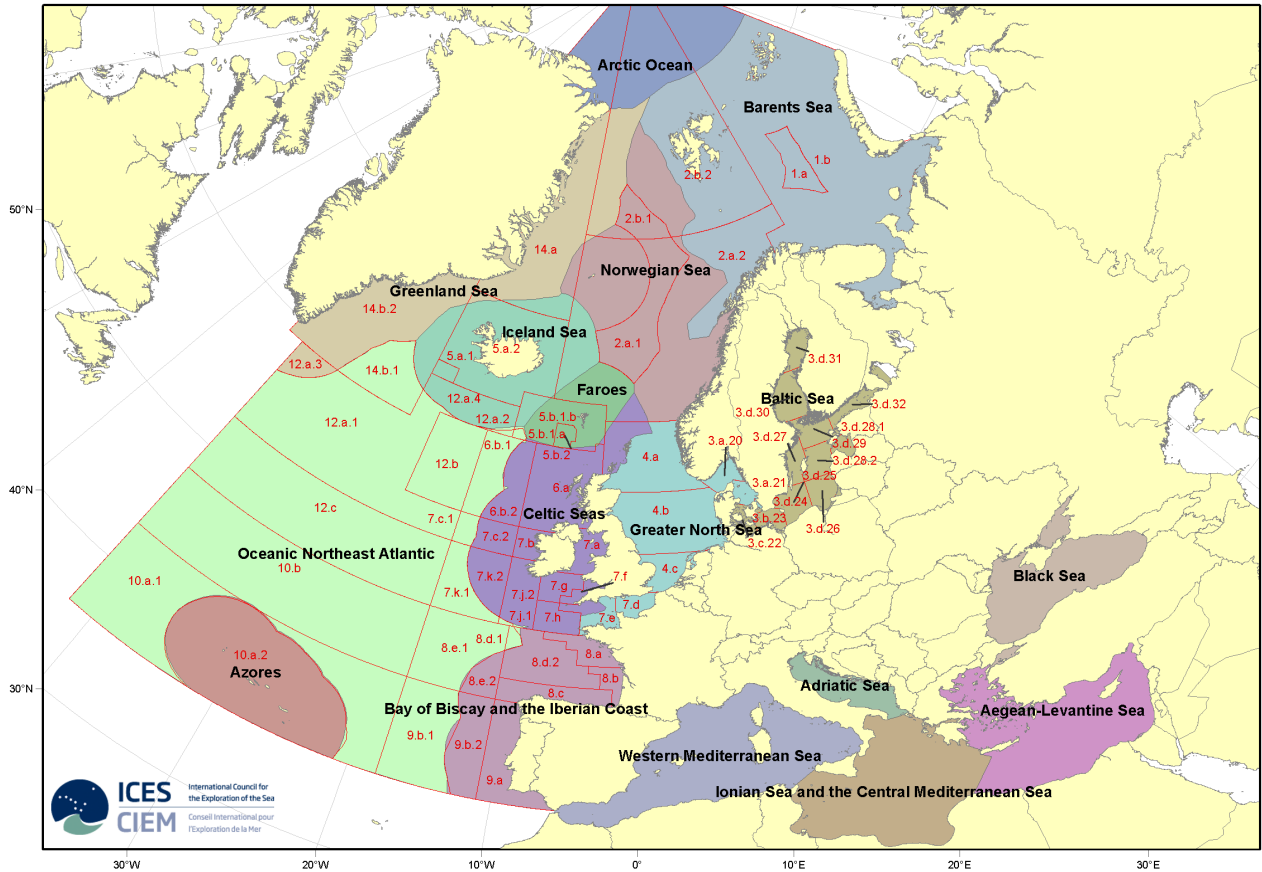


Figure 1 ICES ecoregions, including statistical areas.

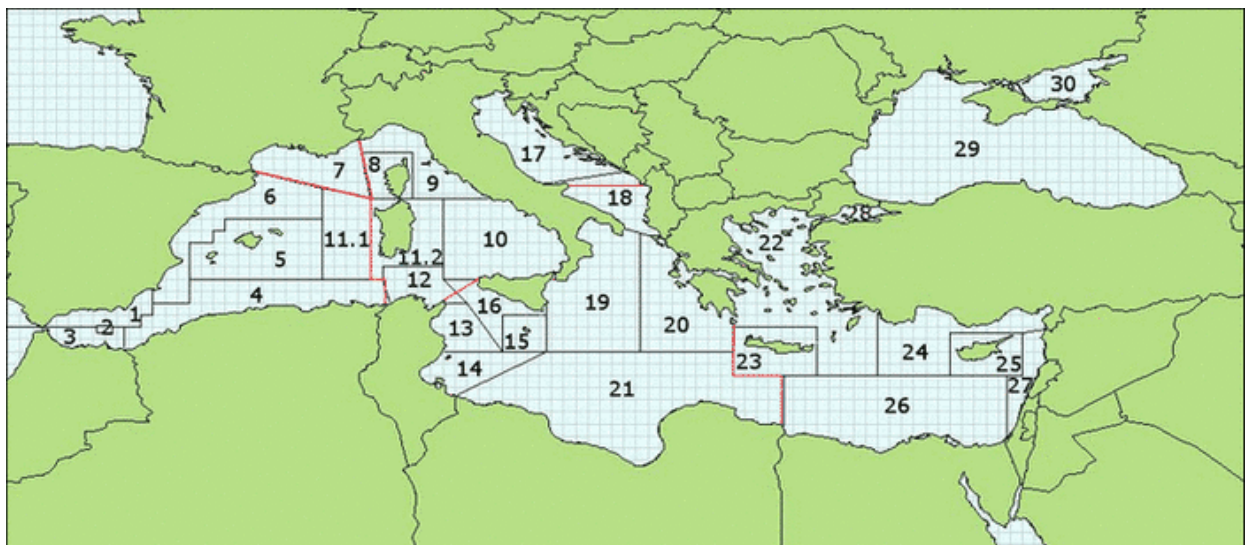


Figure 2 FAO Major Fishing Area 37, the Mediterranean and the Black Sea, including geographical subareas (GSAs). Source: <http://www.fao.org/gfcm/data/maps/gsas>.