

ECOREGION **General advice**

SUBJECT **EU request on monitoring of bycatch of seabirds**

Advice summary

ICES advises on a series of fisheries where bycatch is likely to pose a risk to seabird populations. Fisheries within each of the four European DCF regions as well as some parts of the larger DCF areas were reviewed for level IV métiers. Information on bycatch remains relatively sparse and is becoming increasingly dated. Priority should be given to monitoring in trammelnets and set gillnets in the Baltic, North Sea, and North Atlantic, and in set long-line fisheries in the Atlantic and Mediterranean/Black Sea.

A framework, including metrics and criteria, to define a seabird bycatch problem is described and explored. Further work would be needed to assess the risk of bycatch adversely affecting seabird populations if this framework was adopted.

A standard data format is under development and the database developed by ICES for marine mammal bycatch is designed also to store seabird bycatch data.

Request

The European Commission (DG MARE) requests ICES to consider the following:

- *To review and update current seabird bycatch data and identify fisheries where appropriate follow up monitoring to establish bycatch levels would be desirable.*
- *To explore the criteria and/or metrics that could be used to define a seabird bycatch problem. (This request is partially addressed in earlier request by the Commission to ICES on cetacean bycatch) but ICES should tailor this advice to specifically cover seabird bycatch.*
- *Establish a standard data reporting format for recording seabird bycatch and develop a database of seabird bycatch data in EU fisheries, similar to the database developed by WGBYC for marine mammal bycatch.*

ICES advice

1. Fisheries where appropriate follow-up monitoring to establish bycatch levels would be desirable

Table 1.5.1.3.1 lists those fisheries for which ICES advises that bycatch of seabirds should be monitored. Fisheries are specified at métier level 4 (gear type) for each of the DCF regions Baltic Sea, North Sea, North Atlantic, and Mediterranean Sea/Black Sea. Only those fisheries are listed where bycatch of seabirds is known or at least can be suspected. The decision on whether to recommend monitoring in individual fisheries was based on one of these situations:

- Information/data already exist that indicate seabird bycatch. This information might originate either from dedicated seabird bycatch monitoring schemes, from data collected during the DCF observer programmes, or from specific projects on seabird bycatch.
- Expert judgement determines that bycatch could be suspected/expected/is likely in this particular fishery. This judgement could be based either on anecdotal information about seabird bycatch, or on transfer of knowledge about the same fishing method from other marine areas. It could also be based on biological information, for instance that life habits (such as foraging strategies) of similar bird species make interactions with the specific fishing method likely.

In Table 1.5.1.3.1, countries were named only to indicate where information about seabird bycatch comes from. For most regions, it can be assumed that any bycatch occurring in one fishing fleet is likely to occur in similar fleets of other countries using the same gear. It is likely that there is variance in risk at a sub-regional scale due to variation in bird occurrence and in location of fisheries. Any bycatch recording scheme that is being established should, if possible, take account of any knowledge of such variation.

If monitoring for seabird bycatch is indicated in the table as desirable, this does not necessarily mean that a full and regular monitoring scheme should be implemented. In many cases, especially where seabird bycatch is only suspected, the first step could be to run specific monitoring pilot projects to gain better knowledge about the amount and extent of

seabird bycatch. It should also be noted that the status of seabird populations has not been taken into account; monitoring of bycatch in an increasing population may be less urgent than in a decreasing population. Analysis of existing information on causes of mortality (e.g. from returns of seabirds that have been marked and found dead) may also be useful in prioritizing monitoring.

Table 1.5.1.3.1 Gear types where bird bycatch is known or suspected and ICES advice on the desirability of monitoring. Colours in the gear type cells symbolize level of activity: orange – common fishing gear/activity in this ecoregion; green – negligible or non-existent; white – not known. In the "Bird bycatch" column, "Yes" means data exist and "Suspected" means expert judgement has been applied, with the justification for this judgement being summarized in the final column. An orange colour in the "Monitoring desirable" column indicates a monitoring priority based on likely scale of bycatch.

Baltic

Gear type	Bird bycatch	Monitoring desirable	Remarks and rationale for monitoring
Drifting longlines [LLD]	Suspected	Yes	No data are available on bycatch of birds in the Baltic, but susceptible species that occur in the Baltic are caught elsewhere in this gear.
Set longlines [LLS]	Yes	Yes	Bycatch has been recorded in fisheries targeting flatfish, cod, flounder, and eel in German waters; the species caught include great cormorant, auks, and seaduck.
Pots and traps [FPO]	Suspected	Yes	Evidence from elsewhere indicates that bycatch of species such as great cormorant can occur.
Fykenets [FYK]	Yes	Yes	Great cormorants have been recorded as drowning in fykenets in Danish waters.
Stationary uncovered poundnets [FPN]	Yes	Yes	This gear is used on all Baltic coasts. A low bycatch of great cormorant has been reported in Denmark, Germany, and Sweden.
Trammelnet [GTR] Set gillnet [GNS]	Yes	Yes	Bycatch in gillnets and trammelnets (most studies of seabird bycatch do not distinguish between the two) has been found to be high and possibly unsustainable in a number of Baltic countries. Diving birds that are affected include divers, grebes, great cormorant, seaduck, and auks.

North Sea

Gear type	Bird bycatch	Monitoring desirable	Remarks and rationale for monitoring
Bottom otter trawl [OTB]	Yes	No	Small numbers of common guillemots have been caught in sandeel trawls in the North Sea during the seabird breeding season; this fishery is short in duration.
Midwater otter trawl [OTM]	Yes	Yes	Northern gannets have been caught in the herring trawl fisheries off the northern and northeastern coasts of the UK.
Set longlines [LLS]	Suspected	Yes	No data are available on bycatch of birds in set longlines, but species that occur in the North Sea are caught in this gear elsewhere.
Fykenets [FYK]	Yes	Yes	Great cormorants have been recorded as drowning in fykenets in Dutch waters.
Stationary uncovered poundnets [FPN]	Yes	Yes	Three species of auk have been recorded bycaught in UK J- and T-nets targeting salmon and sea trout; that fishery is closed if bycatch gets too high. High levels of seabird bycatch have also been noted further north in UK.
Trammelnet [GTR] Set gillnet [GNS]	Yes	Yes	From the 1980s, bycatch of many thousands of seaduck and great crested grebe birds has been recorded off the Netherlands; despite mitigation measures, bycatch still occurs. There are few recent data but bycatch of seaduck and diving seabirds still occurs in UK waters and possibly also off Sweden, Germany, and Denmark where similar fisheries operate.
Driftnet [GND]	Yes	No	Bycatch of great cormorants, northern gannets, gulls, and common guillemot has been recorded in the UK bycatch monitoring scheme, notably in salmon and sea trout fisheries off Northumberland and Yorkshire. This fishery is being phased out.

North Atlantic

Gear type	Bird bycatch	Monitoring desirable	Remarks and rationale for monitoring
Bottom otter trawl [OTB]	Yes	Yes	Bycatch has been recorded in Spanish, Portuguese, and French waters in multispecies fisheries. The species caught include northern gannet, gulls, shearwaters, and cormorants.
Midwater otter trawl [OTM]	Yes	Yes	Bycatch has been recorded in the Portuguese seabass fishery. Bycatch of northern gannets has been recorded in the Argentine fishery off northwestern UK, and also in fisheries to the west of the UK targeting herring, mackerel, and horse mackerel.
Midwater pair trawl [PTM]	Yes	Yes	Bycatch, including common guillemot, razorbill, and great cormorant, occurs regularly in the seabass fishery in the western Channel off the UK and France. Some bycatch of gulls occurs in the French anchovy fishery.
Trolling lines [LTL]	Suspected	Yes	There are no data on bycatch from the EU albacore fishery that operates mainly in the Bay of Biscay; seabird bycatch occurs in trolling operations elsewhere.
Drifting longlines [LLD]	Yes	Yes	Low bycatch, including northern gannet, shearwaters, and yellow-legged gull occurs in fisheries targeting tuna and other large fish in the waters of Spain, Portugal, and France.
Set longlines [LLS]	Yes	Yes	Throughout the region, fisheries targeting a wide range of fish species bycatch many species of seabird, in some cases in substantial numbers – for example tens of thousands of northern fulmar and great shearwater. Both surface-feeding birds such as gulls and diving seabirds such as cormorants and auks are affected.
Pots and traps [FPO]	Yes	Yes	There is some bycatch of European shags in Spain.
Fykenets [FYK]	Suspected	Yes	Great cormorants have been recorded as drowning in fykenets in other waters.
Trammelnet [GTR] Set gillnet [GNS]	Yes	Yes	There is a regular and widespread bycatch that includes auks, shearwaters (notably Balearic shearwater), northern gannet, cormorants, seaduck, and divers.
Driftnet [GND]	Suspected	Yes	Small driftnet fisheries in the UK and France target a range of fish species. The available information indicates no bycatch in these, but bycatch does occur in driftnets in other regions and the species affected also occur in the North Atlantic.
Purse seine [PS]	Yes	Yes	Bycatch, especially of Balearic shearwaters occurs in the Portuguese fishery during the non-breeding period. Seabird mortality has also been reported in the Spanish fishery.
Beach and boat seine [SB] [SV]	Yes	Yes	Bycatch of common scoter (and black-headed gull) has been recorded in the Portuguese fishery. The common scoter has an important wintering area off the Portuguese coast.

Mediterranean Sea and Black Sea

Gear type	Bird bycatch	Monitoring desirable	Remarks and rationale for monitoring
Bottom otter trawl [OTB]	Yes	Yes	Some bycatch of Balearic shearwater, northern gannet, and gulls occurs in the Spanish multispecies fisheries.
Trolling lines [LTL]	Yes	Yes	Scopoli's and Yelkouan shearwaters are bycaught in the Ionian and Aegean Seas respectively, and there is a bycatch of Mediterranean shag in the Ionian Sea.
Drifting longlines [LLD]	Yes	Yes	Bycatch has been recorded mainly in the western Mediterranean. The swordfish fishery has bycatches of principally Scopoli's shearwater, but also Balearic shearwater and yellow-legged gull are bycaught. In the eastern Mediterranean Scopoli's shearwater has been bycaught. No bycatch has been recorded in the Aegean and no information is available for certain parts of the Mediterranean (e.g. the Adriatic).
Set longlines [LLS]	Yes	Yes	Bycatch of seabirds including shearwaters (Balearic, Yelkouan, Scopoli's), Audouin's gull, Mediterranean gull, yellow-legged gull, Mediterranean shag, black-legged kittiwake, and skuas occurs in various fisheries targeting mainly hake, Sparidae, and other demersal fish.
Pots and traps [FPO]	Yes	Yes	Mediterranean shag is bycaught in Spanish lobster fishing; no information for other parts of the Mediterranean.
Trammelnet [GTR] Set gillnet [GNS]	Yes	Yes	Bycatch has been recorded of a wide range of seabird species, including Mediterranean shag and great cormorant, seaduck, razorbill, Yelkouan (and potentially Balearic) shearwaters, and Scopoli's shearwater.
Driftnet [GND]	Suspected	Yes	Bycatch of species that occur in the Mediterranean has been reported in other areas for this gear.
Purse-seine [PS]	Yes	Yes	Bycatch of Balearic (and potentially Yelkouan) shearwaters has been reported in Spanish fisheries for sardine, anchovy, and other small pelagics.
Beach and boat seine [SB] [SV]	Suspected	Yes	Bycatch of species that occur in the Mediterranean has been reported in other areas for this gear.
Recreational fisheries	Yes	Yes	Bycatch of Mediterranean shag, shearwaters, and Audouin's gull has been reported in Spain and Greece (particularly hand and pole, trolling lines).

2. Criteria and/or metrics that could be used to define a seabird bycatch problem

What is a bycatch problem for seabirds?

The definition of what constitutes a problem is of course societal rather than scientific. Societal choices can be derived from legislation and internationally agreed guidelines. In Europe, Directive 2009/147/EC on the conservation of wild birds (the Birds Directive) is the most important statute. This sets an overall objective for bird populations: “*Member States shall take the requisite measures to maintain the population of the [bird species] at a level which corresponds in particular to ecological, scientific and cultural requirements, while taking account of economic and recreational requirements, or to adapt the population of these species to that level. (Art. 2).*” In only a very few cases is the population of a seabird species believed to be too great, so it may be assumed that bycatch that causes a population decline is a problem, and for a number of cases where a species is believed to be depleted, bycatch that overly affects the ability of a population size to recover may also be a problem.

In addition to the “legislative” approach above, public perception of waste and unnecessary death is relevant; thus in the case of oil spills, most members of the public regard this as a waste (both of oil and of seabirds) that is unnecessary as oil spills can largely be prevented or avoided. Seabird bycatch does not have the same public profile as oil spills (partly because it is characteristically chronic and continuous, as compared with the episodic and catastrophic nature of high profile oil spills). It is also the case that it is difficult to prevent or avoid some seabird bycatch if some particular fisheries are to continue. It is likely that a high (but not biologically important) bycatch in a fishery where mitigation is possible would be regarded as wasteful and as a problem. This would be consistent with the General Principles section of the FAO Code of Conduct for Responsible Fishing, whereby “*States and users of aquatic ecosystems should minimize waste, catch of non-target species, both fish and non-fish species, and impacts on associated or dependent species.*”

Framework, criteria, and metrics for defining whether bycatch poses a problem to a seabird species

As indicated in the IPOA (International Plan of Action)–Seabirds and reiterated by FAO (2008), there are key considerations in identifying whether or not a seabird bycatch problem exists:

“When defining a seabird incidental catch problem, States and RFMO/As [Regional Fisheries Management Organisations/Arrangements] should consider the following:

- (i) Defining the rationale for determining if a problem does, or does not, exist. The rationale should be based on: (a) the magnitude of seabird bycatch (rate or number); (b) species that are incidentally caught, and their conservation status; and (c) spatial and temporal overlap of fishing effort with seabirds.”*
- (ii) Reviewing available data relevant to the incidental mortality of seabirds.*
- (iii) Validating sources of information and where appropriate follow up with more detailed investigations.*
- (iv) Adopting a precautionary approach where information is lacking or uncertain.”*

ICES advises that these considerations, when taken broadly and in combination with one another, provide sufficient criteria for defining a seabird bycatch problem when applied within a step-wise assessment framework. ICES advises that the application of Potential Biological Removal (PBR) may be utilized to serve as the primary metric for determining whether a seabird bycatch problem exists.

PBR is derived from a formula that combines information on the maximum annual recruitment rate of populations, a conservative estimate of population size, and a recovery factor.

$$PBR = \frac{1}{2} R_{MAX} \times N_{min} \times f$$

R_{MAX} is the maximum annual recruitment rate, N_{min} is a conservative estimate of population size (e.g. the 20th percentile of the population estimate), and f is a recovery factor usually between 0.1 and 1. R_{MAX} can be estimated from the annual adult survival rate in the absence of human effects and the average age at first breeding. The recovery factor f is usually set in categories relating to the amount by which a population is believed to be depleted or is declining and can be designated by broad taxonomic groups, as has been done for marine mammals (in the USA) to account for differences in their life histories.

ICES advises the following assessment framework (Figure 1.5.1.3.1) be used in the identification of a seabird bycatch problem, based upon whether or not seabird bycatch is a substantial portion of the anthropogenic impact that causes losses greater than PBR of a particular species or population. ICES suggests that as a criterion “a substantial portion” could be interpreted as when bycatch exceeds 30% of anthropogenic mortality to the species or population. ICES is aware of some projects to evaluate the relative contribution of bycatch to overall anthropogenic mortality, but these projects are rare. Further information may be available from analyses of the causes of death of ringed birds.

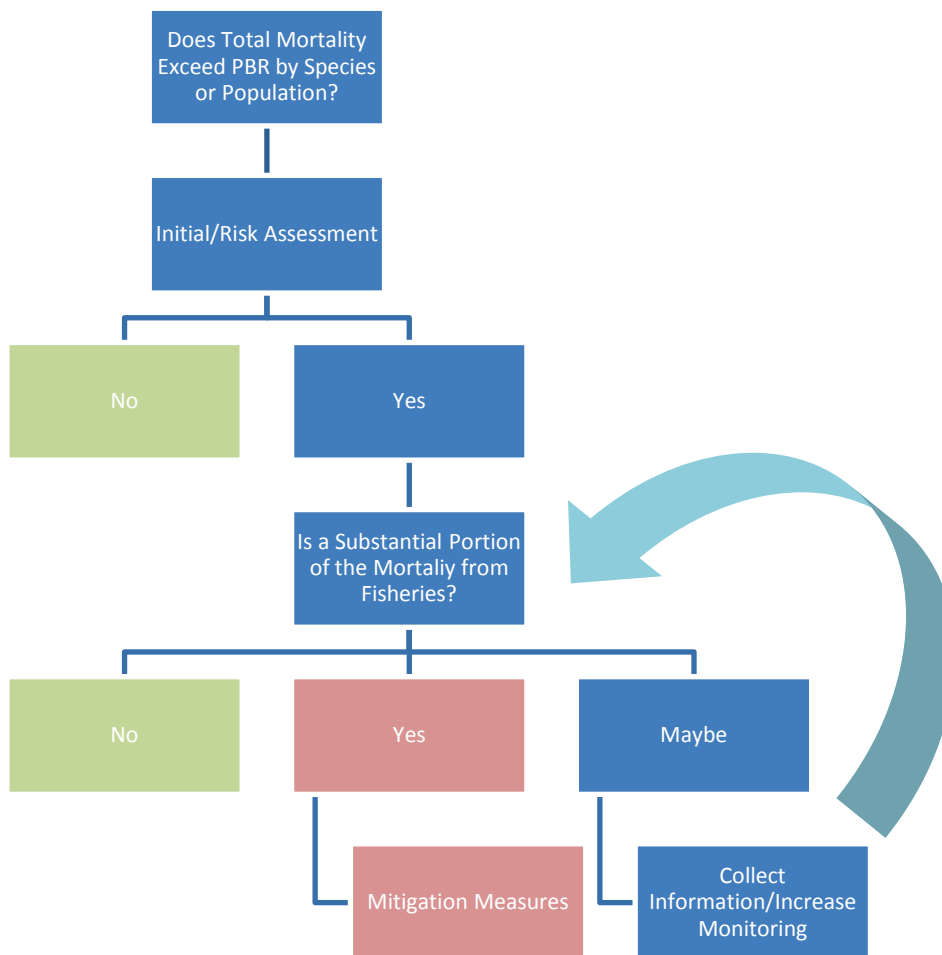


Figure 1.5.1.3.1 A proposed framework for exploring the criteria and metrics that could be used to define a seabird bycatch problem.

Stage 1: The PBR (metric) for each seabird species or population is calculated, using suitable proxies where there is insufficient information for each species or population.

Stage 2: Once the PBR has been calculated, an initial rapid assessment (similar to a risk assessment) should be conducted to determine whether, based on existing information (including inferred information) there is a risk that the total estimate of anthropogenic mortality exceeds the PBR, and whether bycatch is a substantial portion of that mortality. The information to be used for this assessment may include (but is not limited to):

- observations of bycatch,
- the results of interviews and/or questionnaires,
- information regarding the nature of the fishery interactions,
- the geographic overlap between a given species and a fishery/gear type,
- information regarding non-fisheries-related mortality, and
- inferred information regarding the likelihood of certain species interacting with one or more fisheries.

If the initial assessment results in a determination that it is *not likely* that PBR has been exceeded for all anthropogenic mortality, then a seabird bycatch problem does not exist for this species or population. No further immediate action needs to be taken. ICES recommends that this initial assessment be conducted per species/population at least every five years. If the initial assessment results in a determination that it is likely that PBR *has* been exceeded and fisheries are contributing a substantial portion of the removals, then a seabird bycatch problem may exist for this species or population. In this case, a third step is recommended.

Stage 3: A more detailed evaluation of existing information, possibly including further studies to verify the existing data and to further examine the nature and magnitude of the interactions, should be conducted. If this more detailed analysis confirms that the total estimate of anthropogenic mortality exceeds the PBR, and that bycatch is a substantial portion of that mortality, then a determination would be made that a seabird bycatch problem exists for this species. ICES recommends that bycatch mitigation measures for all involved fisheries should be considered and put into effect as

rapidly as possible. If the results of the more detailed study are ambiguous, it can be reaffirmed that a bycatch problem *may exist*. In these circumstances, ICES recommends that additional information, through scientific study or through monitoring, be collected. The results of these efforts will provide additional information from which to conduct future assessments of whether bycatch is exceeding PBR. For seabird species for which a bycatch problem *may be* occurring, a review of any new information should be conducted until either a seabird bycatch problem has been identified to exist or not to exist. Where information remains uncertain regarding the existence of a bycatch problem, ICES recommends a precautionary approach, including prioritizing monitoring efforts among other things, until sufficient information is collected to determine whether or not a bycatch problem exists.

In the event of relevant new information becoming available, including for fisheries that are not believed to pose a risk at present, the framework may be used to review and (re)categorize the risk.

ICES advises that sufficient information exists to identify fisheries where seabird bycatch is likely to be a problem (Table 1.5.1.3.1).

Information to parameterize PBR is available for many seabird species/populations. ICES recommends that in cases where information is not available, suitable precautionary values are used, rather than investing heavily in improving e.g. knowledge on population abundance. It would be valuable to develop guidance for the use of various recovery factors (f), possibly by broad taxonomic groups or by status of population.

A further issue is that insufficient effort data are reported and/or available in many fisheries either known or expected to have high bycatch levels. This applies particularly to smaller vessels; these can set relatively large quantities of static gear that can pose risk to birds. An improvement in the spatial and temporal resolution of effort reporting would be needed to avoid the risk of excessively precautionary advice.

Outside this recommended framework, ICES is aware that there may be other factors contributing to the identification of a seabird bycatch problem. In particular, a nation may wish to undertake monitoring and/or mitigation measures based on a less biologically-based approach, such as one of “societal choice” regarding indiscriminate removal of birds and/or general wastefulness even where there may not be an immediate conservation risk. Any waste is unnecessary and waste reduction should be encouraged.

3. Data reporting format and database for seabird bycatch

ICES advises that seabird bycatch information be stored in the database on bycatch of marine mammals, birds, turtles, and rare and/or endangered fish that is in a late stage of development within ICES. This ICES database was set up to collate and review data from the National reports required under Council Regulation (EC) No. 812/2004. In parallel, a standard reporting format was developed. While the standard reporting format was designed specifically for the tasks under Council Regulation (EC) No. 812/2004, it was designed in such a way that it can contain bycatch data on other groups than cetaceans. ICES advises the use of the standard reporting format defined for recording of marine mammal bycatch under Council Regulation (EC) No. 812/2004.

The following adaptations are needed for reporting information on bycatch of seabirds:

1. References to Council Regulation (EC) No. 812/2004 are redundant and should be removed.
2. In the section on acoustic deterrent devices, the two tables on acoustic deterrent devices are redundant. Any mitigation should be described and referred to here.
3. In the section on observer schemes, the number of tables should be expanded to cover each of the gear types monitored (i.e. “Longlines” should be added). The column with the unit of effort would need to be altered depending on the gear monitored. The column “Days at Sea” should be retained in any additional table as this is the most flexible and widely used unit of effort.

All EU Member States should report data in a standard electronic format to ensure easy import to the database. The ICES database is in the process of being made web-accessible.

Sources

- FAO. 2008. Report of the Expert Consultation on Best Practice Technical Guidelines for IPOA/NPOA–Seabirds, Bergen, Norway, 2–5 September 2008. FAO Fisheries and Aquaculture Report, No. 880. FAO, Rome. 37 pp.
- ICES. 2013. Report of the Workshop to Review and Advise on Seabird Bycatch (WKBYCS). ICES CM 2013/ACOM:61. 79 pp.