

 <p>Agreement on the Conservation of Albatrosses and Petrels</p>	<p><b>Eleventh Meeting of the Seabird Bycatch Working Group</b></p> <p><i>Edinburgh, United Kingdom, 15 - 17 May 2023</i></p> <p><b>Self-reporting logbooks to collect seabird bycatch data: case study in the western Mediterranean Sea</b></p> <p><b><i>Paulo Lago, Vero Cortés, Carles Tobella, Lucía Soliño, María Fargas, David García, Pere Josa, Toni Mulet, Ana Orts, Marguerite Tarzia, Oli Yates &amp; Jose Manuel Arcos</i></b></p>
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## SUMMARY

Bycatch in fishing gear is the greatest threat to the survival of the critically endangered Balearic shearwater *Puffinus mauretanicus*, endemic to the Mediterranean and listed as ACAP priority population. But the numerous and highly diversified Mediterranean fishing fleet, mostly small-scale, makes it difficult to carry out a precise assessment of the problem using traditional methodologies of questionnaire surveys on port and on-board observations. Here a complementary methodology to assess bycatch is presented using self-reporting logbooks fulfilled by the fishers themselves on a daily basis and regularly monitored by a network of observers in the fishing ports. This approach was implemented by SEO/BirdLife between 2017 and 2021 in the western Mediterranean in Spain in which fishers from 42 vessels using demersal longlines collaborated by filling out logbooks monitored by eight observers at port. Data were collected from 3,522 fishing days in which 1,142 birds were caught, with shearwaters being the most affected (93%), with special relevance for *Puffinus mauretanicus* and *P. yelkouan*. Bycatch rates varied between years and areas and according to the configuration and operational characteristics of the gear, being more frequent in the small-scale fleet in late spring. The greatest risk of bycatch occurred when setting during the day, using small pelagic fish as bait, and adding little or no weight to the line. Self-reporting logbooks turned out to be a good method to assess seabird bycatch in small-scale fisheries with lower effort compared to observer programs and to raise awareness and involve fishermen in the finding of solutions to bycatch, showing promise for extension to other areas and gears, mainly in the small-scale fleet.

## RECOMMENDATIONS

We recommend that the Working Group:

1. Discuss about the self-reporting logbooks as a recognised methodology to assess seabird bycatch, especially in small-scale fisheries, and its validation as a recommended methodology.

## **Cuadernos de datos cumplimentados por pescadores para recoger datos de captura accidental de aves marinas: estudio de caso en el mar Mediterráneo occidental**

### **RESUMEN**

La captura accidental en artes de pesca es la mayor amenaza para la supervivencia de la críticamente amenazada pardela balear *Puffinus mauretanicus*, especie endémica del Mediterráneo y prioritaria del ACAP. Pero la numerosa y diversificada flota pesquera mediterránea, en su mayoría de artes menores, dificulta la evaluación precisa del problema mediante las metodologías tradicionales de encuestas en puerto y observaciones a bordo. Aquí se presenta una metodología complementaria mediante cuadernos de datos cumplimentados por los pescadores diariamente y seguidos regularmente por una red de observadores en los puertos pesqueros. Este enfoque fue implementado por SEO/BirdLife entre 2017 y 2021 en el Mediterráneo occidental en España, en el que pescadores de 42 embarcaciones usando palangre demersal colaboraron rellenando cuadernos seguidos por ocho observadores en puerto. Se recogieron datos de 3.522 días de pesca en los que se capturaron 1.142 aves, siendo las pardelas las más afectadas (93%), con especial relevancia para *Puffinus mauretanicus* y *P. yelkouan*. Las tasas de captura variaron entre años y áreas y según la configuración del palangre, siendo más frecuentes en el palangrillo al final de la primavera. El riesgo de captura fue mayor cuando se caló de día, usando pequeños peces pelágicos como cebo, y añadiendo poco o ningún lastre a la línea. Los cuadernos resultaron ser un buen método para evaluar la captura accidental de aves marinas en pesquerías de artes menores con un esfuerzo menor en comparación con los programas de observadores y para concienciar e involucrar a los pescadores en la búsqueda de soluciones para evitar las capturas accidentales, mostrándose como una metodología prometedora para ampliarla a otras zonas y artes, principalmente artes menores.

### **RECOMENDACIONES**

Recomendamos al Grupo de Trabajo:

1. Debatir acerca de los cuadernos de datos cumplimentados por pescadores como una metodología reconocida para evaluar la captura accidental de aves marinas, especialmente en pesquerías de artes menores, y su validación como metodología recomendada.

## **Journal du bord remplis par les pêcheurs pour collecter des données sur les prises accidentelles d'oiseaux de mer : une étude de cas en Méditerranée occidentale**

### **RÉSUMÉ**

Les prises accidentelles dans les engins de pêche constituent la plus grande menace pour la survie du critiquement endangéré, Puffin des Baléares *Puffinus mauretanicus*, une espèce endémique de la Méditerranée, et prioritaire pour l'ACAP. Mais le nombreux et diversifiée flotte de pêche méditerranéenne, composé principalement de la pêche à petit échelle, rendre difficile une évaluation précise du problème au moyen de méthodologies traditionnelles d'enquêtes et d'observations à bord. Ici, il est présenté une méthodologie complémentaire à l'aide de journal du bord remplis quotidiennement par les pêcheurs eux-mêmes et régulièrement suivis par un réseau d'observateurs dans le port de pêche. Cette approche a été mis en place par SEO/BirdLife entre 2017 et 2021 en Méditerranée occidentale en Espagne, dans laquelle les pêcheurs de 42 navires pêchant à la palangre démersale ont collaboré en remplissant des journaux du bord suivis par huit observateurs dans le port. Les données ont été collectées à partir de 3 522 jours de pêche au cours desquels 1 142 oiseaux de neuf espèces ont été capturés, les puffins étant les plus affectés (93 %), particulièrement *Puffinus mauretanicus* et *P. yelkouan*. Les taux de capture variaient selon les années et les zones et selon la configuration de la palangre, étant plus fréquents dans la palangre à la fin du printemps. Le risque de capture était le plus élevé lors de la pose de jour, en utilisant de petits poissons pélagiques comme appât et en ajoutant peu ou pas de poids à la ligne. Le journal du bord s'avérait d'une bonne méthode pour évaluer les captures accidentelles d'oiseaux marins dans la flotte artisanale avec moins d'effort par rapport aux programmes d'observateurs à bord et pour conscientiser et impliquer les pêcheurs à la recherche de solutions à fin d'éviter les capture accidentelle, et en se montrant comme une méthodologie prometteuse pour l'étendre à d'autres zones et engins de pêche, principalement à la pêche artisanale.

### **RECOMMANDATIONS**

Nous recommandons au Groupe de Travail :

1. Discuter des journaux de bord remplis par les pêcheurs en tant qu'une méthodologie reconnue pour évaluer des captures accidentelles d'oiseaux marins, en particulier dans les pêcheries à petite échelle, et sa validation en comme méthode recommandée.

## 1. INTRODUCTION

Bycatch in fishing gear is the greatest threat to the survival of several seabird species, including the three endemic and threatened shearwater species from the Mediterranean (*Calonectris Diomedea*, *Puffinus mauretanicus* and *P. yelkouan*) (Cortes et al. 2017, López 2021), where it especially affects the critically endangered Balearic shearwater *Puffinus mauretanicus* (Genovart et al. 2016), listed as ACAP priority population. But the numerous and highly diversified Mediterranean fishing fleet, mostly small-scale, makes it difficult to carry out a precise assessment of the problem and to find and implement adequate solutions.

Traditionally, two main assessment methodologies have been used, questionnaire surveys on port and on-board observations. Questionnaires allow a large territory to be covered in a short time at a low cost. They are an adequate methodology to obtain a first approximation that provides information on the fishing fleet of a territory and the gears used, but regarding bycatch it only provides a general view, that may be useful to identify sensitive areas, periods and gears where future efforts should be focused on. On-board observations by professional observers allow to collect detailed data on fishing effort, fishing gear operation, and seabird bycatch, but their high cost generally does not allow to cover a significant percentage of the fleet or adequate temporal coverage. On the other hand, small-scale fleets pose several impediments to observers, including the small size of the vessels (that often have little room for an extra person onboard), the high number of vessels to cover, and the irregularity of bycatch events, which is enhanced by the diversity of fishing practices, making it difficult for observers to record them.

Here we describe a complementary method to questionnaire surveys and on-board observations to record bycatch, the use of self-reporting logbooks filled out by fishers themselves, with the aim of obtaining greater detail than questionnaire surveys at a lower cost than on-board observations (and higher potential coverage) to assess bycatch (Cortés et al. 2019, Tarzia et al. 2017). This approach was implemented by SEO/BirdLife between 2017 and 2021 in the western Mediterranean in Spain, mainly focusing on the small-scale fleet using demersal longline, due to its high risk of seabird bycatch. Prior to the study, questionnaire surveys contributed to having an overview of the problem (areas and gears involved), but did not provide detailed information on bycatch. On-board observations were also made, but in addition to the aforementioned difficulties to get observers in some small vessels, the irregularity of the bycatch events could lead to an underestimation of the problem given limited capacity of coverage.

## 2. METHODOLOGY

The information provided here is based on a study carried out in the Spanish Iberian coast and the Balearic Islands between 2017 and 2021.

### 2.1. Logbook characteristics

Self-reporting logbooks used in this study are printed notebooks for fishers to record daily fishing effort, specifications on the fishing gear configuration used, and the interaction with seabirds. Logbooks consisted of the following sections (Tarzia et al. 2017):

- Introduction: general (and brief) information on seabirds and bycatch, an explanation of the purpose of the study, a seabird identification guide, and a sheet with recommendations for handling and safely release birds caught alive.

- General data about the boat, the fisher, and the configuration(s) of the gear most typically used (allowing for different configurations of a given gear type, as well as for different gears used by the same vessel, as small-scale vessels are allowed to alternate gears across the year).
- Data of each fishing day including specific details of the gear configuration used, timing, location, weather, fishing effort (number of hooks/sets) and type of bait, as well as the detailed reporting of any bycatch event (including marine turtles, cetaceans and others), and if any mitigation measure is used.
- Survey for the fishers to provide feedback of their experience of participating in the study and their perception of the problem of seabird bycatch.

The logbooks were printed on paper with plastic covers in DIN A4 or DIN A5 format with a limited number of pages to cover between one and two months of fishing trips (all sections having a fixed number of pages, except the section on daily data, which included one sheet per fishing day).

## 2.2. Fieldwork strategy

In order to cover the whole study area (Spanish Mediterranean), and to build up trust with the fishermen, fieldwork was conducted by a team of eight “local” observers who lived close to the fishing ports. This allowed them to visit ports regularly and hence establish a close relationship with the fishers, monitoring their work and solving any doubts, incorporating suggestions and maintaining their motivation. Visits were conducted as often as possible, at minimum one per month to allow renovation of logbooks.

To engage with the fishers, a small amount of money was offered to collaborate in the fulfilling of the logbooks. This was intended as a sign of respect for the work of the fishers, and as a small incentive to collaborate. With the years, some fisheries turned out to be only interested in the money, and these were easily spotted and politely disregarding for future collaboration. But most fishermen willingly collaborated and kept providing information when they had finished their work with the logbooks.

## 2.3. Fleets assessed

Initially, various fishing gears were addressed (longlines, purse seine, trawling, nets, etc.). However, once it was confirmed that demersal longline had a greater impact on shearwaters, the study focused on this type of gear. Specifically, this included vessels registered as “bottom longliners”, which are bound to use this gear (usually the “piedra-bola” configuration, alternating weights and buoys), as well as its more artisanal version of the small-scale fleet called “palangrillo” (usually setting a line with few or no weights, and without buoys). The latter are allowed to alternate longline with other gears, such as set-nets and traps.

## 3. RESULTS

77 vessels followed by a network of eight observers participated in 26 ports in Catalonia, the Valencian Community, the Balearic Islands and Murcia, recording 1,197 seabirds caught in the various fishing gears. The most relevant data were collected by 42 vessels that used demersal longline (bottom longline and “palangrillo”), collecting data from 3,495 fishing days in which 1,144 catches were recorded, of which 93% were shearwaters, with special relevance for the smaller *Puffinus* (*P. mauretanicus* and *P. yelkouan*) (Fig.1). In the case of the small-scale demersal longline, 61% of the shearwaters were captured alive, while in the bottom longline

the majority drowned (Cortés et al. 2021). Seabird bycatch rates per fishing day varied considerably between years and throughout the year, being highest at the end of the spring, and with variations between the coastal waters of the Iberian Peninsula (which are important foraging grounds for the shearwaters) and the waters from the Balearic Islands (where *Puffinus mauretanicus* and *Calonectris diomedea* breed and feed) (Fig. 2). Bycatch rates were estimated as birds bycaught per day and were on average 0.35 for bottom longliners and 0.69 for small-scale fleet using “palangrillo” for the peak period (spring). However, these figures were subject to high variability, depending on season, weather and operational characteristics. The greatest risk of bycatch occurred when setting during the day, using small pelagic fish as bait, and adding little or no weight to the line (Cortés et al. 2017 and 2021). Multiple-event captures occurred regularly, with up to 43 shearwaters recorded in a single line during the study.

#### 4. DISCUSSION AND CONCLUSIONS

Self-reporting logbooks turned out to be a good method to assess the occurrence of bycatch in small-scale fisheries, provided that they were conducted with regular monitoring in port, following a strategy to build trust and raise awareness among fishers. Effort required is relatively low compared to observer programs, showing promise for extension to other areas and gears, mainly in the small-scale fleet.

Shearwater bycatch by demersal longlines, including the small-scale version “palangrillo”, turned out to be high for the three species of shearwaters regularly present in the western Mediterranean. This supports the perception that this is the major cause behind the decline of the including the Critically Endangered Balearic shearwater *Puffinus mauretanicus* (Genovart et al. 2016), as well as the other two endemic species of the basin.

Logbooks allowed to identify with some detail periods and situations of risk, which is an important step forward to develop and implement mitigation measures.

The approach of logbooks also allowed to raise awareness and involve fishermen in the finding of solutions to bycatch, provoking positive changes in the fishing behaviour to reduce seabird bycatch. Indeed, the perception is that some of the fishermen collaborating on the study already reduced bycatch as they were more aware of the situations of risk and tended to avoid them.

The high number of seabirds captured alive opens the door to work on training fishermen to handle and release them while minimizing damage, which could reduce the impact of the fishing activity.

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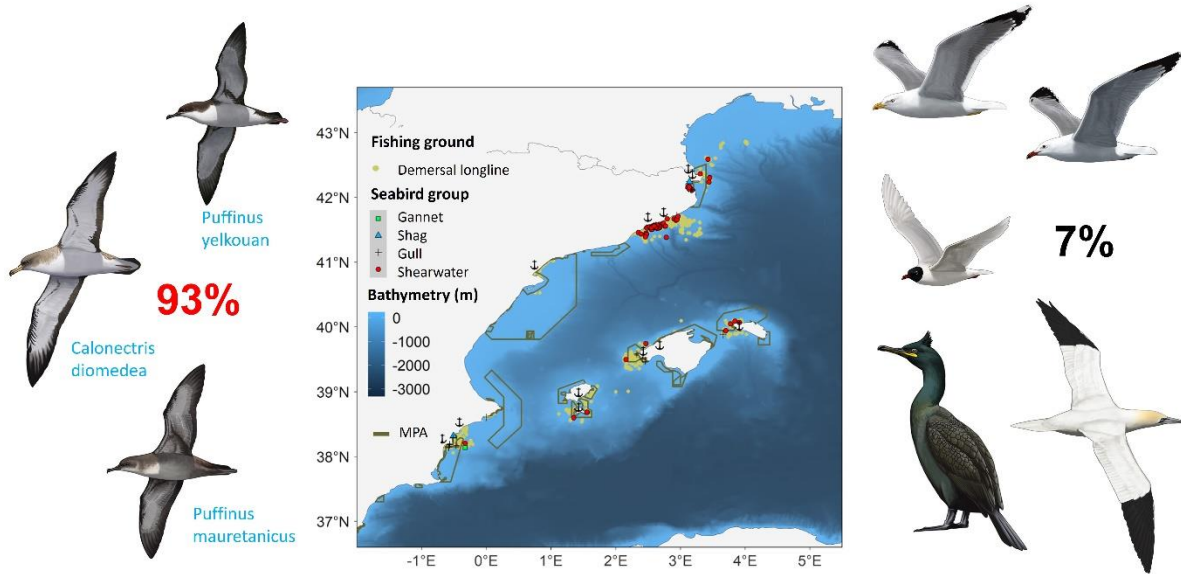


Fig. 1. Seabird species bycaught on demersal longlines in the western Mediterranean sea in Spain, fishing effort and captures distribution recorded in self-reporting logbooks.

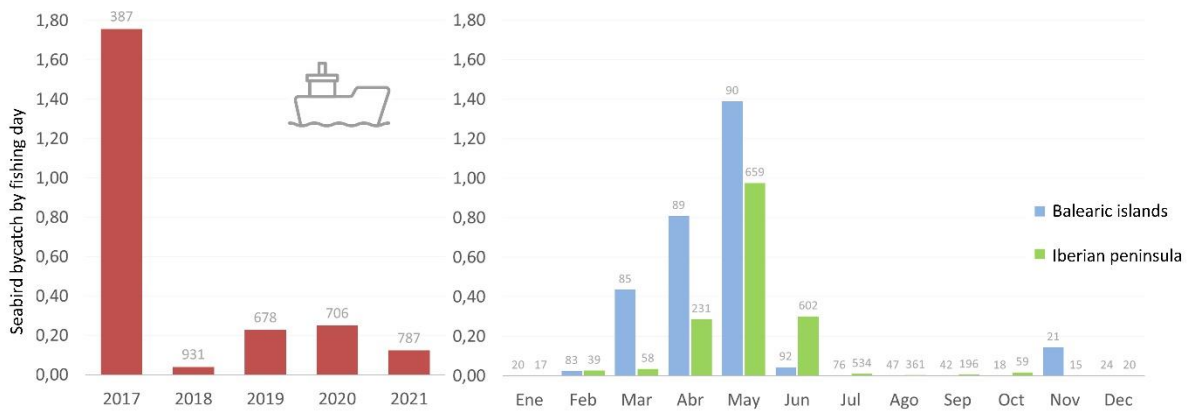


Fig. 2. Interannual (left) and monthly (right) variability of the seabird bycatch rate by fishing day. The values above the bars indicate the number of fishing days recorded in self-reported logbooks.