

## NEAFC request on seabird bycatch in the NEAFC regulatory areas (RAs)

### Advice summary

No seabird bycatch events were reported to ICES in fisheries in the North-East Atlantic Fisheries Commission (NEAFC) regulatory areas (RAs) for 2019–2021. Until significant improvements in data quality and quantity are resolved, ICES cannot conclude that no seabird bycatch occurs in the NEAFC RAs, nor estimate robust and unbiased bycatch rates.

ICES identified four subareas within the NEAFC RAs where the relative risk of seabirds interacting with fisheries is likely to be high; this is based on fisheries data for 2018–2022 and available knowledge on twenty seabird species that occur in the area.

ICES advises on a three-step incremental approach for improving data and knowledge to evaluate seabird bycatch in the NEAFC RAs. This includes the acquisition of complete and high-resolution fisheries data, design and implementation of a pilot study, and establishment of a long-term dedicated monitoring programme to evaluate seabird bycatch.

### Request

*NEAFC needs information regarding bird bycatch in the NEAFC regulatory area in order to address the calls and commitments set out on bird bycatch under the UNGA fisheries resolutions. According to anecdotal information bird bycatch is considered low in the fisheries conducted in the NEAFC regulatory area.*

*NEAFC requests ICES to compile and aggregate available data on bird bycatch in the NEAFC regulatory area, i.e. spatially and temporally distributed, as well as per gear.*

*ICES is requested to advise upon what is necessary in order to provide recurrent advice on bird bycatch as well.*

*ICES may provide advice on other aspects of the request it deems necessary.*

### Elaboration on the advice

#### Data availability on fisheries and seabird bycatch in the NEAFC RAs

Based on the very limited monitoring data submitted and available to ICES, no seabird bycatch incidents were reported in the NEAFC RA for 2019–2021. The NEAFC RAs are: Regulatory Area 1 (RA1) – Reykjanes Ridge, Regulatory Area 2 (RA2) – Banana Hole, and Regulatory Area 3 (RA3) – Loophole (Figure 1).

Until significant improvements in data quality (uncertainty in fishing gears used and gear-specific effort) and quantity (through dedicated seabird bycatch monitoring and systematic reporting) are resolved, ICES cannot conclude that no bird bycatch occurs in the NEAFC RAs, nor estimate robust and unbiased bycatch rates.

#### Risk assessment

Given current data and knowledge limitations, the risk of seabird bycatch cannot be distinguished from the risk of other direct interactions between seabirds and fishing vessels, including cable strikes, entanglements, and collisions. The available evidence suggests that interactions between seabirds and fisheries are likely to occur in the NEAFC RAs.

ICES identified four subareas within the NEAFC RAs where the relative risk of seabirds interacting with fisheries is likely to be high (Figure 1); this is based on fisheries data for 2018–2022 and available knowledge on twenty seabird species that occur in the NEAFC RAs:

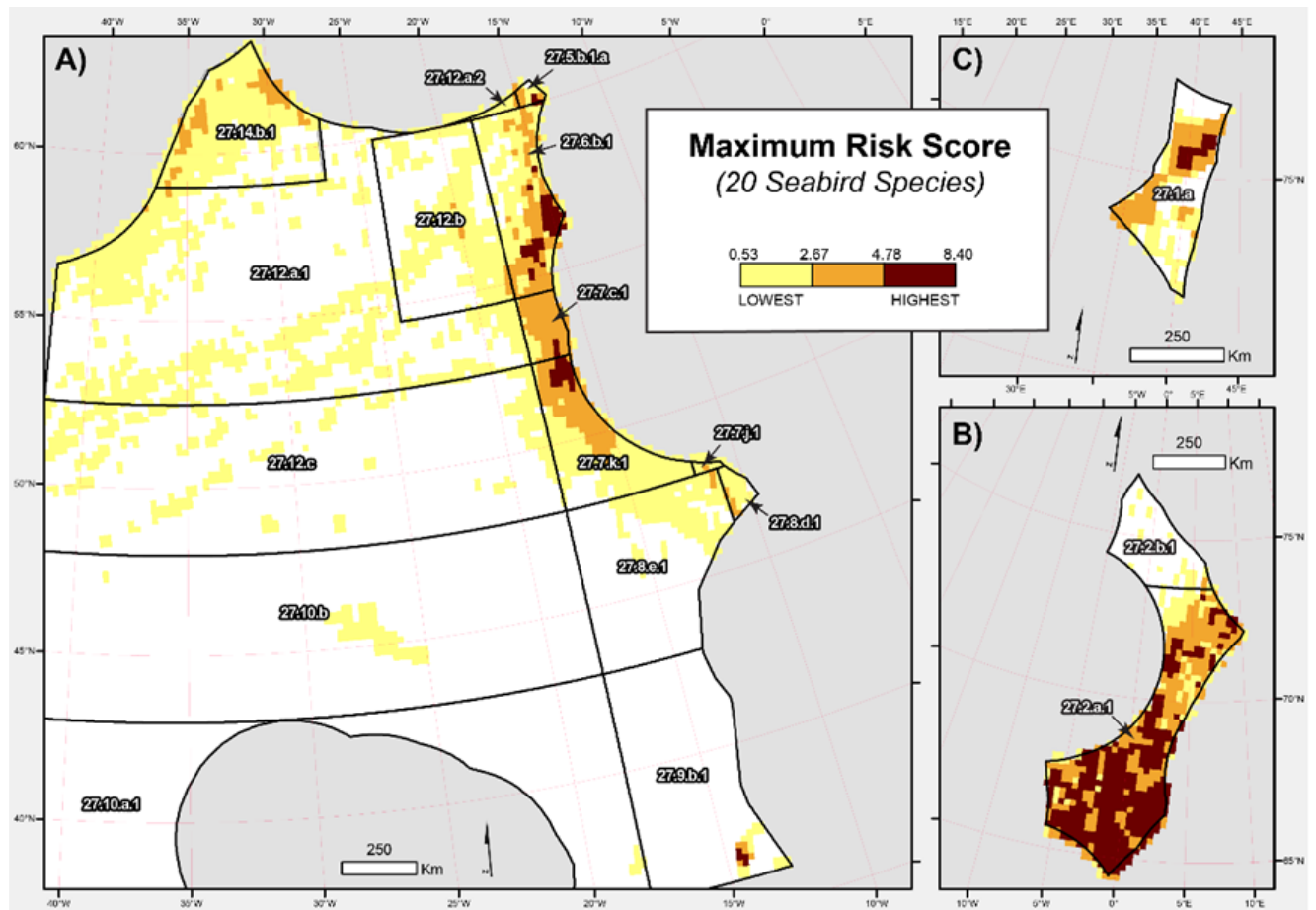
- Within RA1 (Reykjanes Ridge), two high-risk subareas were identified within ICES fishing areas 27.6.b.1 and 27.7.k.1.

- Within RA2 (Banana Hole), one high-risk subarea was identified, which covers most of the southern portion of ICES fishing area 27.2.a.1.
- Within RA3 (Loophole; ICES fishing area 27.1.a), a high-risk subarea was identified north of the 75th parallel north and between 35 and 45 degrees of longitude east.

### **Improving the evidence base for providing advice on seabird bycatch**

ICES advises on the following incremental approach for improving the quantity and quality of data and knowledge to evaluate seabird bycatch in the NEAFC RAs:

- As a first step, vessels operating in the NEAFC RAs need to report, at a minimum, which fishing gear they are using and when. Reporting of fishing activity data at haul level is needed to optimize seabird bycatch monitoring and assessments.
- As a second step, ICES recommends implementing a pilot study to monitor all seabird–fishery interactions (bycatch, collisions, and cable strikes) in the NEAFC RAs, considering best practices for the design of seabird bycatch monitoring in other RFMOs. The pilot study is intended to provide the basic knowledge on the frequency and distribution of seabird bycatch events.
  - Sampling in the pilot study needs to be based on a combination of electronic monitoring (EM) and trained fisheries observers. Combining EM with fisheries observers will serve to supplement, validate, and calibrate EM-generated data and may assist with defining adequate subsampling of EM footage to support longer-term seabird bycatch monitoring. Species-level reporting and standardized monitoring procedures across the NEAFC Contracting Parties are required.
  - In the pilot study and subsequent monitoring, all interactions and bycatch incidents need to be reported, as well as the absence of interactions and bycatch incidents. Reporting true zeros is essential to reliably estimate spatio-temporal variations in seabird bycatch and seabird–fishery interaction rates and the magnitude of seabird mortality in the region.
  - Consideration should be given to the sampling design of the pilot study to prioritize monitoring of the four high-risk subareas identified in the risk assessment.
- As a third step, and based on information from the above steps, ICES recommends designing, reviewing, and implementing a long-term and large-scale monitoring programme that balances the costs of sampling with the representativeness of the whole fishing fleet. Simulation tools can be used to refine a monitoring programme that maximizes detection of seabird bycatch while minimizing potential bias. Adequate monitoring coverage will be case-specific and should be informed by reliable bycatch rate estimates and power analyses.



**Figure 1** Composite map showing maximum risk scores for seabird–fishery interactions in the three NEAFC RAs (RA1 [panel A], RA2 [panel B], and RA3 [panel C]) and the ICES statistical areas within. The risk scores are based on fisheries data from 2018–2022 and biological, population status, and distribution information for 20 seabird species. White-coloured areas indicate an unknown risk of seabird–fishery interactions based on the available data and information.

## Suggestions

ICES notes the occurrence of fishing effort with longlines in deep waters in RA1, which is not associated with any NEAFC catch reports. Fishing effort targeting tuna species is occurring in the NEAFC RAs and poses an additional risk to seabirds (Wolfaardt *et al.*, 2020; ICES, 2022a). Seabird–fishery interactions reported in areas adjacent to the NEAFC RAs may provide additional relevant information for the assessment of seabird bycatch. ICES suggests that NEAFC initiates close cooperation with other RFMOs (e.g. ICCAT) and NEAFC Contracting Parties to improve the evidence base for monitoring and assessing fishing effects on seabird populations.

ICES suggests that NEAFC consider establishing dedicated bycatch monitoring programmes – not only for seabirds but for all protected, endangered, and threatened species, for example as listed in ICES 2022b.

## Basis of the advice

### Background

There are currently no regulations in the NEAFC Rules for Recording of Catch and Fishing Effort (Article 9 in NEAFC, 2021) that require a monitoring programme for the recording of incidental bycatch of seabirds. These rules do not require vessels to record data on incidental seabird bycatch in their logbooks. Even if such reporting were required for the fishing fleets of EU Member States, for example under EU Data Collection Framework (DCF), the overall data would remain incomplete unless non-EU countries had similar rules for their fleets.

The reporting of bycatch monitoring data for this advice was incomplete. NEAFC Contracting Parties accounting for most of the fishing effort did not report any bycatch monitoring in the NEAFC RAs. It is unclear whether no additional monitoring exists or whether monitoring data do exist but were not reported to ICES. The bycatch monitoring data submitted to ICES are summarized in ICES (2023a).

The NEAFC RAs is of high importance and relevance for seabird conservation, as denoted by the North Atlantic Current and Evlanov Sea basin (NACES) MPA in NEAFC RA1, which is considered a major hotspot for migratory seabirds in the Atlantic Ocean.

## Methods

### Seabird data

ICES issued two data calls in 2021 and 2022 for data on bycatch monitoring and bycatch incidents in the NEAFC RAs; the data calls were sent to NEAFC (ICES, 2021, 2022c).

Data on seabird distribution were obtained from two large-scale tracking projects: SEATRACK\* and BirdLife International's Seabird Tracking Database†. The SEATRACK distributions were based on tracking data from 2006 to 2019. The data from the BirdLife International's Seabird Tracking Database were based on tracking information from 2002 to 2016. For all species, monthly distribution information was aggregated and averaged on a standard spatial grid of  $0.25 \times 0.25$ -degree cells, corresponding to the highest possible resolution given the available data.

### Fisheries data

Vessel monitoring system (VMS) data for the period 2018–2022 were received from NEAFC and linked using a unique annual vessel identifier (the "RID" field). Other data sources – including ICES VMS data and AIS data – were considered but not retained for analyses. Despite issues with gear type identification, the NEAFC VMS data were considered the most spatially and temporally comprehensive. For each vessel, the time interval between consecutive VMS pings was calculated and assigned to each position. Any interval values greater than four hours were truncated to this duration, which is the minimum VMS reporting frequency for vessels operating within the NEAFC RAs. Gear information at the annual level was only available for some vessels, meaning that a vessel operating in two fisheries (e.g. pelagic trawl and demersal trawl) will only have one gear recorded. Catch information received as catch reports transmitted over the VMS system was linked to vessels on the date of operation. Fishing activity was inferred from VMS data based on vessel speed. A speed of 6 knots or lower was taken to indicate fishing activity in vessels that reported using bottom-trawl gears and vessels without a registered gear type. For vessels that reported using static gears, a speed of 4 knots or lower was taken to indicate fishing activity.

The fishing effort data were aggregated across the 2018–2022 period and on a spatial grid of  $0.25 \times 0.25$ -degree cells, corresponding to the highest resolution available for the seabird distribution data. Fishing intensity was estimated as the total number of fishing hours per grid cell, month, and gear type. This metric represents the actual number of hours fished and is considered a reliable measure of fishing effort for vessels that reported using mobile gears (trawl and seine), whereas for vessels using passive gears (net, longlines, and traps), it is a proxy for the intensity of fishing operations, given the possible overlap between setting, hauling, and steaming speeds and given the long interval between VMS polling relative to the time spent deploying and hauling gear.

### Risk assessment

A list of 20 seabird species that may be subject to incidental bycatch in the NEAFC regulated fisheries was developed based on expert knowledge and evidence from other geographical areas (in the Annex). This list is considered appropriate for identifying spatial areas that may be most problematic in terms of seabird–fishery interactions or that require attention within the NEAFC RAs. However, the list may have excluded other co-occurring and bycatch-prone seabird species.

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\* <https://seapop.no/en/seatrack/about-seatrack/>

† [www.seabirdtracking.org/](http://www.seabirdtracking.org/)

A risk assessment method (ByRA; Verutes *et al.*, 2020) was applied to evaluate the relative risks of seabird–fishery interactions spatially. It used available fisheries data and information on the distribution, conservation status, and biology of the 20 seabird species, and complementing knowledge gaps with expert opinion. The ByRA method was initially developed to estimate bycatch risks for marine mammals and was adapted for relevance to seabird–fishery interactions (ICES, 2023b). Several exposure and resilience criteria were scored, including criteria for spatial and temporal overlap between seabirds and fishing activities, which were evaluated at the spatial scale of  $0.25 \times 0.25$ -degree cells. The method assumes that spatio-temporal overlap represents potential interactions between fisheries and seabirds with any fishing activity having a non-zero risk of interacting with seabirds when both active vessels and seabirds co-occur in space and time. A relative risk score was estimated by species and spatial grid cell and the results were aggregated over all species to identify subareas in which the risk of fisheries interacting with seabirds is likely to be high.

There are various sources of uncertainty in the seabird distribution layers that were not taken into account, depending on the species and data source. These are a potential limitation and source of bias. Several of the seabird species considered exhibit strong seasonal movements which were not considered in the assessment. For species without tracking data ( $n=6$ ), presence information available from BirdLife International/IUCN species range documentation was used. When a species' range overlapped with a NEAFC RA at any given time of the year, the species was assumed to occur in that entire area in all months. In one case (pomarine skua, *Stercorarius pomarinus*), no range information was available, and the species was assumed to be present only in NEAFC RA1 in all months, based on expert knowledge. The various criteria scored for risk were weighted for data quality and otherwise considered equivalent. However, some criteria may ultimately be more important compared to others and would require a stronger weighting once information layers are improved.

### Additional information

The seabird species found in the NEAFC RAs are highly migratory and subject to a wide array of natural and anthropogenic threats across their range. In the absence of reliable bycatch estimates in most of their distribution range, it is not currently possible to assess the population-level impact of fishing on these seabirds, i.e. whether fishing poses a threat to the long-term survival of these species or is within acceptable levels.

Climate change is affecting seabird species distribution (Dias *et al.*, 2019; Orgeret *et al.*, 2021; Hakkinen *et al.*, 2022) with possible consequences on seabird-fishery interactions. This will ultimately affect or invalidate the conclusions drawn from the current risk assessment.

Guidelines to develop and implement dedicated bycatch monitoring programmes using EM, including templates for Vessel Monitoring Plans and Calls for Tenders, are available (ICES, 2019, 2023c).

The risk assessment and underlying seabird distribution information are broad scale in nature. At-sea surveys data exist for some areas/seabird species that could be used in the future to locally validate some of the seabird tracking data used in the assessment.

ICES advice on the occurrence and rates of seabird bycatch in different métiers in various ICES ecoregions has been published previously (ICES, 2022d, 2022e).

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*Recommended citation:* ICES. 2023. NEAFC request on seabird bycatch in the NEAFC regulatory areas. *In* Report of the ICES Advisory Committee, 2023. ICES Advice 2023, sr.2023.11, <https://doi.org/10.17895/ices.advice.24204291>

## Annex

**Table A1 List of seabird species that occur in the NEAFC RAs and were considered in the risk assessment.**

Number	Species	Species	Distribution data source
1	Cory's shearwater	<i>Calonectris borealis</i>	BirdLife International's Seabird Tracking Database
2	Scopoli's shearwater	<i>Calonectris diomedea</i>	BirdLife International's Seabird Tracking Database
3	Audubon's shearwater	<i>Puffinus lherminieri</i>	BirdLife International's Seabird Tracking Database
4	Manx shearwater	<i>Puffinus puffinus</i>	BirdLife International's Seabird Tracking Database
5	Great shearwater	<i>Ardenna gravis</i> ( <i>Puffinus gravis</i> ) <sup>‡</sup>	BirdLife International's Seabird Tracking Database
6	Sooty shearwater	<i>Ardenna grisea</i> ( <i>Puffinus griseus</i> ) <sup>§</sup>	BirdLife International's Seabird Tracking Database
7	Long-tailed skua	<i>Stercorarius longicaudus</i>	BirdLife International's Seabird Tracking Database
8	Pomarine skua	<i>Stercorarius pomarinus</i>	Expert knowledge
9	Great skua	<i>Catharacta skua</i> ( <i>Stercorarius skua</i> ) <sup>**</sup>	Range information/map available at: <a href="https://www.iucnredlist.org/species/22694160/132532556">https://www.iucnredlist.org/species/22694160/132532556</a>
10	Razorbill	<i>Alca torda</i>	BirdLife International's Seabird Tracking Database
11	Northern gannet	<i>Morus bassanus</i>	Range information/map available at: <a href="https://www.iucnredlist.org/species/22696657/132587285">https://www.iucnredlist.org/species/22696657/132587285</a>
12	Little auk	<i>Alle alle</i>	SEATRACK
13	Northern fulmar	<i>Fulmarus glacialis</i>	SEATRACK
14	Black-legged kittiwake	<i>Rissa tridactyla</i>	SEATRACK
15	Common guillemot	<i>Uria aalge</i>	SEATRACK
16	Brünnich's guillemot	<i>Uria lomvia</i>	SEATRACK
17	Atlantic puffin	<i>Fratercula arctica</i>	SEATRACK
18	Black guillemot	<i>Cephus grylle</i>	Range information/map available at: <a href="https://www.iucnredlist.org/species/22694861/132577878">https://www.iucnredlist.org/species/22694861/132577878</a>
19	Ivory gull	<i>Pagophilae burnea</i>	Range information/map available at: <a href="https://www.iucnredlist.org/species/22694473/132555020">https://www.iucnredlist.org/species/22694473/132555020</a>
20	Sabine's gull	<i>Xema sabini</i>	Range information/map available at: <a href="https://www.iucnredlist.org/species/22694479/157413905">https://www.iucnredlist.org/species/22694479/157413905</a>

<sup>‡</sup> Included as *Puffinus gravis* in ICES Roadmap for ICES bycatch advice on protected, endangered and threatened species (ICES, 2022b).

<sup>§</sup> Included as *Puffinus griseus* in ICES Roadmap for ICES bycatch advice on protected, endangered and threatened species (ICES, 2022b).

<sup>\*\*</sup> Included as *Stercorarius skua* in ICES Roadmap for ICES bycatch advice on protected, endangered and threatened species (ICES, 2022b).