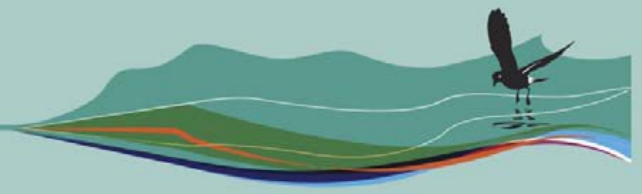
PROTECTING SEABIRDS IN THE MEDITERRANEAN:
ADVANCING THE MARINE PROTECTED AREA NETWORK

INTERNATIONAL WORKSHOP

23RD – 25TH NOVEMBER 2015



Examples of threats affecting seabirds at sites in the Mediterranean, the case study of Greece

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Bycatch impact on seabird populations and mitigation measures

"Concrete conservation actions for the Mediterranean Shag and Audouin's Gull in Greece, including the inventory of relevant marine IBAs"

Project species and sites

Species:

Mediterranean Shag

(*Phal. aristotelis desmarestii)*

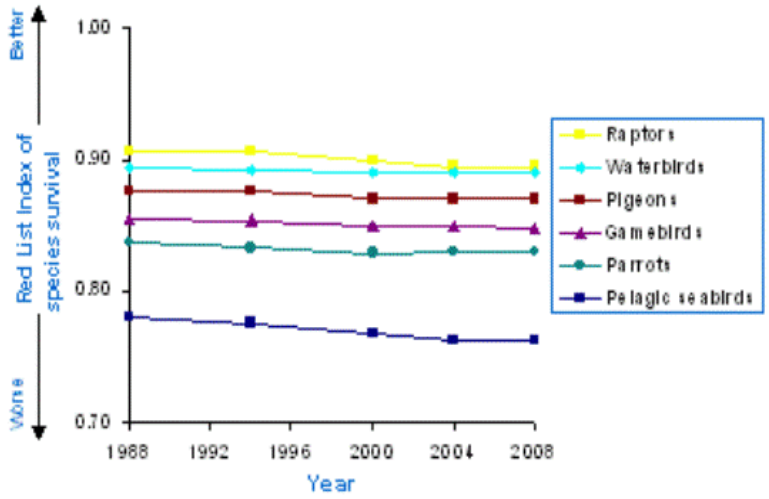
Audouin's Gull

(*Larus audouinii)*

Sites: 17 SPAs in the Aegean and Ionian Sea

Seabird bycatch

- Seabirds, particularly pelagic seabirds have been identified as globally most threaten bird group.
- Their conservation status has deteriorated over the last two decades faster than in any other bird group.
- It is estimated that more than 200.000 birds die in fishing gear in European waters

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Why this conservation action?

• By-catch: Significant threat for seabirds, sea turtles, cetacean species, seals

• The problem of seabird by-catch in commercial (mostly longline and gillnet) fisheries has been particularly severe in the southern oceans and has mainly affected various species of albatrosses and petrels

• Data on seabird by-catch mortality is less well known for European Union's marine ecosystems and particularly in the Eastern Mediterranean are still patchy and insufficient to determine the rates of seabird by-catch and its impact on seabird populations

•**Aegean and Ionian Sea**: Significant fishery areas, large seabird colonies, migration path for seabirds

Impacts on seabirds in Greece

- All species of seabirds in Greece, apart from the European Storm Petrel have been recorded to be caught in different types of fishing gear:
  - Yelkouan Shearwater
  - Scopoli's Shearwater
  - Audouin's Gull
  - Mediterranean Shag
  - Yellow-legged Gull

Conclusive determination of impacts of bycatch on seabird populations are currently not possible due to:

- Insufficiency of available data from on-board observations and fisheries questionnaires as well as
- gaps information on seabird population trends in Greece

However, available data allows **estimation of potential impacts on seabird populations**.




Audouin's Gull

- Reported and recorded to be caught primarily in **bottom longlines** and during breeding season due to feeding on longline baits, as well, as caught fish.
- Higher frequency of bycatch incident expected within usual foraging range **- up to 10km from the colony**.
- Mortality in longlines reaches **at least 0.9-1.9% of breeding population annually** in particular colonies (dead individuals recorded in N. Dodecanese colonies & bycatch rates increased during the 10 years).
- The population of the species in Greece has declined by more than 33% over the last decade
- Bycatch, primarily in demersal longlines, considered to be a threat of **medium or potentially locally high importance** in Greece.

Importance of bycatch

nationally

locally

Case study:
Colony at Leipsi
Northern Dodecanese

Breeding population 2009-2011: 53 pairs

0.9-1.9% of the breeding population annual bycatch rate, while the facts indicate increase of bycatch.

Mediterranean Shag

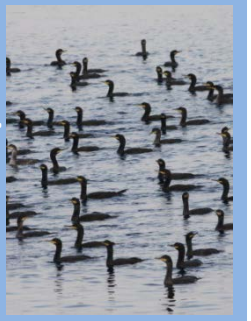
- Reported to be caught primarily **in nets** and **bottom longlines** at almost all sites of Shag's breeding and post-breeding concentrations.
- The species is most vulnerable to bycatch in **nets** placed in **coastal waters close to their colony and roosting sites** where large congregations of shags are formed.
- Bycatch does not seem to have significant impact on the species on the national level, however occasional bycatch incidents involving a significant proportion of local populations may have an important negative impact of local populations. Therefore the threat is estimated to be **low** and may become **locally high**.

Importance of bycatch

nationally			
locally			

Case study:
Colony at Thasos
Northern Aegean

Breeding population
90-110 breeding pairs.
Stable.
Post breeding season
1.000 individuals



Up to 2.7-3.3% of the local population annual bycatch rate.

Yelkouan Shearwater

- Reported to be caught primarily in the **bottom longlines particularly during spring but also summer months. Large numbers may be caught simultaneously in nets as well.**
- The global population of the species is declining and the species threat status has been recently upgraded to Near Threatened (IUCN).
- Bycatch, primarily in bottom longlines considered to be a threat of **medium importance and periodically as well as locally of high importance** for the species in Greece because a vast part of the global breeding population migrates through Aegean Sea and the largest bycatch rates seem to occur during spring and potentially high numbers of birds die annually.

Importance of bycatch

nationally

locally

Migration in Aegean Sea

25.000-70.000 individuals

Vulnerable (IUCN)

Most of the global breeding population migrates through the area.

Scopoli's Shearwater

- Reported to be caught primarily in **bottom longlines**, mostly in the **vicinity of the colony sites** as well as in the **main foraging areas during spring and summer.**
- The population trends at two large colonies (S Ionian Sea & Crete) which have been regularly monitored do not indicate population decline. However, even unsustainable bycatch rates of breeding individuals could be temporarily replaced by prospectors.
- Bycatch, primarily in bottom longlines, is considered to be a threat **of medium and occasionally high importance** for the species in Greece, because it is estimated that potentially high numbers of Scopoli's Shearwaters die annually, primarily in bottom longlines. Particularly during spring large numbers may be caught in longlines simultaneously.

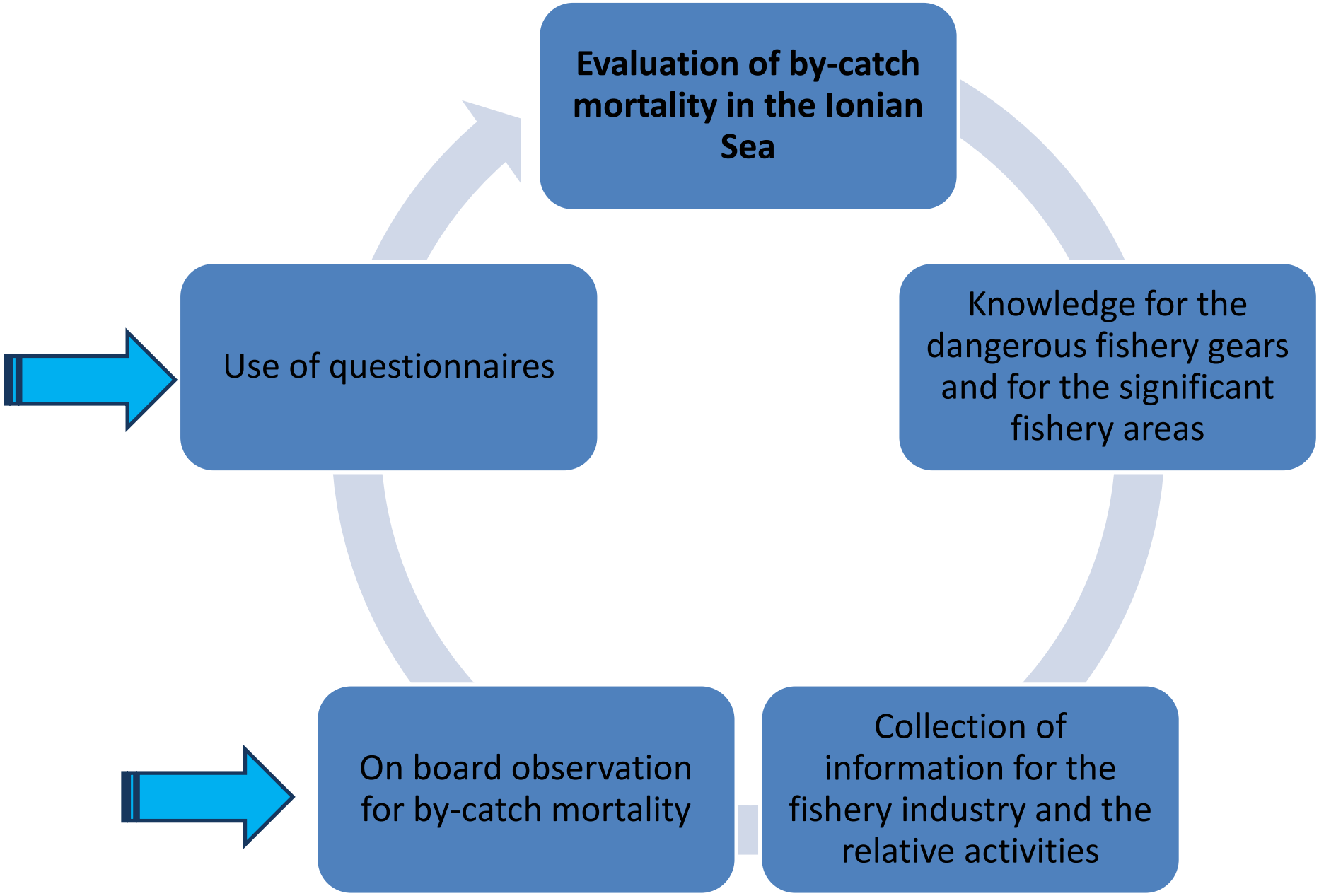
Importance of bycatch

nationally			
locally			

Case study: Ionian Sea

Breeding population 5.000-6.000 pairs
Stable.

1.8-2.1% of the entire population in the S Ionian Sea annually.


Evaluation of by-catch mortality in the Ionian Sea
Knowledge for the dangerous fishery gears and for the significant fishery areas
Collection of information for the fishery industry and the relative activities
On board observation for by-catch mortality
Use of questionnaires

Questionnaire p. 1

Ερωτηματολόγιο για τα θαλασσοπούλια

Α. Κατανομή των θαλασσοπουλιών

1. Ποια είδη θαλασσοπουλιών συναντάτε

☐ Μύχους (Κέπφους) ☐ Αρτέμηδες ☐ Θαλασσοκόρακες (Καλικατσούδες) ☐ Αιγαιόγλαρους ☐ Πετρίλους

Αν ναι

2. Σε ποιες περιοχές και ποιες περιόδους (π.χ. ποιο μήνα) του χρόνου συναντάτε τα κοπάδια των θαλασσοπουλιών (με περισσότερα από 10 άτομα); *Περιγράψτε παρακάτω τις τοποθεσίες και τις χρονικές περιόδους που έχετε δει τέτοια κοπάδια. Σημειώστε τις περιοχές στη θάλασσα στον συνοδευτικό χάρτη, με τα αρχικά τους όπως φαίνεται παρακάτω.*

Μ: Μύχος (Κέπφος) .....

Α: Αρτέμης .....

Θ: Θαλασσοκόρακας (Καλικατσού) .....

ΑΙ: Αιγαιόγλαρος .....

Υ: Υδροβάτης(Πετρίλος) .....

3. Σε ποια νησιά ή νησίδες πιστεύετε ότι φωλιάζουν θαλασσοπούλια; Περιγράψτε τις τοποθεσίες παρακάτω και σημειώστε τις νησίδες και τα σημεία στα νησιά στον συνοδευτικό χάρτη. *(Σημείωση: Οι φωνές που ακούγονται από τις φωλιές των Μύχων και των Αρτέμηδων τη νύχτα μοιάζουν με το κλάμα μωρών παιδιών.)*

Μ: Μύχος (Κέπφος) .....

Α: Αρτέμης .....

Θ: Θαλασσοκόρακας (Καλικατσού) .....

ΑΙ: Αιγαιόγλαρος .....

Υ: Υδροβάτης(Πετρίλος) .....

Είδη θαλασσοπουλιών στην Ελλάδα:

Θ: Θαλασσοκόρακας

ΑΙ: Αιγαιόγλαρος

ΑΣ: Ασημόγλαρος

Α: Αρτέμης

Μ: Μύχος

Υ: Υδροβάτης

Questionnaire p. 2

Β. Συλλήψεις θαλασσοπουλιών σε αλιευτικά εργαλεία

* προαιρετικά πεδία

Σκάφος: ..... Ειδος σκάφους*[1]:..... Λιμάνι*.....

Μήκος σκάφους: ..... Ιπποδύναμη κύριας μηχανής (HP): ..... ☐ Επαγγελματικό ☐ Ερασιτεχνικό

Αλιευτικά εργαλεία[2]: .....

Αλιευτική προσπάθεια*: Αρ. μεροκαμάτων/μήνα*:.....

	Ιαν.	Φεβ	Μαρ	Απρ.	Μαϊ.	Ιουν.	Ιουλ.	Αυγ.	Σεπτ.	Οκτ.	Νοε.	Δεκ.
Δίχτυα:												
Παραγάδια βυθού:												
Αφροπαράγαδα:												
Άλλο:												

Δίχτυα*:.....(μέτρα/ημέρα)
Παραγάδια βυθού*:.....(αρ. αγκιστριών/ημέρα)
Αφροπαράγαδα*:.....(αρ. αγκιστριών/ημέρα)

Περιοχές αλιείας*: .....

Απόσταση από την ακτή: ελάχιστη ..... μέγιστη: ..... Βάθος: ελάχιστο: ..... μέγιστο: .....

Απώλεια αλιευμάτων ή/και ζημιές σε αλιευτικά εργαλεία
Περιοχές: .....
Εποχές: .....
Είδη θαλασσοπουλιών που προκαλούν τη ζημιά: .....
Άλλα είδη θαλάσσιας πανίδας που προκαλούν ζημιά: .....

Ετήσιο κόστος ζημιών (€): .....
Ένταση της ζημιάς:
☐ ελάχιστη
☐ μέτρια
☐ μεγάλη

Συλλήψεις θαλασσοπουλιών ανά αλιευτικό εργαλείο

Είδος θαλασσοπουλιών που συλλαμβάνονται[3]	Είδος αλιευτικού εργαλείου[2]	Εποχές συλλήψεων του συγκεκριμένου είδους[4]	Περιοχές συλλήψεων του συγκεκριμένου είδους θαλασσοπουλιών	Αρ. συλλήψεων/ ημέρα αλιείας	Αρ. συλλήψεων/ μήνα αλιείας	Αρ. συλλήψεων/ έτος

Σχόλια / Προτάσεις για την επίλυση του προβλήματος

Questionnaire p. 3

Επεξηγήσεις

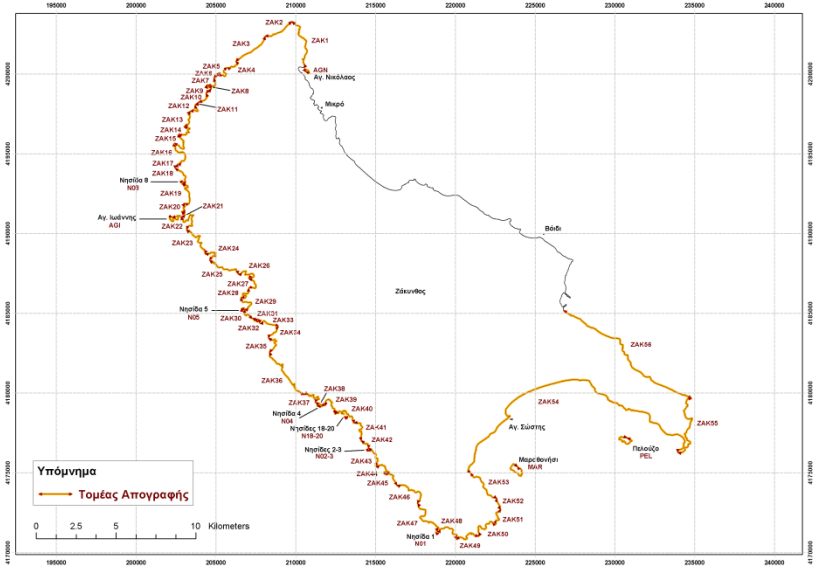
Είδος σκάφους [1]
Παραδοσιακό
Μοντέρνο
Καραβόσκαρο
Τρεχαντήρι
Ταχύπλοο
Καταμαράν
Άλλο

Είδος αλιευτικού εργαλείου [2]	
Κωδικός	*Εργαλείο*
1	Μανωμένα δίχτυα
2	Απλάδια
3	Παραγάδια
4	Ξιφοπαράγαδα
5	Βολκοί – Νταούλια
6	Ιχθυοπαγίδες
7	Συρτή
8	Πετονιές
9	Αργαλειός
10	Καλαμαριέρα
11	Ζαργανόδιχτο
12	Κουλούρα
13	Άλλα κυκλικά δίχτυα
14	Άλλα εργαλεία
15	Βιντζότρατα

Είδη θαλασσοπουλιών [3]
Θαλασσοκόρακας (Καλικατσού)
Μύχος
Αρτέμης
Αιγαιόγλαρος
Ασημόγλαρος
Υδροβάτης (Πετρίλος)

Εποχές [4]	
Κωδικός	*Εποχή*
I	Χειμώνας
II	Άνοιξη
III	Καλοκαίρι
IV	Φθινόπωρο
ή	
Ιαν	Ιανουάριος
Φεβ	Φεβρουάριος
Μαρ	Μάρτιος
Απρ	Απρίλιος
Μαϊ	Μάιος
Ιουν	Ιούνιος
Ιουλ	Ιούλιος
Αυγ	Αύγουστος
Σεπ	Σεπτέμβριος
Οκτ	Οκτώβριος
Νοε	Νοέμβριος
Δεκ	Δεκέμβριος

Χάρτης 7: Ζάκυνθος 1:130.000



Mapping spatial information

Figure A By-catch areas for all used fishing gears per year

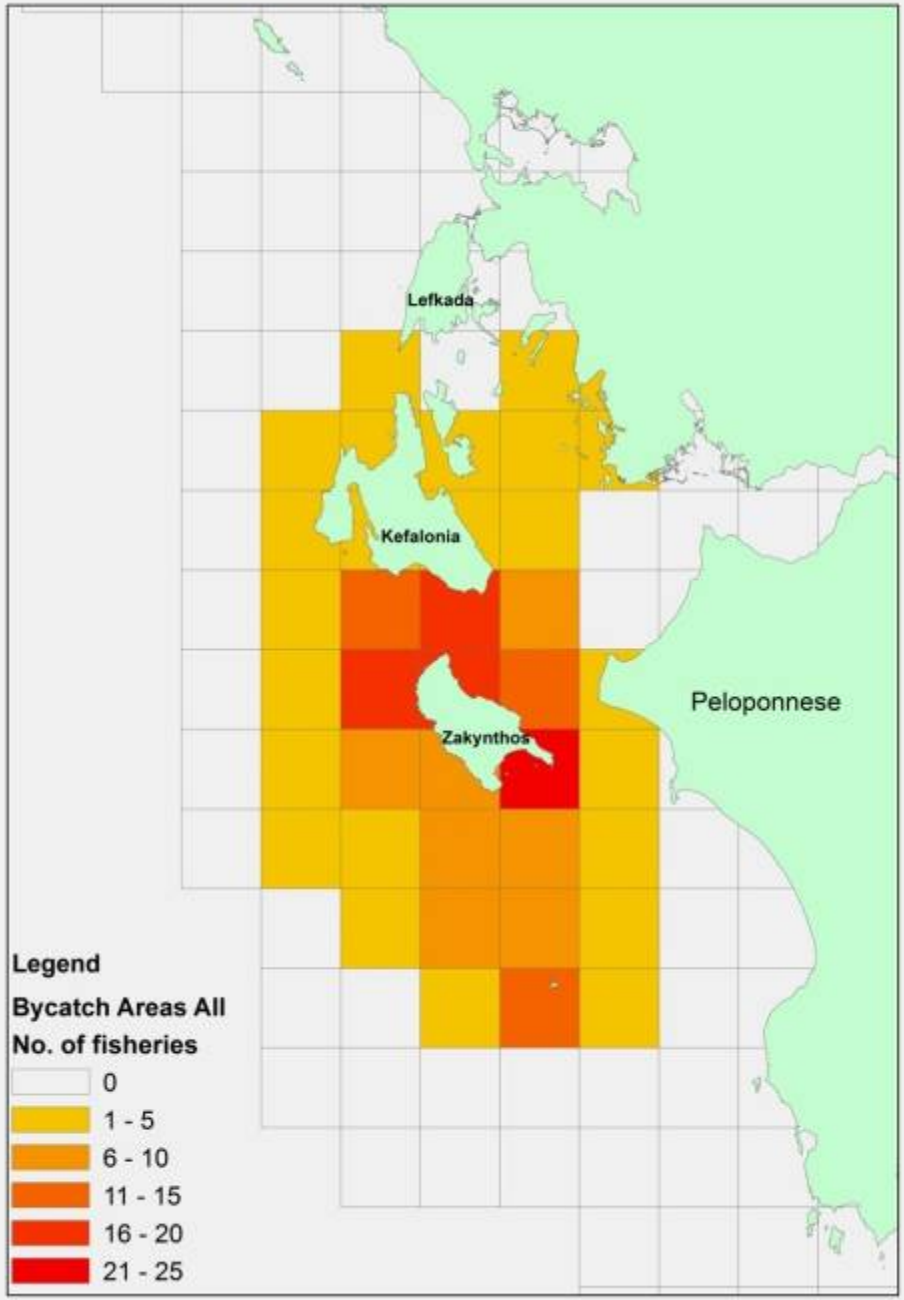


Figure B. By-catch areas for nets per year

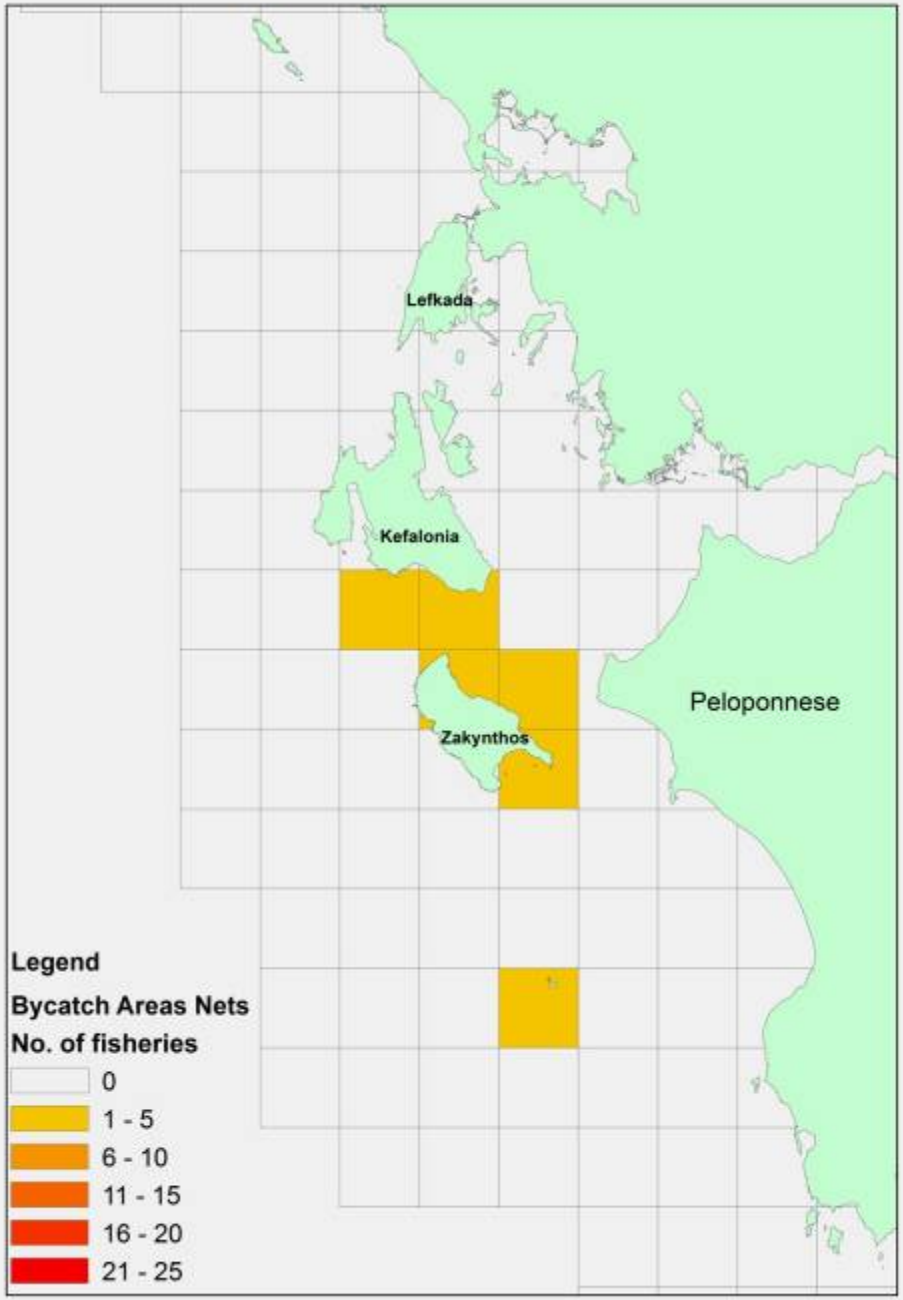


Figure C. By-catch areas for Bottom Long Line per year

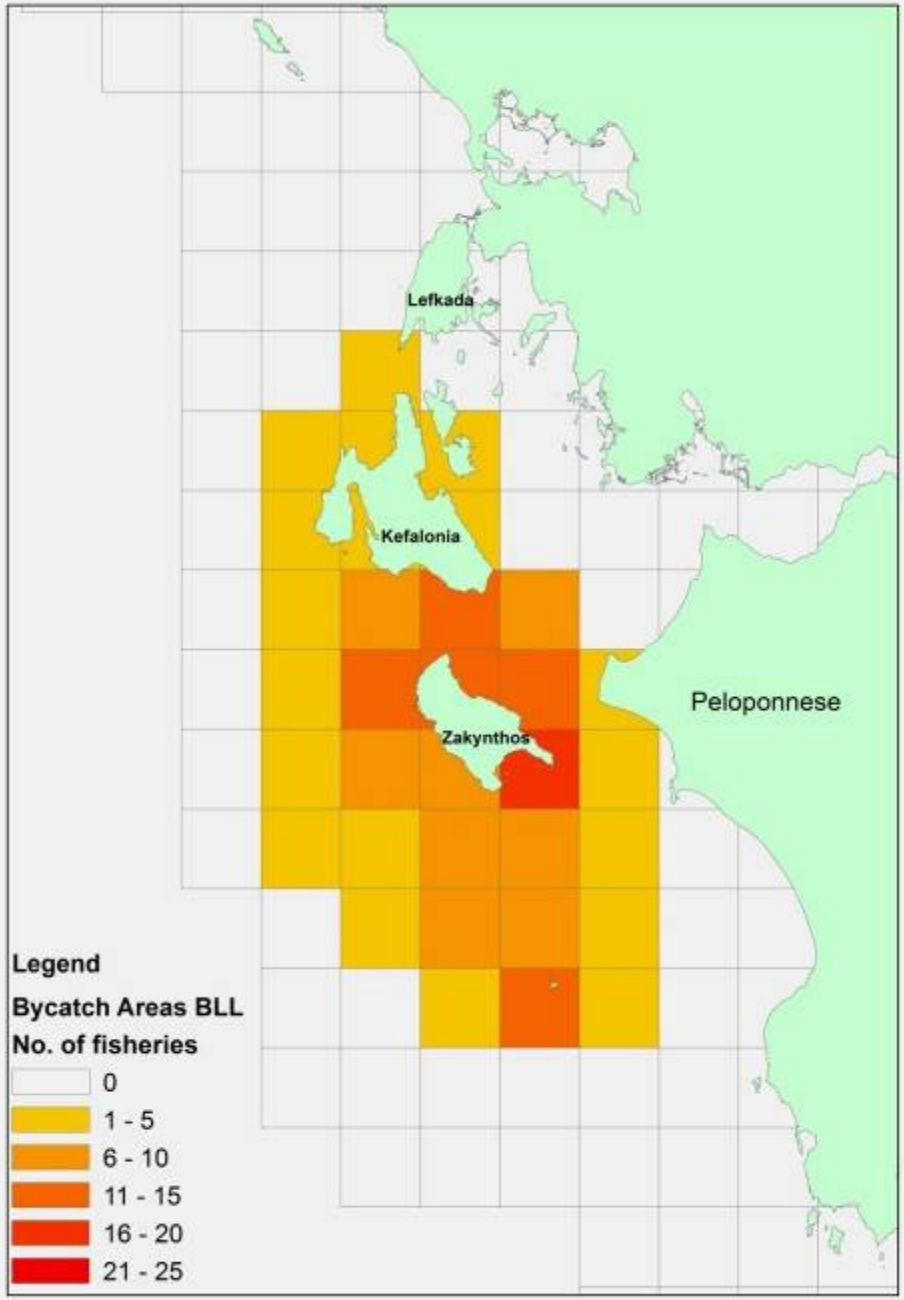
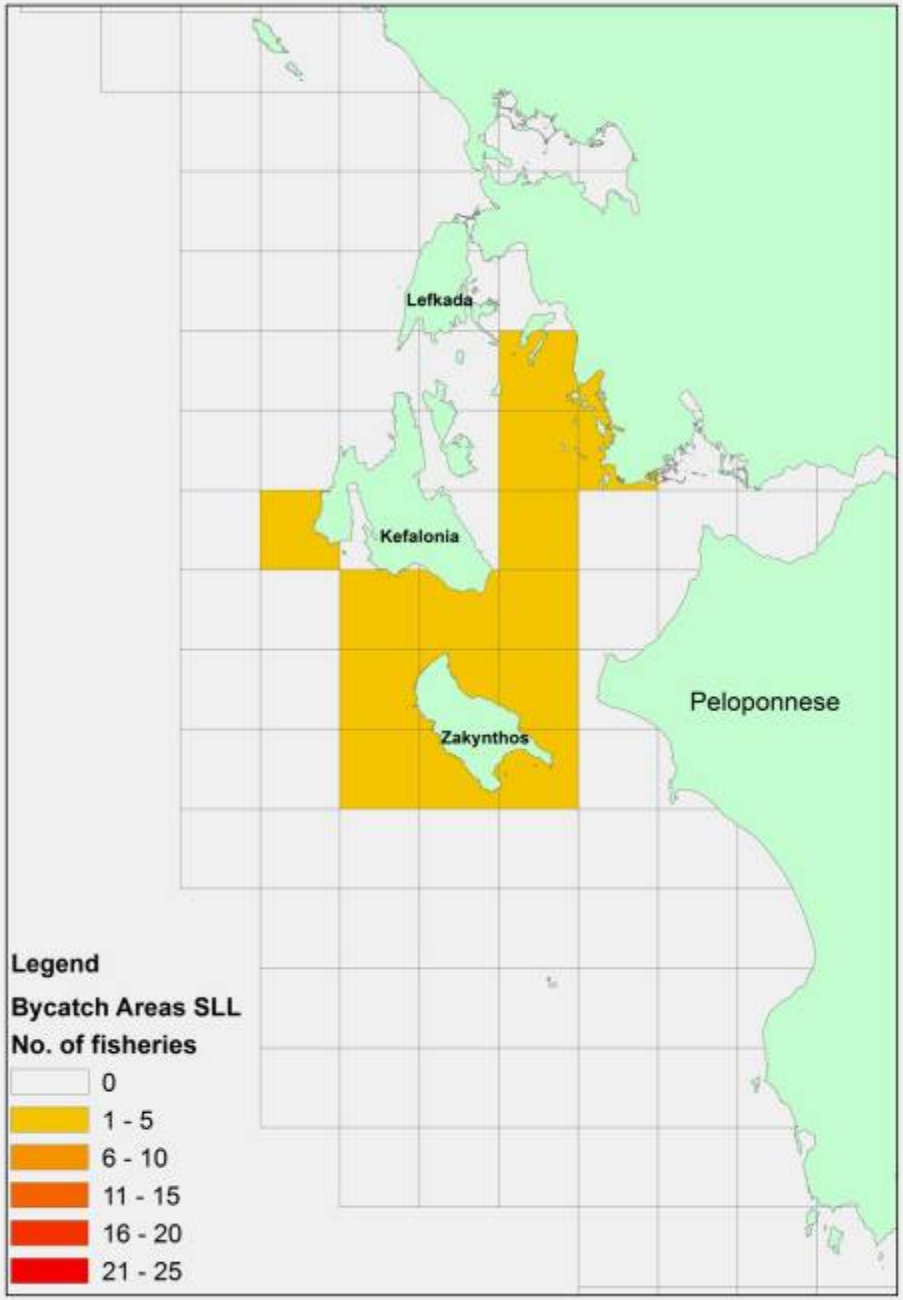


Figure D. By-catch areas for Surface Long Line per year



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Research Article

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Does by-catch pose a threat for the conservation of seabird populations in the southern Ionian Sea (eastern Mediterranean)? A questionnaire-based survey of local fisheries

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Abstract

A significant number of studies worldwide have shown that incidental catches (by-catch) of seabirds in fishing gear might pose a considerable risk for the conservation of their populations. Nevertheless, reliable data on by-catch rates of seabirds in European marine ecosystems are patchy and need to be improved. This study constitutes a first attempt at the evaluation of by-catch rates in the southern Ionian Sea. Data were obtained by distributing a specific questionnaire to the fishers of Zakynthos Island. 150 professional fishers (representing 90% of the local fishing fleet) participated in the survey, and were interviewed during July-December 2010. The information collected showed that commercial longline and (to a lesser extent) gillnet fishery gears caused incidental catches mostly of Scopoli's Shearwater and Mediterranean Shag. The temporal analysis of incidental bird mortality showed that seabirds were more susceptible to be trapped in fishery gears set around sunrise during spring and summer whereas spatial analysis of by-catch data indicated variations in the number of seabirds caught in different fishery areas.

Keywords: incidental catch, longline, gillnet, Scopoli's Shearwater, Mediterranean Shag.

Introduction

Fisheries-seabird interactions include both negative (e.g. prey depletion) and positive (e.g. food provision via fisheries discards) effects on the population of marine birds (Tasker *et al.*, 2000; Montevecchi, 2002; Lourao *et al.*, 2011). Entrapment of seabirds in fishing gear constitutes one of the most significant direct negative effects of the fisheries industry. On the other hand, numerous studies worldwide have demonstrated that incidental catches (by-catch) of seabirds in fishing gear potentially pose a considerable risk to their populations (Weimerskirch & Jouventin, 1987; Brothers *et al.*, 1999). The problem of seabird by-catch in commercial (mostly longline and gillnet) fisheries has been particularly severe in the southern oceans and has mainly affected various species of albatrosses and petrels (Brothers, 1991; Favero *et al.*, 2003). At the same time, incidental catches of seabirds reduce the effectiveness of fishery activities due to bait loss and associated decreased fish catches since it is observed that hooked seabirds in longline sets may remove the line from the desired fishing zone or cause the breaking of the line when trying to release the bait from the hook (Sánchez & Belda, 2003). As a consequence, by-catch may lead to considerable economic losses for fishing companies (Gandini & Frere, 2012).

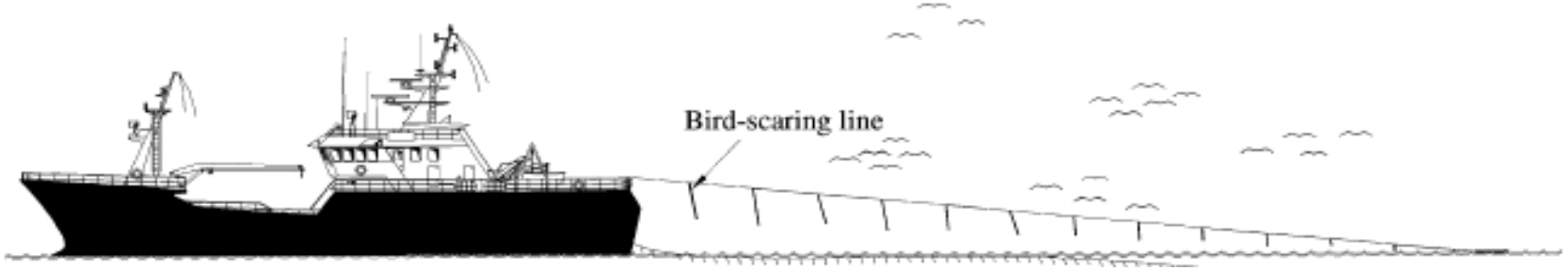
However, available data on seabird by-catch mortality are scarce for European Union marine ecosystems, particularly in the eastern Mediterranean where such information is still patchy and insufficient to determine the rates of seabird by-catch and consequent impact on seabird populations.

In the Mediterranean, species known to be implicated in incidental by-catch on fishing gears are Scopoli's (*Calonectris diomedea*), Balearic (*Puffinus mauretanicus*) and Yelkouan (*Puffinus yelkouan*) Shearwaters, Mediterranean Shag (*Phalacrocorax aristotelis desmarestii*), and Audouin's (*Larus audouinii*) and Yellow-legged (*Larus michahellis*) gulls (ICES, 2008; Dinesh *et al.*, 2009; Barcelona *et al.*, 2010). Some of these species are long lived and characterized by naturally high levels of adult survival, late onset of breeding, a low reproductive rate and a long breeding cycle. Increased adult mortality in species with these life history traits may undermine the stability of their regional population in the long term (FAO, 2008). Therefore, there is an urgent need to assess the magnitude of the by-catch problem in the region and to promote adequate conservation measures to reduce the negative impacts on seabird species.

This study was carried out as part of the LIFE07/NAT/GR/000285 project "Concrete conservation actions for Mediterranean Shag and Audouin's Gull in Greece including the inventory of relevant Marine IBAs" and attempts to improve

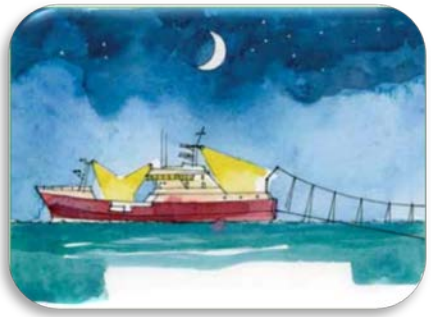
Proposed mitigation measures

- Numerous seabird bycatch mitigation measures have been successfully tested and applied worldwide.
- Due to characteristics of the Greek fishing fleet – large number of small demersal fisheries - only few are consider applicable.
- Some fishermen by their own initiative already use mitigation measures to reduce longline bait losses.



Proposed mitigation measures

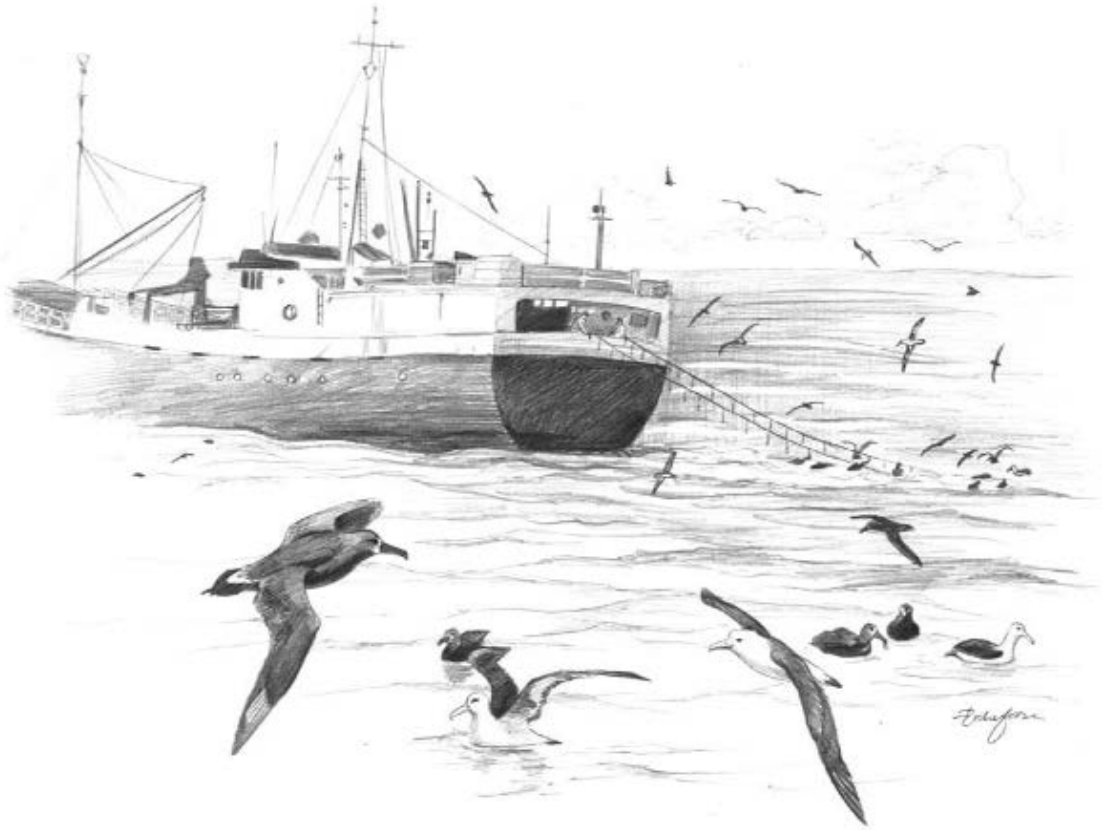
Mitigation measure	Tested in Greece?
Night setting and hauling of longlines with reduced lighting	Yes
Application of heavier weights for the longlines to sink faster	Yes
Avoiding large concentration of Scopoli's and Yelkouan Shearwaters, particularly during spring and summer	Yes
Creating of noise to distract birds	Yes
Distraction with colourful strips of cloth or buoys during longline setting	Yes
Use of defrosted longline baits which sink faster	Yes
Avoiding setting nets in coastal areas adjacent colonies of Med. Shag and Yelkouan Shearwater as well as marine areas of large congregations of these species.	



Requirements for future work

- Additional on board systematic surveys need to be carried out to increase sampling effort which will allow correct estimation of seabird bycatch
- By specific fishing gear type – elaborate further “nets” & “longlines”
- Amateur fishing – impacts completely unknown
- Geographic extent:
  - Foraging areas in the vicinity of important colonies and marine congregations, as identified by marine IBAs and areas identified by this assessment
- Periods:
  - Migration and breeding period of shearwaters
  - Breeding season of Audouin’s Gull
  - All year Mediterranean Shag

Acknowledgements to:
Local fishermen that contributed to our study
Members/volunteers of the fieldwork teams



Interactions between Fisheries and Seabirds

THANK YOU FOR YOUR ATTENTION