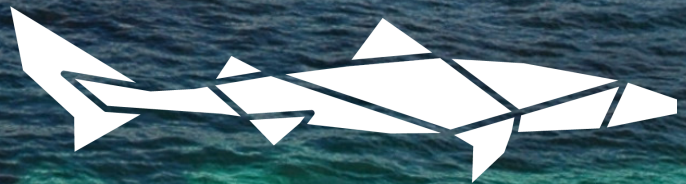




Clean  
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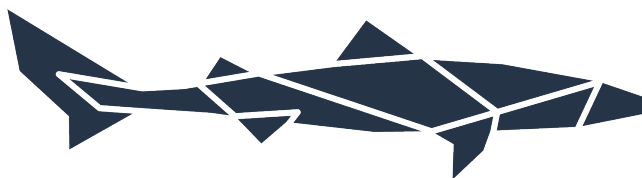
**SPURDOG  
BYCATCH  
MANAGEMENT  
PROGRAMME**



**A THREE YEAR REVIEW**

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## INTRODUCTION

Spurdog (*Squalus acanthias*), members of the Squalidae or dogfish family also known as spiny or picked dogfish, are demersal, shoaling sharks that give birth to live young (viviparous). Spurdog are typically small, with males reaching a maximum length of 95cm and females 122cm, and are characterised by a sharp spine on the leading edge of both dorsal fins.

Spurdog are widely distributed in northern and southern temperate shelf seas. Within the North-east Atlantic and adjoining areas, this highly migratory species is found in predominantly coastal waters from Iceland and the Barents Sea, southwards to North-west Africa.

Although spurdog were considered to be nuisance fish in the 1800s, commercial landings increased during the first half of the 20th century. The species supported an important international commercial fishery, fished by UK, French, Irish and Norwegian vessels [1, 2] and peaking in the 1960s.

## HISTORY OF SPURDOG STOCK MANAGEMENT

The European Commission (EC) first implemented spurdog management measures in 2000, but measures to control fishing only became restrictive from 2007.

The International Union for Conservation of Nature (IUCN) initially listed spurdog as *Critically Endangered*, a listing which was later reviewed and revised to *Endangered* in 2015 [3].

Following general population declines, precautionary fisheries management measures were put in place in 2010 to move spurdog in the North-east Atlantic from a commercial species to a conservation species. A zero Total Allowable Catch (TAC) for spurdog was put in place for all EU-registered fishing vessels operating in EU waters.

In anticipation of the Common Fisheries Policy Landing Obligation in 2019, which required all catches to be kept on board, landed and counted against quotas, in 2016 the EC listed spurdog as a *Prohibited Species*, thus making it exempt from the Landing Obligation. This meant the species could continue to be discarded from vessels at sea, effectively 'opting out' of the legislation and neither reducing fishing pressure nor addressing the wasteful discarding of dead fish.

Currently, the *Prohibited Species* listing prevents spurdog from becoming a 'choke' species (a species with a low quota that can cause a vessel to stop fishing in a given area, even if it still has quota for other species) under the UK's Fisheries Act 2020.



◀ Spurdog landed on Newlyn quay, mid 20th Century. Photo by Laurence Hartwell.

### ICES advice for spurdog in the North-east Atlantic and adjoining areas

“When the precautionary approach is applied, there should be no targeted fisheries on this stock in 2021 and 2022.”

And that...“Based on medium-term projections (30 years), annual catches at the recent assumed level (2468 tonnes) would allow the stock to increase at a rate that is similar (8% lower) to that estimated with zero catches; therefore, ICES considers that bycatch should not exceed the recent assumed level of total catches of 2468 tonnes.”

Published October 2020 [4]

These activities result in the bycatch of a diverse variety of sharks, skates and rays (known collectively as elasmobranchs). Bycatch is the unintended capture or entanglement of non-target species in fishing gear.

Fishermen within this region consider populations of spurdog to be locally and seasonally common. Whilst the *Prohibited Species* listing for spurdog has resulted in zero landings, interactions between fishermen and spurdog continue. With high local abundance and an aggregative or “shoaling” nature, spurdog are susceptible to bycatch in UK fisheries, for example in the offshore gill netting fishery operating in the Celtic Sea [5, 6, 7]. Spurdog bycatch in gill net and trawl fisheries often results in the animals dying, with the dead spurdog discarded as waste.

Fishermen have experienced a loss of earnings from:

- No longer being able to land and sell spurdog;
- Extended periods of down-time clearing nets of bycaught individuals;
- Paying to repair gear that has been damaged by bycatch events.

Fishermen have reported that levels of bycatch can be so substantial that vessels may be displaced from their historic fishing grounds in order to avoid such impacts.

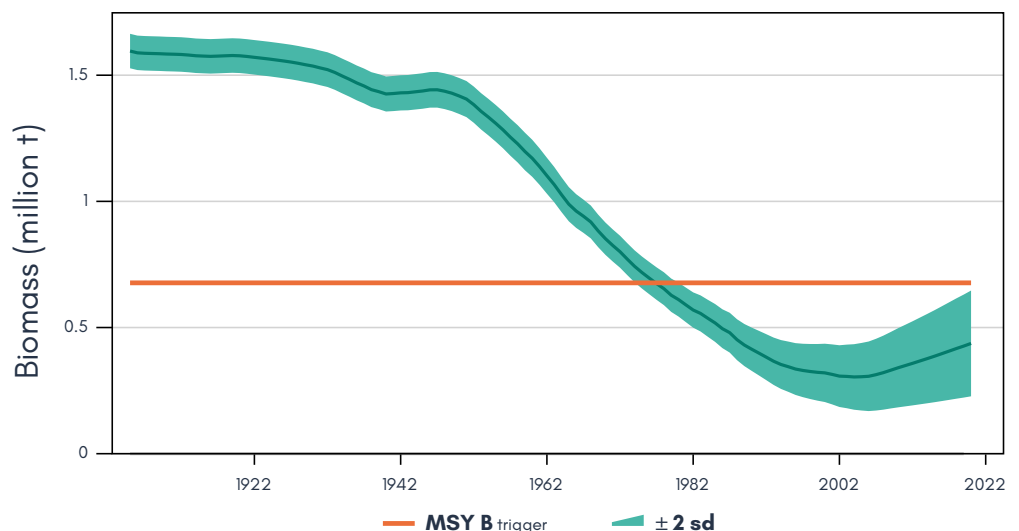
## SPURDOG BYCATCH AND MANAGEMENT

In the Celtic Sea (ICES Divisions 7e-j), offshore commercial gill and trammel netters from the South-west of the UK fish on open ground, targeting whitefish such as cod (*Gadus morhua*), hake (*Merluccius merluccius*), monkfish (*Lophius* spp.) and turbot (*Scophthalmus maximus*).

**FIGURE 1**

Spurdog in ICES subareas 1-10, 12, and 14 (the Northeast Atlantic and adjacent waters). Summary of stock assessment: total biomass.

ICES. 2020. Spurdog (*Squalus acanthias*) in subareas 1-10, 12, and 14 (the Northeast Atlantic and adjacent waters). In Report of the ICES Advisory Committee, 2020. ICES Advice 2020, dgs.27.nea.





One of the biggest challenges to managing shark, skate and ray (elasmobranch) fisheries when compared with other commercially valuable species is that relatively little is known about their populations in UK waters. Consequently, elasmobranchs are referred to as 'data-limited' species. This makes stock assessments difficult, and often results in the adoption of more precautionary management approaches such as *Prohibited Species* listings, where the species in question cannot be targeted, retained, transhipped or landed. Such measures are viewed by some sectors of the fishing industry as overly punitive and ineffective, and often do not reflect what fishermen report to observe whilst at sea.

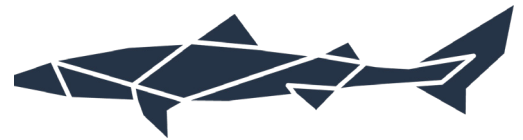
### THE CHALLENGE



Until 2010, commercial landings of spurdog provided fisheries scientists with information on when, where, and how much spurdog was caught, by weight, sex and age (derived from length) - data which was used to inform stock assessments. The introduction of zero Total Allowable Catch for spurdog in 2010 meant that this avenue for routinely collecting fishery-dependent data (data collected directly from the fishery) was no longer available. Working directly with fishermen, the Spurdog Bycatch Management Programme overcomes this issue. Utilising their vessels, fishing gear, and knowledge, scientifically-robust data on spurdog bycatch can be collected through the programme, improving our understanding of the species and informing management decisions.

### THE SOLUTION





## PILOT MONITORING PROGRAMME

The level of dead spurdog discards reported by the fishing industry does not align with Defra's vision for sustainable use of the marine environment and opposition to wasteful discards. The Spurdog Bycatch Management Programme was established to assess the feasibility of managing spurdog bycatch in real-time, as an alternative to the *Prohibited Species* listing, with the goal of minimising overall fishing mortality, significantly reducing wasteful dead discards, and ultimately contributing to the aim of Defra's 'Shark, Skate and Ray Conservation Plan' to sustainably manage elasmobranch stocks.



# CATALYST FOR CHANGE

In light of the wasteful discarding of dead spurdog and the direct impact of the ban on spurdog landings on the UK's South-west offshore commercial gill net fisheries, the fishing industry united under the Cornish Fish Producers' Organisation (CFPO) and stressed the need for change to the UK Government. Additional pressure was applied through the voice of the Shark Trust, championing a need for greater conservation and sustainably-managed exploitation.

Together, these voices raised awareness within Defra of the need to establish effective policy, informed by the best available scientific data, to prevent the wasteful discarding of dead spurdog.

Understanding the value of fishermen sharing knowledge and information on their fisheries, Defra commissioned an industry-led research programme, run by Cefas, to inform future management of spurdog bycatch, through:

- Fishermen and scientists working together to generate scientifically-robust data on spurdog bycatch levels and mortality in the Celtic Sea gill net fishery;
- Trialling an alternative approach to the *Prohibited Species* listing to prevent 'choking' in the fishery;
- Not incentivising fishermen to target the stock;
- Reducing wasteful discards and overall fishing-induced mortality of spurdog;
- Promoting best practice in returning live spurdog to the sea for the benefit of the stock.





# A NEW DAWN IN SCIENCE- INDUSTRY COLLABORATION

As a result, a collaborative research partnership between Cefas, the CFPO, Defra, the Shark Trust, and the Marine Management Organisation (MMO) was formed to direct the development of the Spurdog Bycatch Management Programme – Europe’s first near real-time bycatch reporting programme for spurdog. The programme was evaluated by the Scientific, Technical and Economic Committee for Fisheries (STECF) and supported by the European Commission.

As part of the collaborative research partnership, an Expert Steering Group (ESG) was established, with quarterly meetings held to oversee the co-specification, co-design and co-implementation of the programme. All participating skippers are members of the ESG, and their regular attendance and participation is a conditional requirement of their inclusion in the programme.

## PURPOSE

The purpose of the programme is to enable fishermen to make informed, near real-time decisions on where to fish, avoid bycatch hot-spots, actively manage spurdog catches, and self-regulate the uptake of a bycatch allowance. As a result, the programme has the potential to reduce wasteful dead discards of spurdog.

## INCENTIVE

Under the Secretary of State determination of fishing opportunities for British fishing boats pursuant to section 24(2) of the Fisheries Act 2020, UK fishing vessels participating in the Spurdog Bycatch Management Programme are provided with a combined UK quota for spurdog, which, in 2021, was 115 tonnes. Within this, each vessel may land a maximum of two tonnes per month of spurdog that is dead at the moment that fishing gear is hauled on board.

*“Fishermen have long recognised that spurdog are a vulnerable species because of their biological and reproductive characteristics.*

*There has been no targeted fishery on spurdog for a decade or more, but having to throw away dead spurdog whilst targeting other species is a wasteful practice that does absolutely nothing to enhance the stock. Cornish fishermen have seen increasing catches of spurdog in the Cornish hake fishery, which they attribute to a gradual increase in the stock since directed fisheries for the species were closed.*

*The Spurdog Bycatch Management Programme is a unique collaboration between stakeholders that has enabled fishermen to minimise the wasteful practice of dead*

*discarding, whilst also providing scientists and managers with valuable spatial and statistical information on spurdog catches and distribution.*

*Our hope is that, armed with this information, scientists and managers will have the knowledge and confidence to move towards a situation where all vessels in the highly mixed fisheries around Cornwall will be allowed to retain dead spurdog, whilst returning those that are alive and continuing to gather valuable data.*

*It is also hoped that more resources will be directed towards researching the status of the spurdog stock, to inform future management decisions.”*

**The Cornish Fish Producers’ Organisation**

# THE SPURDOG BYCATCH MANAGEMENT PROGRAMME

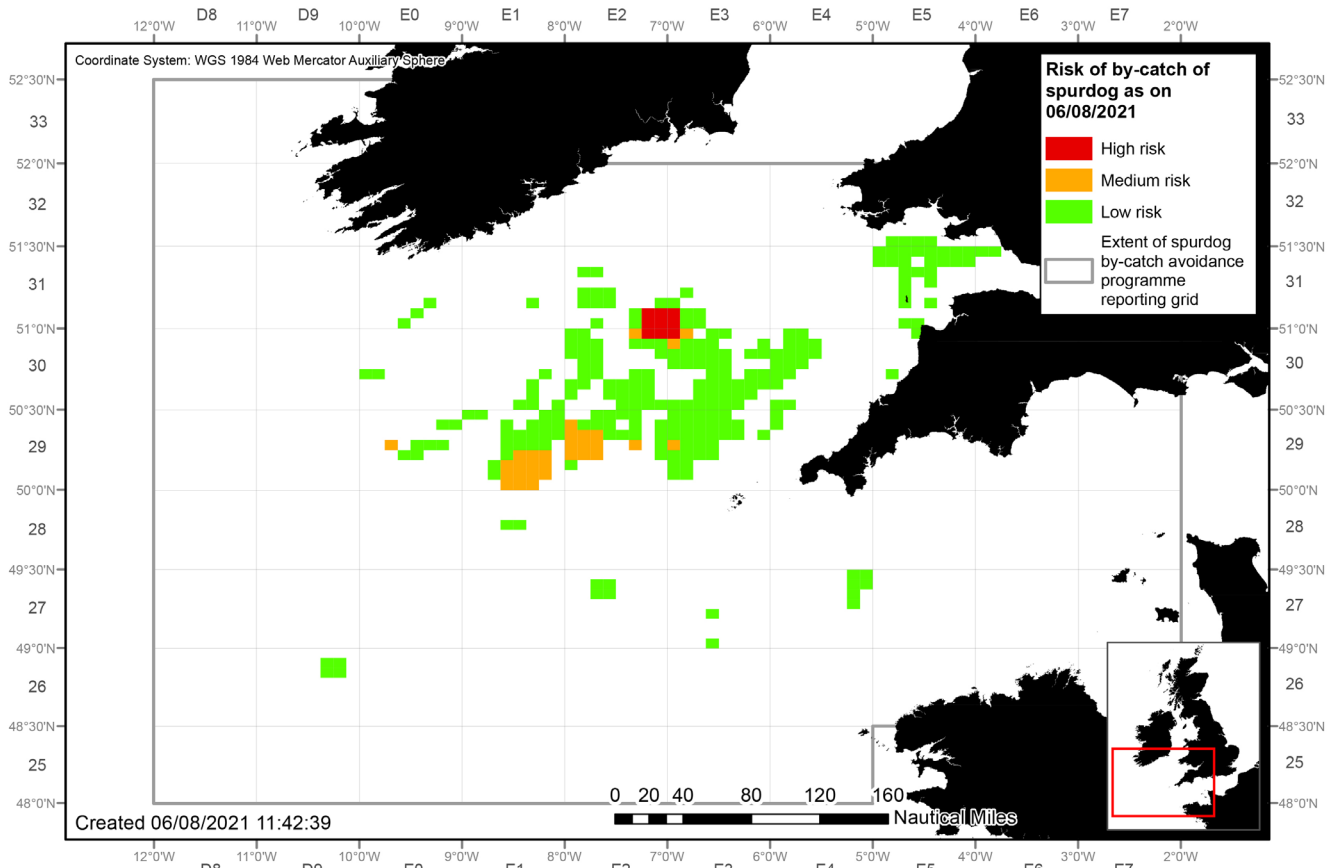
The Spurdog Bycatch Management Programme formally began in November 2016 and still operates today, with CFPO fishermen self-reporting the presence or absence of spurdog bycatch during normal fishing activity every 24 hours via email and an online portal.

Bycatch information provided by skippers is compiled and shared back with all participating fishermen using a bycatch advisory map, with Red indicating high risk of significant spurdog bycatch, Amber medium risk of significant bycatch, and Green low risk of significant bycatch.

*“This collaborative research partnership has delivered the most complete spatiotemporal understanding of spurdog bycatch and discard survival in the Celtic Sea, key information which can be used to inform fisheries management for spurdog.”*

**Dr Carl M. O’Brien CBE, Chief Advisor  
Marine Fisheries, Cefas**

Participation in the programme is incentivised through the provision of a dead spurdog bycatch quota which, in turn, provides fisheries scientists with an estimate of the level at which the quota would need to be set in order to prevent spurdog bycatch from ‘choking’ the fishery.



**FIGURE 2** Example of a semi-automated bycatch advisory map, indicating risk of spurdog bycatch in the Celtic Sea.

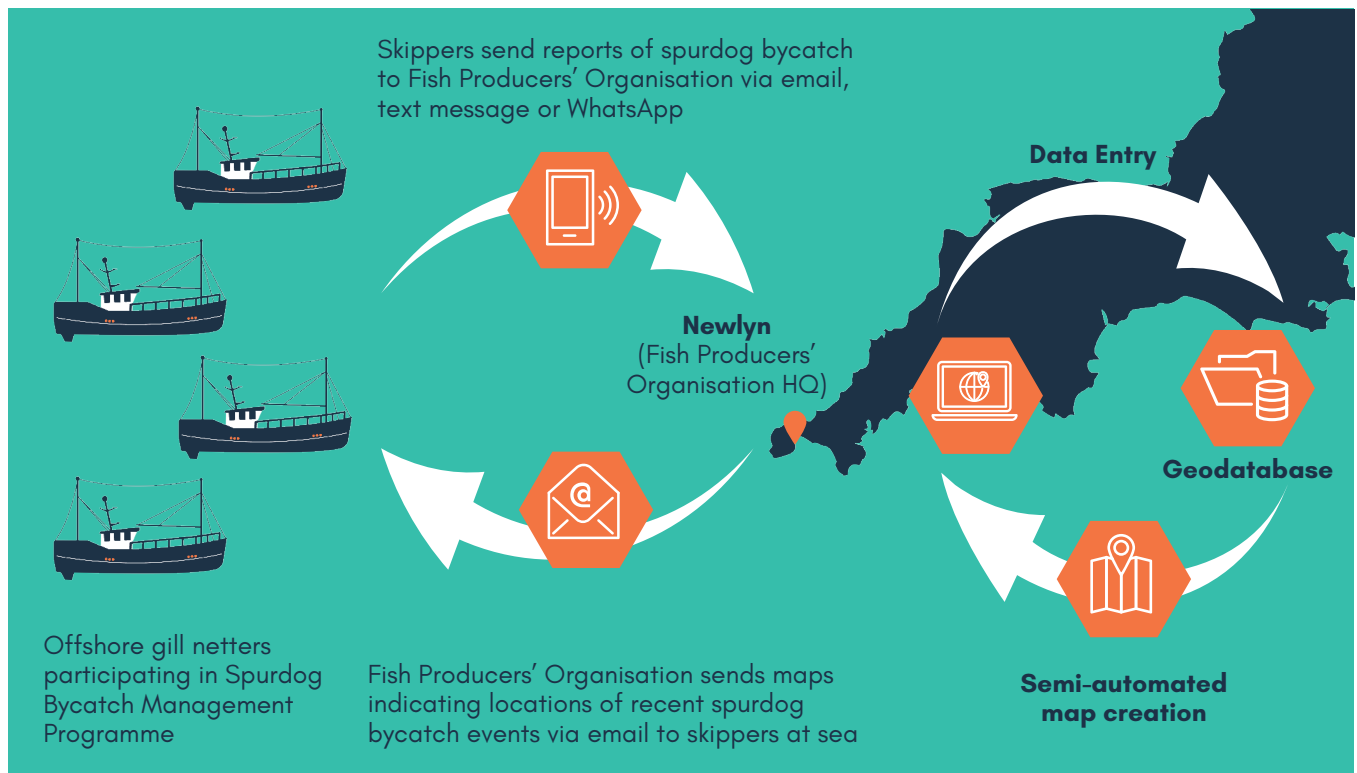
## PARTICIPATING VESSELS

Between 2017 to 2019, a total of six offshore netters, with vessel lengths of 16m or more, participated in the programme. Three vessels were recruited into the programme ahead of January 2017, while a fourth vessel from the same fleet joined in March 2018, and two further vessels were recruited in October 2019. These six vessels operate out of the fishing port of Newlyn, Cornwall, in the South-west of the UK, using fixed, demersal gill nets to target whitefish such as hake, fishing year-round on open ground and wrecks within the Celtic Sea (ICES Divisions 7e-j). During the spring and summer months (April – July), the same vessels typically use trammel nets to target monkfish and turbot<sup>1</sup>.



Offshore gill netters participating in the programme send reports of spurdog bycatch to the CFPO Headquarters in Newlyn, via email, text message or WhatsApp every 24 hours. This data is entered into a geodatabase and used to create semi-automated bycatch advisory maps. The CFPO sends these maps back to participating skippers at sea, indicating locations of recent spurdog bycatch events.

**FIGURE 3** Overview of the programme, whereby participating vessels and CFPO headquarters communicate spurdog bycatch events.



<sup>1</sup>In addition, three demersal trawlers have also been involved in the programme, affording further valuable insights into spurdog bycatch in mobile fishing gear (data is not reported within this document).



### VESSEL REQUIREMENTS

To participate in the Spurdog Bycatch Management Programme, all skippers are required to:

- **Report every 24 hours to the CFPO** on the presence or absence of spurdog bycatch during normal commercial fishing operations, recording:
  - Zero bycatch (to help inform seasonal patterns of spurdog bycatch), or;
  - Weight of any spurdog bycatch, split by: retained weight (kg); discarded weight alive (kg); and discarded weight dead (kg).
- **Adopt the Spurdog Bycatch Management Programme's Code of Conduct**, which includes:
  - Responsible fishing practices to help reduce incidental bycatch wherever possible.
  - Best post-catch handling practices to help minimise time on deck for live spurdog and maximise discard survival.

- **Statutory reporting** – any spurdog bycatch caught (both retained and discarded) by the participating vessel must be entered into the e-log and submitted to the CFPO and MMO to be monitored, using the species code 'DGS'.

Marine Management Organisation (MMO) authorisation letters were issued to all participating skippers, allowing the retention of a maximum of two tonnes of dead spurdog bycatch per vessel per month on fishing grounds within ICES Divisions 7e-j.

Any skippers failing to comply with programme requirements were put under immediate review, with repeated non-compliance resulting in permanent removal from the Spurdog Bycatch Management Programme.



## SPURDOG BYCATCH MANAGEMENT PROGRAMME CODE OF CONDUCT


Co-developed and co-produced by the Shark Trust, CFPO fishermen and Cefas, and complied to by participating skippers.



**SPURDOG BYCATCH MANAGEMENT PROGRAMME**

### Best practice





- ✔ Good handling practice improves the long-term survival of sharks, skates and rays returned alive to the sea.
- ✔ This can contribute to stock recovery for zero-TAC and Prohibited species.
- ✔ Maximise the survival of any juvenile sharks, skates and rays and large breeding females being discarded.



- ▶ Inform other fishermen of the location of significant unwanted bycatch and take appropriate avoiding action.
- ▶ Avoid deploying fishing gear in the vicinity of observed or reported significant bycatch events.
- ▶ Where possible 'shake free' zero-TAC or Prohibited species from fishing gear into the sea, prior to hauling gear on deck.
- ▶ If brought on deck, increase the animal's chance of survival by handling with care.
- ▶ Where possible, have a dedicated 'soft surface' area on deck to lay sharks, skates and rays on while removing fishing gear.
- ▶ Clear fishing gear as quickly as possible, return live sharks, skates and rays to the water prior to sorting the commercial catch.
- ▶ Process commercial catch as soon as safely possible; where possible avoid leaving fish in direct sunlight.

February 2021  
Image © Bay Photographic; (CC BY 2.0)

Supported by:

**SPURDOG BYCATCH MANAGEMENT PROGRAMME**

### Discarding SPURDOG DGS




Always lift a Spurdog to move it

Grip shark behind head - in front of pectoral fins, but avoiding gills




Dragging or lifting a Spurdog solely by its tail can damage the animal

Avoid contact with the gills which are easily damaged

### GOOD PRACTICE

**1** Increase chance of survival by removing live Spurdog carefully from fishing gear and avoid dropping them onto the deck.

**2** As quickly as possible, clear fishing gear and return live Spurdog back to the sea.

**3** Return Spurdog to the sea by hand, not by foot through the vessel's scuppers.

**4** Record estimated weight (kg) of live and dead discarded Spurdog.



**REMEMBER: Return all live Spurdog to the water ASAP.**

February 2021  
Illustrations © Marc Dando | Shark Trust

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## HIGHLIGHTS

In the first three years of the programme, 2017 to 2019, participating skippers submitted a total of 1,043 daily reports. Reports were available for 69% of days fished by participating skippers in the three-year period, and accounted for 82% of dead spurdog landings (90 tonnes were reported as retained for landing, compared to 117 tonnes landed) during the programme.



## BYCATCH TOOL AND ADVISORY MAPS

The CFPO enter skippers' daily spurdog bycatch reports into an online portal and geodatabase every 24 hours. Cefas then run quality controls and process the data to create bycatch advisory maps using a dedicated Bycatch Tool.

The Bycatch Tool geographically processes and sums weights of spurdog bycatch, reported over two-month periods for each of the geographical areas fished by participating skippers. The Tool then compares this to spurdog bycatch data from the same time period of previous years.

Bycatch advisory maps for skippers are automatically created from the summed bycatch data, using the traffic light (Red, Amber, Green) system. These maps are then reviewed by Cefas and shared with the CFPO, who forward the maps by email to all participating skippers.

## REPORTED BYCATCH LEVELS

Between 1st January 2017 and 31st December 2019, a total of 258 tonnes of spurdog bycatch was reported by skippers, with 72 tonnes reported in 2017, increasing to 82 tonnes in 2018, and 104 tonnes in 2019. Despite this observed increase over time, spurdog bycatch remained consistently stable from one year to the next when compared to the level of fishing effort reported.

### REPORTED SPURDOG BYCATCH EVENTS

The majority of skippers' daily bycatch reports showed zero or low spurdog bycatch:

- Zero spurdog bycatch events accounted for 48% (497 of 1,043) of skippers' daily reports.
- Low bycatch events (less than 100kg) accounted for 20% (215 of 1,043) of skippers' daily reports.
- Medium bycatch events (100 - 450kg) accounted for 18% (185 of 1,043) of skippers daily reports.
- High bycatch events (over 450kg) accounted for only 14% (146 of 1,043) of skippers' daily reports, but comprised 79% (204 tonnes) of total spurdog bycatch weight reported.





# SEASONAL AND SPATIAL PATTERNS

Based on spurdog bycatch data reported by skippers during the three years 2017 to 2019, the peak season for spurdog bycatch was defined as a four-month period from October to January, with the non-peak season being the remaining eight months from February to September.

The peak spurdog bycatch season accounted for 34% (355 of 1,043) of all skippers' daily bycatch reports, and 69% (178 tonnes) of total spurdog bycatch by weight reported during the programme.

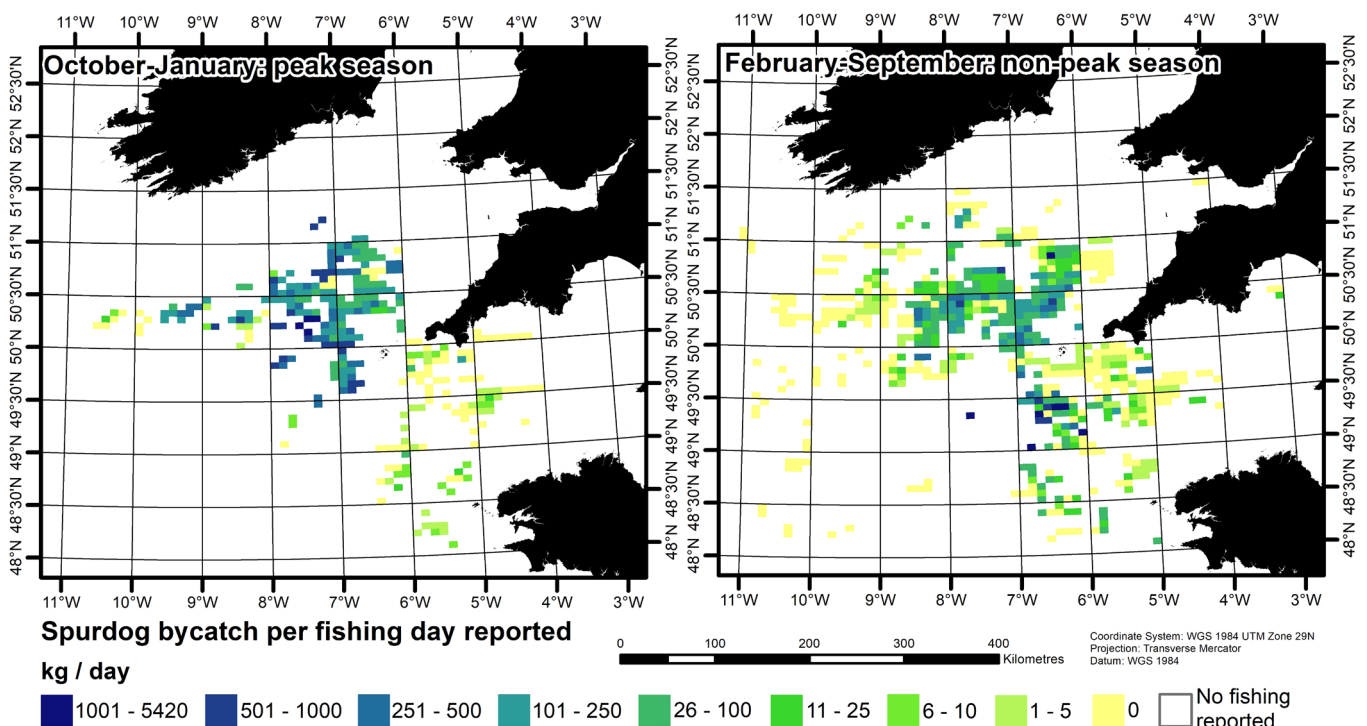
Fishing activity reported by skippers throughout the programme covered approximately 41,000 km<sup>2</sup> of fishing grounds across the Celtic Sea. Spatial coverage of fishing activity reported by skippers during the peak bycatch season was highly constrained to central, offshore fishing grounds, with approximately 19,000 km<sup>2</sup> of coverage, compared to 33,000 km<sup>2</sup> coverage during non-peak season.

## SPURDOG BYCATCH SEASONS AND SPATIAL COVERAGE

- The peak season for spurdog bycatch occurred between October and January, accounting for 69% (178 tonnes) of total spurdog bycatch during the programme.
- During the peak season, fishing activity was more aggregated than the non-peak season, during which fishing occurred over a broader area.



**FIGURE 4** Seasonal spurdog bycatch reported (per day in kg) by skippers participating in the Spurdog Bycatch Management Programme between 2017 and 2019 for (a) October to January (peak bycatch season, four months), and (b) February to September (non-peak season, eight months).



# BYCATCH LANDINGS VS COMMERCIAL LANDINGS

Between 1st January 2017 to 31st December 2019, a total of 117 tonnes of dead spurdog bycatch was landed by participating skippers for the commercial market (30 tonnes in 2017, 37 tonnes in 2018 and 50 tonnes in 2019). By comparison, over the same time period participating skippers also landed 2,292 tonnes of hake, 403 tonnes of whitefish, 147 tonnes of flatfish, monkfish, skate and rays, and 99 tonnes of other species for the commercial market.

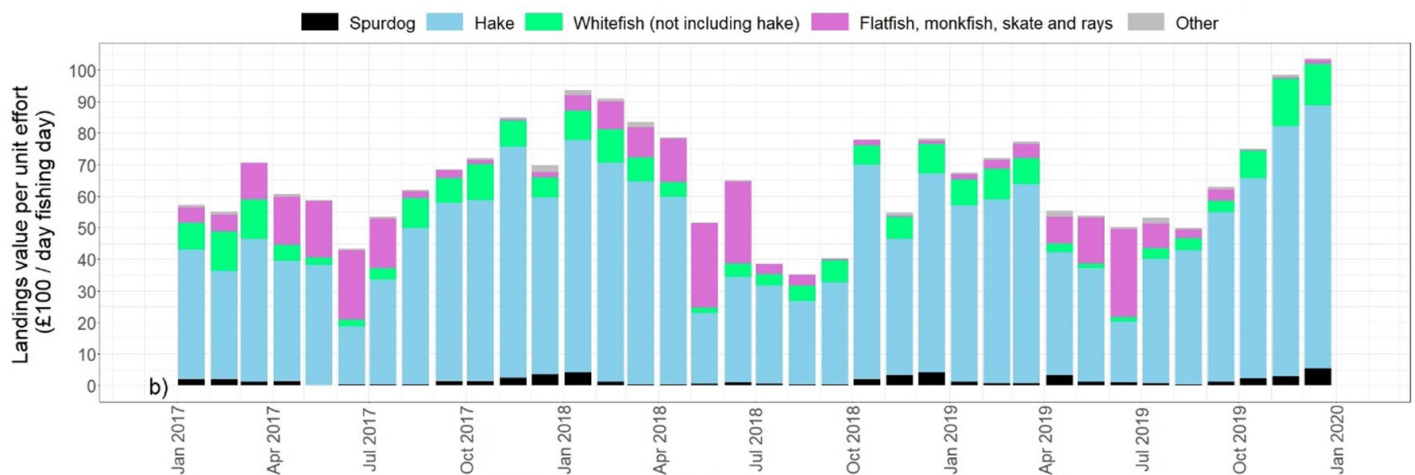
Spurdog landings typically followed a seasonal pattern, accounting for less than 2% of total monthly landings value, up to a maximum of 6% in some winter months (October to January), and less than 1% in spring and summer months (May to September).

## HIGHLIGHTS

- Provision of a two-tonne dead spurdog bycatch quota proved not to be an incentive for participating skippers to target spurdog.
- Spurdog accounted for less than 2% of the total market value of landings for participating skippers throughout three years of the programme (2017 to 2019).
- Highest monthly spurdog landings of up to 6% occurred during the same months as the highest hake landings, the fleet's prime whitefish target species.



**FIGURE 5** Landings value per unit effort (£100 / fishing day) for dead spurdog bycatch (black), compared to target commercial species - hake (blue), whitefish (green), flatfish, monkfish, skate and rays (pink) and other (grey) - in the three years of the Spurdog Bycatch Management Programme, 2017 to 2019.



# ON-DECK SURVIVAL AND MORTALITY OF SPURDOG BYCATCH

Throughout 2017 to 2019, skippers' daily bycatch reports of spurdog survival or mortality remained highly variable, with no clear seasonal pattern observed.

Overall, a total of 112 tonnes (44%) of spurdog bycatch was reported as released back to sea alive, 90 tonnes (35%) as dead and retained for landing, and 40 tonnes (16%) as dead bycatch discarded back to sea. Survival and mortality were not recorded systematically during the first three months of the programme and were hence unknown for 16 tonnes of spurdog bycatch recorded during this period (5%).



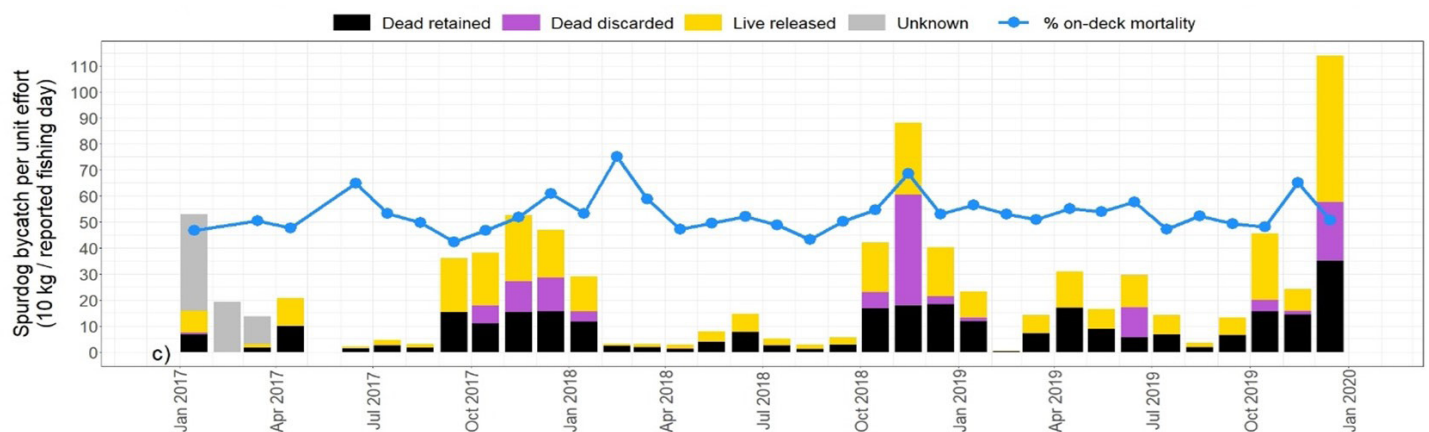
## ON-DECK SURVIVAL OF SPURDOG BYCATCH

For the three years, 2017-2019:

- 51% (130 tonnes) of spurdog bycatch was reported as dead on-deck, of which 90 tonnes were retained for landing and 40 tonnes were returned back to sea as dead discards.
- 44% (112 tonnes) of spurdog bycatch was reported as released back to sea alive.
- In the initial three months, on-deck survival data was not systematically recorded (accounting for 5% or 16 tonnes of spurdog bycatch).



**FIGURE 6** On-deck survival status of spurdog bycatch per unit effort (10 kg/ reported fishing day) during 2017 to 2019: dead retained (black), dead discarded (pink), live released (yellow), and unknown survival status (grey). Blue line shows % on-deck mortality.





## KEY ACHIEVEMENTS

**Quality control of data** reported by participating skippers through CFPO and Cefas processing and analysis procedures.

**Up to 100% daily reporting** of spurdog bycatch by skippers, during the peak spurdog bycatch season.

**Delivery of the most complete representation to date** of the seasonal movements, distribution, bycatch levels and discard survival of spurdog in the Celtic Sea.

**Development of a near real-time bycatch reporting and mapping tool.** This has yielded new fishery-dependent data on spurdog catches in space and time in the Celtic Sea, Bristol Channel and the Western English Channel (ICES Divisions 7e-j). This information is shared back to participating fishermen.

**Dedicated Spurdog Bycatch Management Programme Codes of Conduct** co-developed by the Shark Trust, CFPO, Defra and Cefas, and complied with by participating skippers.

**Development of an Expert Steering Group and trusted collaborative partnership** between the fishing industry, science, conservation and policy, working together to actively manage and reduce wasteful dead discards of spurdog.

**The Spurdog Bycatch Management Programme**, along with an evidence-based dead spurdog bycatch quota, offers an alternative approach to the *Prohibited Species* listing for the offshore netting fleet operating in the Celtic Sea, reducing wasteful discarding of dead bycatch, without creating an incentive for fishermen to target spurdog or creating a 'choke' species.

**No targeting of spurdog bycatch.** Catch and landings data has shown no evidence of the Spurdog Bycatch Management Programme increasing levels of spurdog bycatch, and therefore fishing mortality of the stock. Only dead spurdog were landed, with the dead spurdog bycatch quota falling within current assumed annual catch rates suggested by ICES to allow stock recovery at a rate that is similar (8% lower) to that of zero catches.



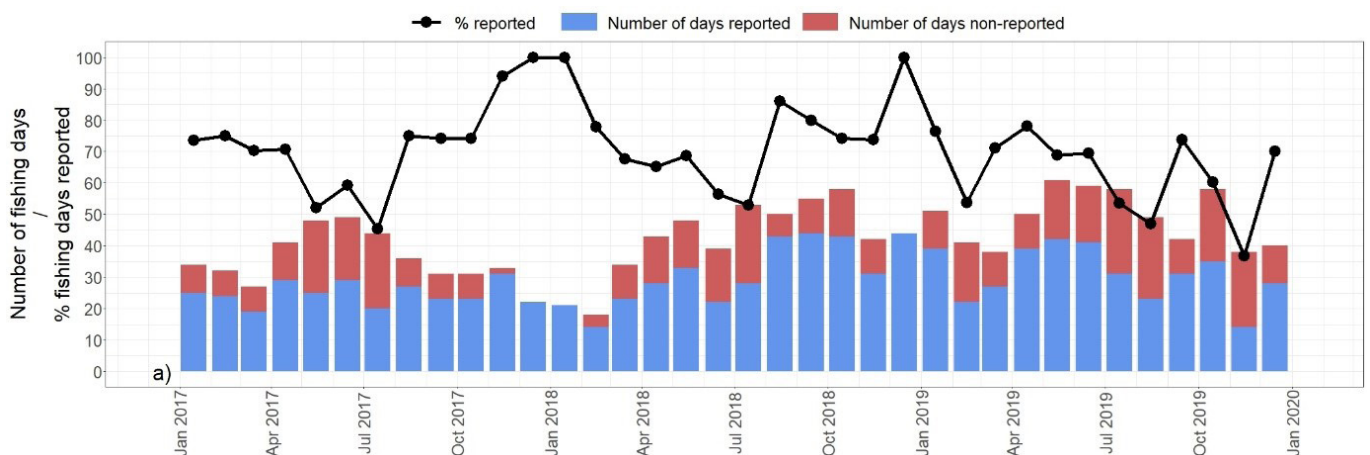
# AREAS FOR IMPROVEMENT

## ➤ Increasing skippers' daily bycatch reporting during the non-peak spurdog bycatch season (February to September).

Seasonal variation in the submission of skippers' daily bycatch reports was evident. During winter months (peak spurdog bycatch season), skippers successfully reported up to 100% of their fishing days. However, during some spring and summer months (non-peak spurdog bycatch season) skipper reports frequently dropped to below 50% and on one occasion below 40% (November 2019).



**FIGURE 7** Variation in skippers' daily bycatch reports during the Spurdog Bycatch Management Programme, between 2017 and 2019, with 'number of days reported' in blue, and 'number of days non-reported' in red, and overall % of fishing days reported in black.



➤ **Providing real-time information to inform fishing decisions.** The current Bycatch Tool is *near* real-time, as there is a delay of roughly 17 hours between skippers first submitting bycatch reports, to skippers receiving an advisory map. This delay is compounded by the fact that skippers' bycatch reports can be up to 24 hours "old", as they are sent at the end of the fishing day. In addition, fishing gear soak times of 24-48 hours must be considered. Once a skipper receives a bycatch advisory map detailing where spurdog bycatch is or is not occurring, gear has often already been deployed.

Despite the near real-time Bycatch Tool representing a significant advancement in the sharing of catch information, there is currently no evidence of avoidance behaviour. Improvements are required to enable real-time reporting, so that bycatch data may inform fishing decisions "in the moment".

➤ **Preventing overlandings of more than two tonnes per month of quota.** During 2017 to 2019, the Spurdog Bycatch Management Programme observed three individual cases of a participating skipper accidentally landing more than the authorised two tonne per month quota: 2.44 tonnes in November 2017; 2.73 tonnes in 2018; and 2.24 tonnes in 2019. This was due to skippers under-estimating the weight of dead spurdog bycatch retained prior to landing.

➤ **Avoidance of ‘high grading’ of dead spurdog.** Often, more than two tonnes of dead spurdog could be caught in a month, but only two tonnes could be retained, landed and sold by participating vessels. On occasion, dead spurdog were discarded before the monthly retention limit was reached, with participating fishermen selecting which dead spurdog to retain, and which to discard. It is thought that this was driven by market forces – for example, large spurdog command a higher price than small spurdog.



## AREAS FOR IMPROVEMENT

### Feedback received from fishing industry members on the Spurdog Bycatch Management Programme.

- Members have continually stressed the importance of the potential economic value of dead discarded spurdog to their business, if it could be retained and landed. They have asked that dead discarded spurdog be included in future assessments of the value and proportion of spurdog in comparison to total catch, rather than only the retained or landed catch.
- The programme could work towards creating a more “positive profile” of skippers’ fishing activity and efforts in the programme, noting there was concern around the public perception of catching an endangered species.
- Securing additional quota for the programme, through international swaps and/or annual fisheries negotiations with the EU, was important to the fishing industry.
- More clarity around the options for spurdog bycatch data to be used to inform the abundance of spurdog in the Celtic Sea – with a view to contributing to the stock assessment for spurdog in the North-east Atlantic.
- Continued evaluation of the programme, to ensure that it is suitable to inform the management of spurdog, how data is collected, and the types of data collected.



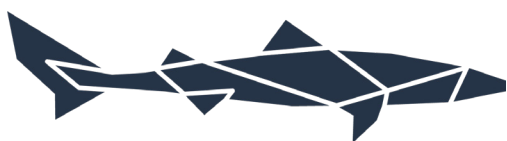
## WIDER CONSIDERATIONS

The Spurdog Bycatch Management Programme offers one alternative approach to the *Prohibited Species* listing for fishing vessels using static nets offshore in the Celtic Sea. However, the programme is not a “silver bullet” for all fisheries and all choke species. An assessment needs to be made on a case-by-case basis, taking account of regional differences.

Several conditions need to be in place to ensure the effectiveness of real-time bycatch management programmes [8]:

- The feasibility of avoiding unwanted catches;
- Motivation for the fishing industry to “buy-in” to real-time spatial avoidance or management;
- Engagement of the fishing industry;
- Technological infrastructure to share, analyse and store data in real-time;
- Scientific support to ensure scientifically robust and validated data;
- Funding for any additional resources required;
- Trust between stakeholders, including data-sharing agreements to determine how, and by whom, self-reported, high-resolution industry data of catches can be used.

The main requirement to initiate a successful real-time bycatch management programme is a clear **incentive** for fishermen to participate.



### SOUTHERN NORTH SEA

Spurdog are a significant bycatch and discard species for demersal longline fishermen fishing along the East Anglian coast, in the southern North Sea. Working in partnership with those fishermen, Cefas assessed whether the Spurdog Bycatch Management Programme currently underway in the Celtic Sea could be adapted and extended to the East Anglian inshore demersal longline fishery, as an alternative to a *Prohibited Species* listing. The study found that on-deck survival of spurdog was between 73 - 100% here, with the assumption that immediate on-deck survival translates to long-term discard survival. As the driver of the Spurdog Bycatch Management Programme in the Celtic Sea is to reduce bycatch, dead discards and fishing mortality of spurdog, the same driver and therefore incentive (dead spurdog bycatch quota) was absent from the East Anglian inshore demersal longline fishery. It was therefore concluded that the extension of the Spurdog Bycatch Management Programme to the southern North Sea would not be appropriate [9].

### IRISH WATERS

In 2017, Ireland submitted a proposal to the European Commission for a spurdog bycatch avoidance programme for Irish trawl and netting vessels, to be assessed by the European Union’s Scientific, Technical and Economic Committee for Fisheries (STECF). STECF concluded that, amongst other things, “to improve the chances of meeting its objectives, further details are needed before the programme is initiated”. To date, no such programme is underway in Ireland [10].

## POSSIBLE NEXT STEPS

### **Increase the number of vessels to increase spatial coverage within annual quota limits.**

The potential to gather better data on stock status and distribution has not yet been fully realised. This is due to the limited number of vessels included in the programme to date, relative to the wider commercial fleet. As of April 2021, authorisation has been given to increase vessel participation across the CFPO commercial fleet to a maximum of 12 vessels. The CFPO has identified appropriate vessels to ensure that all retained dead spurdog remain within annual quota limits. Skippers have formally agreed to all programme requirements, including accurate and timely reporting of bycatch of spurdog, porbeagle and common skate through the new Clean Catch UK App, retention of only dead spurdog within set limits, and granting access to fisheries observers on board.

Increased vessel participation will afford improved spatial coverage across South-west fishing grounds.

Mortality in the stock will remain unchanged (only dead spurdog can be landed), meaning that expanding the programme to include more vessels should not impact on improving stock status.



### **Increase the flexibility of the monthly bycatch allowance to further reduce dead discards.**

The data collected by the programme demonstrates the seasonal nature of spurdog bycatch within the fishery. The current monthly limit of two tonnes of dead spurdog per vessel does not reflect the “real life” situation in the Celtic Sea, limiting the programme’s effectiveness.

To render the data as useful as possible, and ensure that the Bycatch Tool is used effectively, the seasonality of spurdog bycatch could be reflected in the dead bycatch quota.

Based on the data collected by the programme, the monthly limit of two tonnes of dead spurdog per vessel could be increased to up to five tonnes per vessel per month for gill netting vessels during the peak spurdog bycatch season, to further reduce wasteful dead spurdog discards. The UK annual dead spurdog bycatch quota would need to be increased in order to support this, but would need to remain within the limits advised by ICES.

### **The introduction of Electronic Monitoring and trained industry observers.**

Camera systems need to be introduced to a number of participating vessels in order to improve validation of skippers’ reported bycatch data. Dedicated industry workshops have also been scheduled to train fishermen as industry observers.

## POSSIBLE NEXT STEPS

### **Reporting bycatch of sensitive marine wildlife.**

As well as daily reporting of spurdog bycatch, skippers will be encouraged to record bycatch of wildlife such as sharks, skates and rays, marine mammals and seabirds via the Clean Catch UK App.

### **Reduce the delay between reporting and the provision of advice.**

The tools for skippers to submit and receive information on spurdog bycatch are being improved and updated to include the new Clean Catch UK App, with a view to providing real-time reporting and visualisation of bycatch data.

### **All dead spurdog should be retained until the monthly limit is reached.**

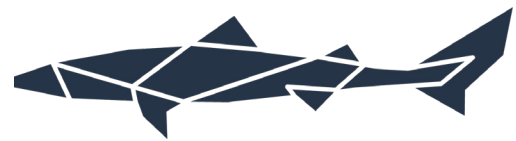
This would avoid the 'high grading' of dead spurdog (see page 18).

### **Increase the frequency of reporting across the year.**

All participating skippers must submit a daily report of spurdog bycatch, even when bycatch is zero.

### **Consider skippers' areas for improvement.**

The programme will work with skippers to consider how their suggested areas for improvement on the programme (see page 18) could be delivered.





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## Project partners



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