

Disentangling a whale of a problem: Bottom-up approaches to entanglement mitigation in Scottish waters

Ellie MacLennan

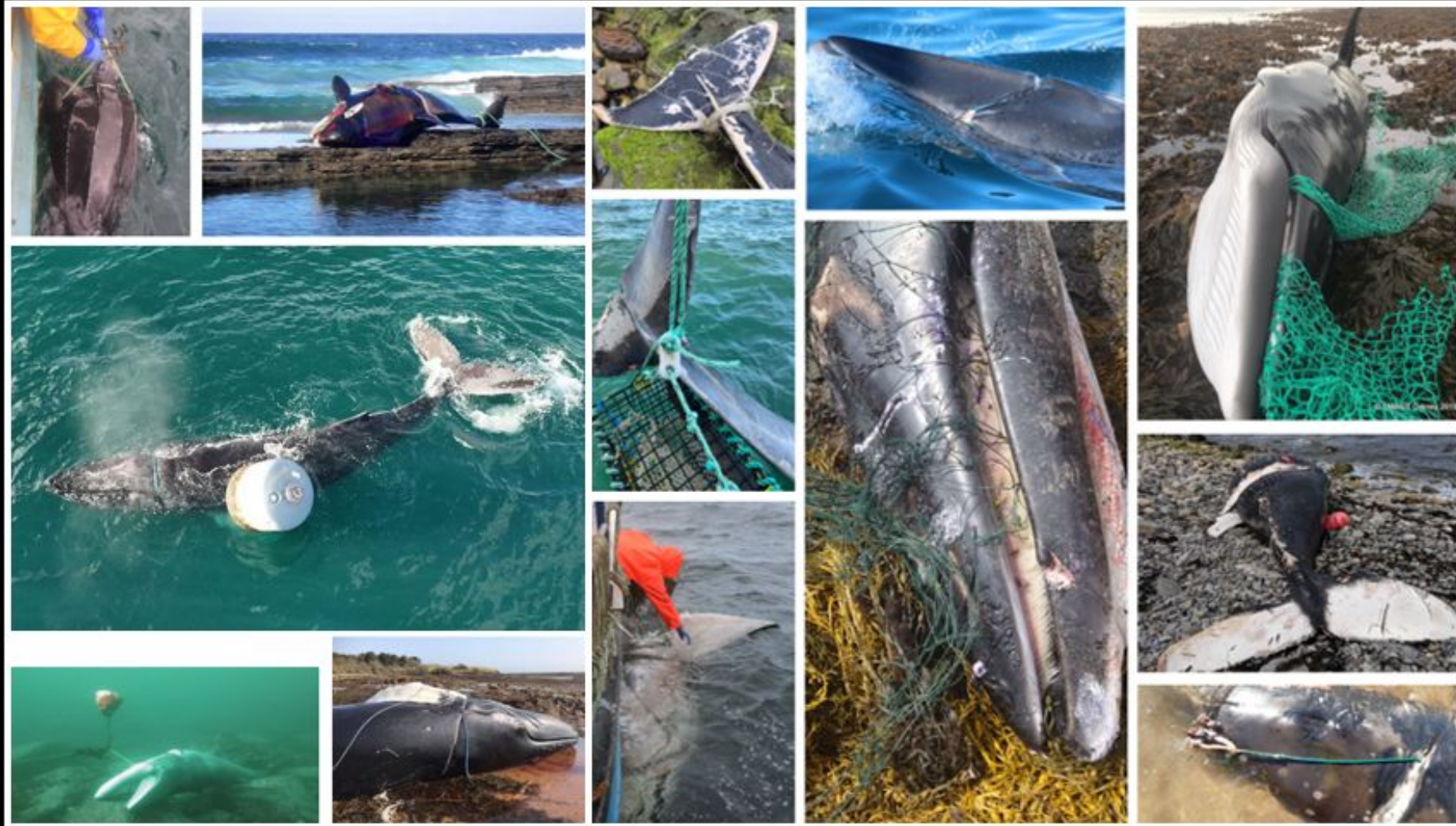
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WARNING:
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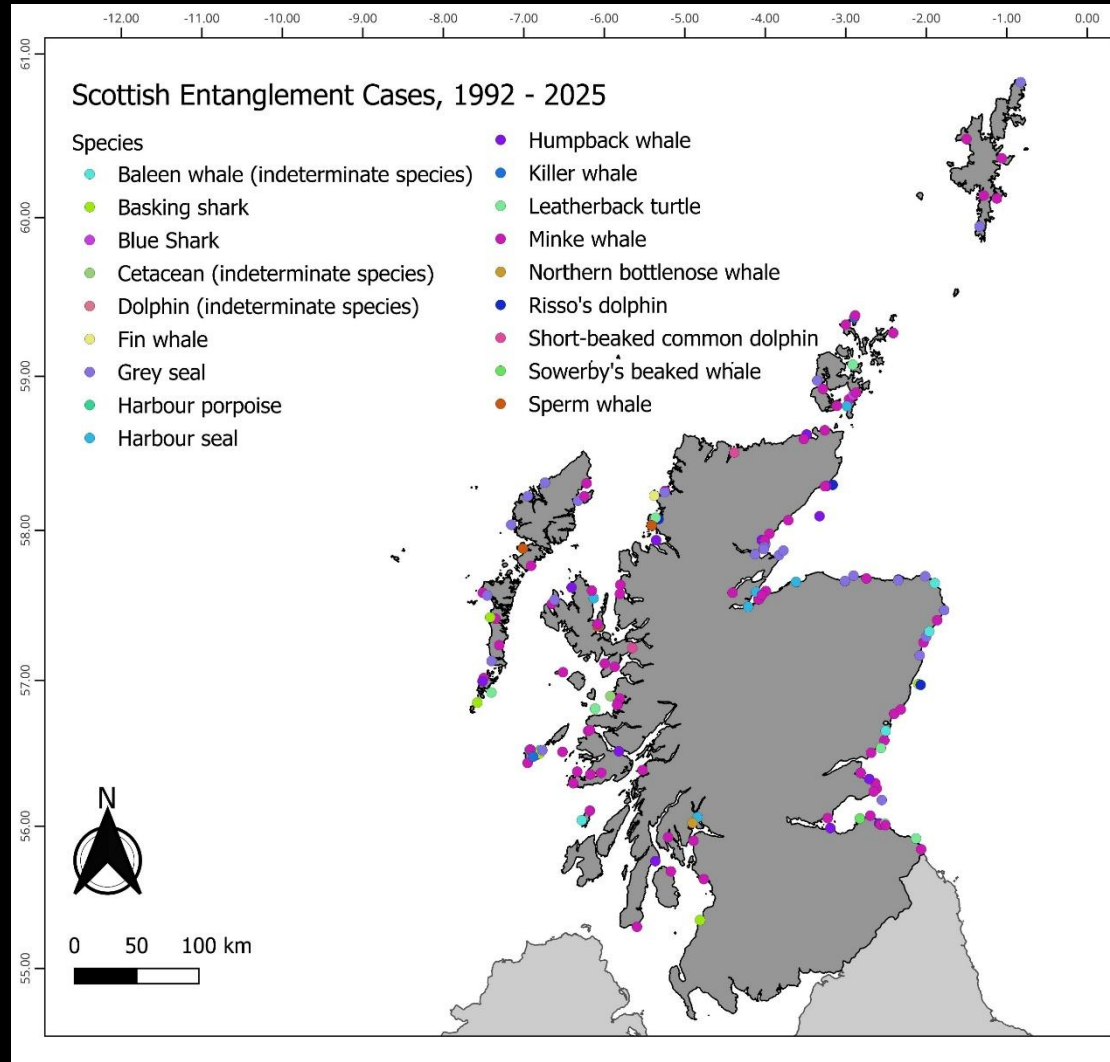


Entanglement – *‘the unintentional capture or restraint of marine animals in materials of anthropogenic origin, typically rope, line or netting which become wrapped around the head, body and/or fins. This includes cases where animals are anchored by the entangling gear or are towing this’.*

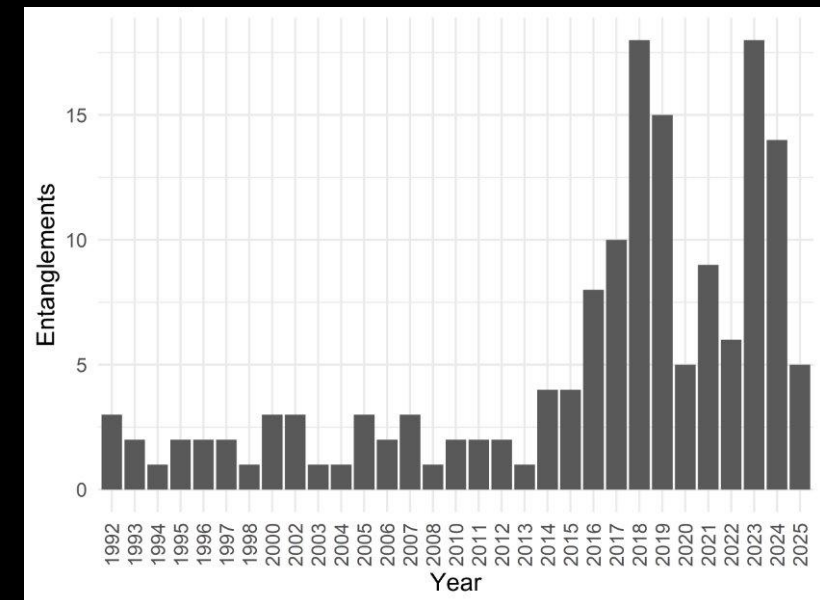




The problem in Scotland?



- At least 19 species of cetacean, seal, shark and turtle known to have been entangled
- Largest identified cause of non-natural mortality in baleen whales
- Only recorded non-natural cause of mortality in basking sharks and turtles





The problem in Scotland?

- Incidence and severity appear to be increasing
- 112 recorded cetacean entanglements since 1992
- Half occurred in the last six years
- Majority are Baleen whales (84%)



Image credit: Anthony Rigell



Image credit: Anthony Rigell



Image credit: Norman Gillies



SCOTTISH ENTANGLEMENT ALLIANCE

Aim - To bring together the combined expertise of Scottish fishermen and partner organisations to provide a co-ordinated, comprehensive monitoring and engagement programme to better understand the scale and impact of marine animal entanglements in Scottish waters, and to develop practical industry-led solutions to reduce this risk.



Fisher interviews, Scotland-wide 2018-2019



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ENDANGERED SPECIES RESEARCH
Endang Species Res

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Estimates of humpback and minke whale entanglements in the Scottish static pot (creel) fishery

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“Considerably more whale entanglements occur in the Scottish creel fishery than previously thought based on strandings alone, with estimates of 6 humpback whales and 30 minke whales becoming entangled each year”.

to engage in entanglement mitigation, with suggestions such as the introduction of sinking groundline to the sector, and these options should be urgently pursued.

KEY WORDS: Minke whale · Humpback whale · Entanglement · Bycatch · Creel fishery · Scotland

1. INTRODUCTION

Whale entanglement in static pot/trap fishing gear has been identified globally as a major cause of large whale mortality (Hamilton & Baker 2019). It has been

documented in areas such as western Australia (humpback whales *Megaptera novaeangliae*, How et al. 2021), the Republic of Korea (minke whales *Balaenoptera acutorostrata*, Song et al. 2010) and the northeastern USA (North Atlantic right whales

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Species	Alive	Dead	Total
Minke whale	8	43	51
Basking shark	10	39	49
Humpback whale	8	3	11
LB turtle	6	4	10
Harbour porpoise	0	6	6
Pilot whale	3	1	4
Unidentified dolphin	3	1	4
Porbeagle shark	0	3	3
Risso's dolphin	2	1	3
Orca	2	0	2
Fin whale	0	1	1
Sei whale	1	0	1
White-sided dolphin	0	1	1
			146

GOOD PRACTISE GUIDE for reporting and disentangling large marine animals caught in creel gear



Encountering an entanglement

Marine animal entanglements can have significant impacts to both the animals and fishermen involved. Documentation is key to prevention and so it is important that every incident is reported.

If you encounter an animal entangled in your fishing gear please report this, even if the animal is dead. This information not only improves our understanding of entanglements, but valuable data can be obtained from each incident about the health of both the species involved and the wider marine environment.

By working together with fishermen our aim is to identify ways to reduce entanglements with-out threatening livelihoods.

Any information you choose to share will be treated sensitively, positively and confidentially.

TO REPORT AN ENTANGLED ANIMAL OR FOR ADVICE AND ASSISTANCE
PLEASE CALL THE
SCOTTISH ENTANGLEMENT ALLIANCE (SEA)
PARTNERS ON:
01463 243030
OR CONTACT HM COASTGUARD ON:
VHF CH. 16

What will happen when you report an entanglement?

You will be asked for details including:

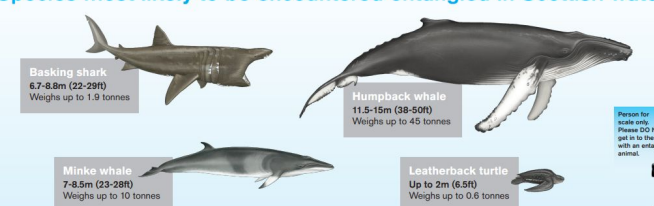
- Date and time found.
- Location.
- Description of the animal and if it's alive or dead.
- Description of the entanglement configuration.
- Photos and/or video of the incident.
- If you require any assistance.

Disentangling an animal

We strongly advise against attempting to disentangle a live animal yourself without first seeking advice. However if you choose to do so please consider the following key points:

- Your safety and that of your crew and boat is paramount. Help is available.
- DO NOT get into the water. These are wild animals and can be very dangerous and unpredictable.
- DO NOT approach the animal from behind or head on, and keep noise to a minimum to prevent any further distress.
- Assess the entanglement and identify where and how the animal is caught e.g. around the tail and/or fins, through the mouth etc., before cutting any gear.
- Disentangle from head to tail, cutting away from the animal.

Species most likely to be encountered entangled in Scottish waters



Common misconceptions:

- The animal is in immediate danger. If it can reach the surface to breathe, a whale can survive days, even weeks entangled.
- Cutting as much as possible is better than nothing. Entanglements can have lasting impacts on an animal's ability to swim, feed and reproduce, and a single line left on the animal can still lead to death.
- Whales are gentle giants. Whales are unpredictable wild animals and you should assume that they do not know that you are there to help.

Useful kit to have on board:

Sharp knife, grapple, spare buoys, rope and weights; binoculars; camera; mask.

TO REPORT AN ENTANGLED ANIMAL OR FOR ADVICE AND ASSISTANCE
PLEASE CALL THE SCOTTISH ENTANGLEMENT ALLIANCE (SEA) PARTNERS ON: 01463 243030 OR CONTACT HM COASTGUARD ON: VHF CH. 16

“Having experienced an entanglement myself I never ever want to see that again. I can honestly say it was the worst day of my fishing career. If I need to compromise or make changes to how I fish to ensure that it doesn't happen again, then I'd happily do it”.

www.scottishentanglement.org

Disentanglement training, Ullapool 2019



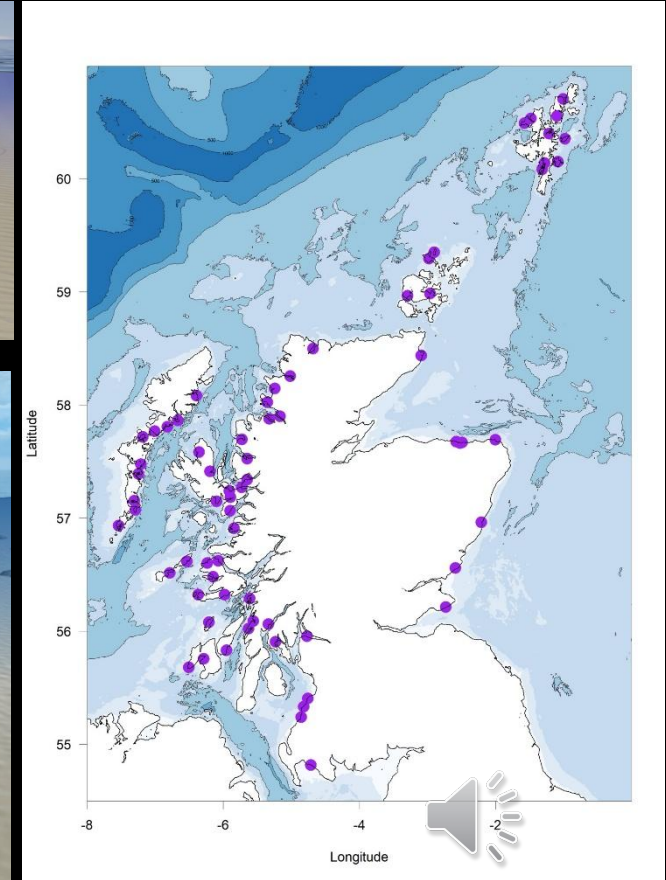
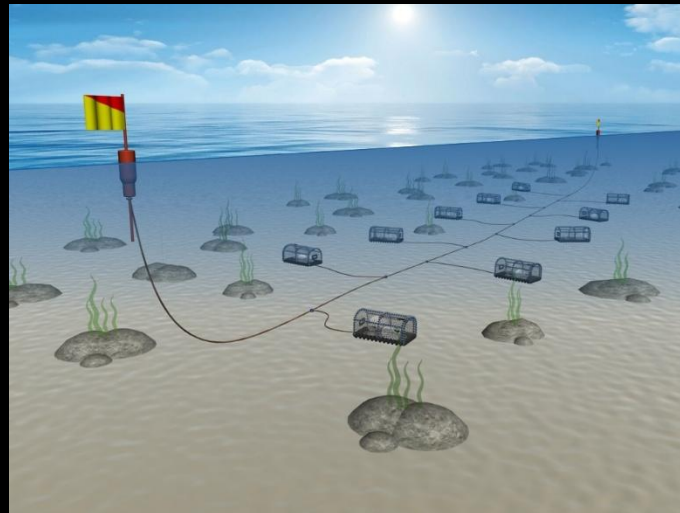
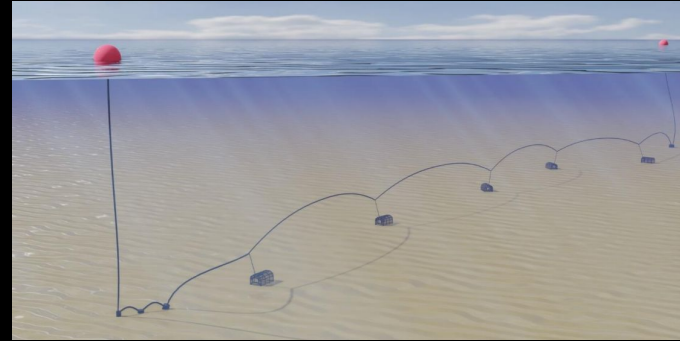
20 fishermen attended, four have since successfully disentangled whales.





Negatively buoyant rope trials, 2022 -

- A transition to negatively buoyant rope could reduce entanglement risk by 83% for minke, 76% for basking sharks, and 50% for humpbacks.
- Evidence-based, industry-led.
- Low cost, low tech.
- Directly reduces risk without requiring major changes to fishing practices.
- 120 vessels currently trialling negatively buoyant rope.





Negatively buoyant rope trials, 2022 -

Recommendations for the implementation of negatively buoyant groundline in Scottish creel fisheries



Scottish Entanglement Alliance, 2026



www.scottishentanglement.org

ENTANGLEMENT

Sinking rope: a win-win for cetaceans and fishermen?

A creel fisherman may experience the entanglement of a cetacean, basking shark or turtle once in their career, if at all – but the overall impact on cetacean populations can still be significant. To reduce the figures, the fishermen-led Scottish Entanglement Alliance is exploring the introduction of sinking groundline in the fishery



WORK BY THE Scottish Entanglement Alliance (SEA), a collaborative partnership of fishing, science and NGO groups, has shown that most of the whales and basking sharks that become entangled in creel ropes are caught in the groundline. But is this a problem with a win-win solution?

By SUSIE CALDERAN
Scottish Entanglement Alliance

Nature Restoration Fund (managed by NatureScot) and led by Whale and Dolphin Conservation, and has just published its report. The project's aim was to work with fishermen to assess if sinking rope was practical to use in ground and crab fleets, looking at possible issues such as fasteners, abrasion, handling, weight and the rope picking up mud.

The feedback from the skipper of the 15 creel boats working out of the North West Highlands and the Isle of Skye who used the rope was very positive, with few experiencing any problems during the year and a half that the project ran, over 1000 boats through the trial. Rates of snagging or other

problems were judged to be no higher than with buoyant rope. Several fishermen preferred the rope, saying it sat better on deck and on the seabed.

Sinking line has been used elsewhere in the world to reduce whale entanglement in creels, pots and traps. On the US east coast, it has been one of a range of measures used in response to North Atlantic right whale entanglement. In South Africa, it was introduced to the octopus fishery to mitigate Bryde's whale entanglement and has worked well, with no further entanglements reported. In the



Left to right: Jarrod Styles, Susie Calderan and DL MacKinnon aboard the vessel Vahalla, one of the 15 vessels that took part in the trial.

Sinking line: a definition

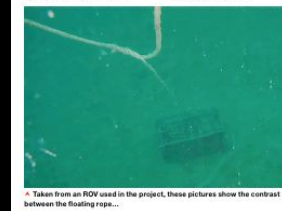
"We have been asked why we use the term 'sinking line' and not the more traditional leadline, used as ground ropes, for example, on gill-nets.

"The answer is that the ropes used in this trial are negatively buoyant – but not just. The rope sits very lightly on the seabed, and is much less dense than what traditionally would be called leadline, used as ground ropes, for example, on gill-nets.

"Sinking line does just that – it sinks."

US, the situation is much more complicated, and it has been more difficult to understand how effective each of the range of measures brought in have been. However, in trialling sinking rope in Scotland, we hope for a better future risk reduction and fewer implementation problems than in the US. This is for a number of reasons. Firstly, we have much clearer information on where in the gear entanglements are taking place (80% of basking sharks and minke whales, and 90% of humpback whales, become entangled in groundline). Secondly, engagement with fishermen in the US is often problematic, whereas this project was planned from the start to take a bottom-up, collaborative approach. Thirdly, the design and manufacture of sinking line has much improved since it was first implemented in the US. It is only slightly heavier than standard rope, and lies lightly on the seabed, with minimal movement or impact on the seabed.

To assess the performance and behaviour of the rope in the water, the project also deployed depth sensors (accelerometers and current meters) and carried out remotely operated vehicle (ROV) filming on a range of rope configurations on both crab-fleets and ground creels. The arches formed by floating rope had an average maximum height of 5.7m off the seabed, with no significant difference between self-short or hand-short gear.



Taken from an ROV used in the project, these pictures show the contrast between the floating rope...

... and the sinking rope when in the water. The floating rope was measured to have an average maximum loop height of over 5m off the seabed, whilst the sinking rope – not as heavy as earlier leadline rope – lay lightly on the seabed, without mudding up or affecting any seabed life.



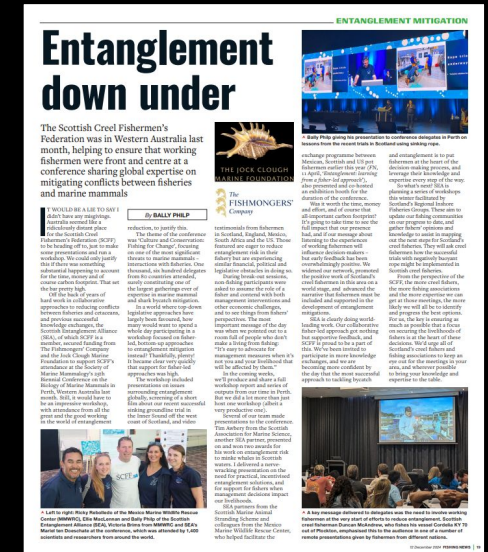
Knowledge exchanges

Promoting fisher-led approaches to entanglement mitigation

Mexico and California:



Australia:



Disentanglement training, Kyleakin 2026



30 Fishermen, aquaculture staff, RNLI crew, researchers and volunteer rescuers attended



In conclusion....

“Conservation, ultimately, is a social process rooted in peoples’ choices. It has consequences not only for species and ecosystems, but also for people and their livelihoods. We need to understand those consequences if we’re going to find solutions that are effective, lasting, and equitable”

Mary Kate McCoy



Disentangling a whale of a problem:

Bottom-up approaches to entanglement mitigation in Scottish waters

Thank you

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