SCOTTISH ENTANGLEMENT ALLIANCE









Project Summary

UNDERSTANDING THE SCALE AND IMPACTS OF MARINE ANIMAL ENTANGLEMENT IN THE SCOTTISH CREEL FISHERY

EUROPEAN UNION
EUROPEAN MARITIME AND FISHERIES FUND
Investing in Sustainable Fisheries

Scottish Government
Riaghaltas na h-Alba
gov.scot

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Project Summary

This project sought to assess the extent, scale and impact of marine animal entanglements in creel fishing gear from an animal welfare, conservation and industry perspective and has demonstrated that throughout Scottish waters marine animal entanglement is more prevalent, and impacts a wider range of species, than previously thought.

Entanglement can have devastating lethal and non-lethal impacts on individual animal welfare, and potentially raises conservation concerns due to impacts at a population level.

The economic impact of entanglement as a result of lost time or gear is seen as negligible, however industry led interest in finding workable solutions to reduce entanglement risk is evident.

Moving forward, continued engagement with fishers to identify technically, logistically and economically workable mitigation strategies will be vital.

Entanglements occur in the ropes between the pots and the ropes to the sea surface and technical solutions are required for both.

PROJECT FINDINGS

- Marine animal entanglements are increasing in Scottish waters, affecting a wide range of marine mammal, shark and turtle species.
- From post-mortem records, entanglement accounts for almost half of all diagnosed causes of death in minke and humpback whales examined, and almost all those for basking shark and leatherback turtles.
- There appears to be a significant under-reporting of entanglement incidents, with over 95% thought to be going unreported.
- Most entanglements occur in rope consistent with creel fishing however cases involving trawl netting, marine debris and monofilament line have also been documented.
- 159 Scottish commercial creel fishers participated in interviews about their experiences of marine animal entanglement within a 10-year period. Almost half had experienced at least one entanglement, with 146 incidents involving at least 12 different species reported in total.
- Assessment of photographic records of 256 minke whales off the west coast of Scotland showed that 22.3% had entanglement related marks.
- The creel industry have actively and positively engaged in this project, and fishers have suggested a variety of possible mitigation measures that they would be willing to trial.

* Mitigation measures trialed in other studies include weighted lines and ‘ropeless’ gears.

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.

Background

Entanglement of marine wildlife is a global issue that has conservation, welfare, economic and human safety implications. It is estimated that hundreds of thousands of cetaceans (whales, dolphins and porpoises), sharks and turtles die each year as a result of interactions with fishing gear, which can have devastating welfare and conservation impacts. These events can also be distressing and potentially dangerous for those discovering them, particularly when the animal is still alive, and may have a financial impact on individual fishers through lost fishing time, and damage or loss of fishing gear and any associated catch.

Around Scotland, a diverse array of marine animals including cetaceans, basking sharks and turtles inhabit the inshore waters, which also provide valuable fishing grounds for static and mobile fishers. The Scottish fishing industry makes a significant contribution to the national economy and forms the social and cultural backbone of many coastal communities. However, with thousands of miles of rope and netting associated with these fisheries deployed in the water at any given time, the incidence, rate and range of species impacted by entanglement has been increasing in recent years.

SCOTTISH ENTANGLEMENT ALLIANCE (SEA) AIMS

The Scottish Entanglement Alliance (SEA) is a partnership between six organisations dedicated to promoting and protecting Scotland’s wildlife, natural heritage and sustainable creel fishery. Initiated following an industry-led request for help with, and willingness to engage in, work to address large marine animal entanglements, SEA partners aimed to engage directly with the inshore creel fleet to:

- Raise awareness of entanglements amongst fishers and other marine users;
- Improve reporting rates of marine animal entanglements;
- Provide opportunities for fishers to become involved in entanglement research and disentanglement efforts; and
- Assess the socio-economic, welfare and conservation impacts of entanglements.

PROJECT PARTNERS

SCFF Scottish Creel Fishermen’s Federation

Scottish Natural Heritage
Dualchas Nàdair na h-Alba
nature.scot

Scottish Marine Animal Stranding Scheme

WDC Whale and Dolphin Conservation

Hebridean Whale & Dolphin Trust

British Divers Marine Life Rescue

Project Outcomes

1.

DISTRIBUTION, TRENDS AND WELFARE IMPACTS OF MARINE ANIMAL ENTANGLEMENTS

This project investigated several aspects of large animal entanglement, including assessing the economic and social cost to fishers alongside the welfare and conservation impact on marine wildlife.

A review of the distribution of marine animal entanglements reported to the Scottish Marine Animal Stranding Scheme (SMASS) demonstrates entanglements occur all around the Scottish coast (Figure 1.).

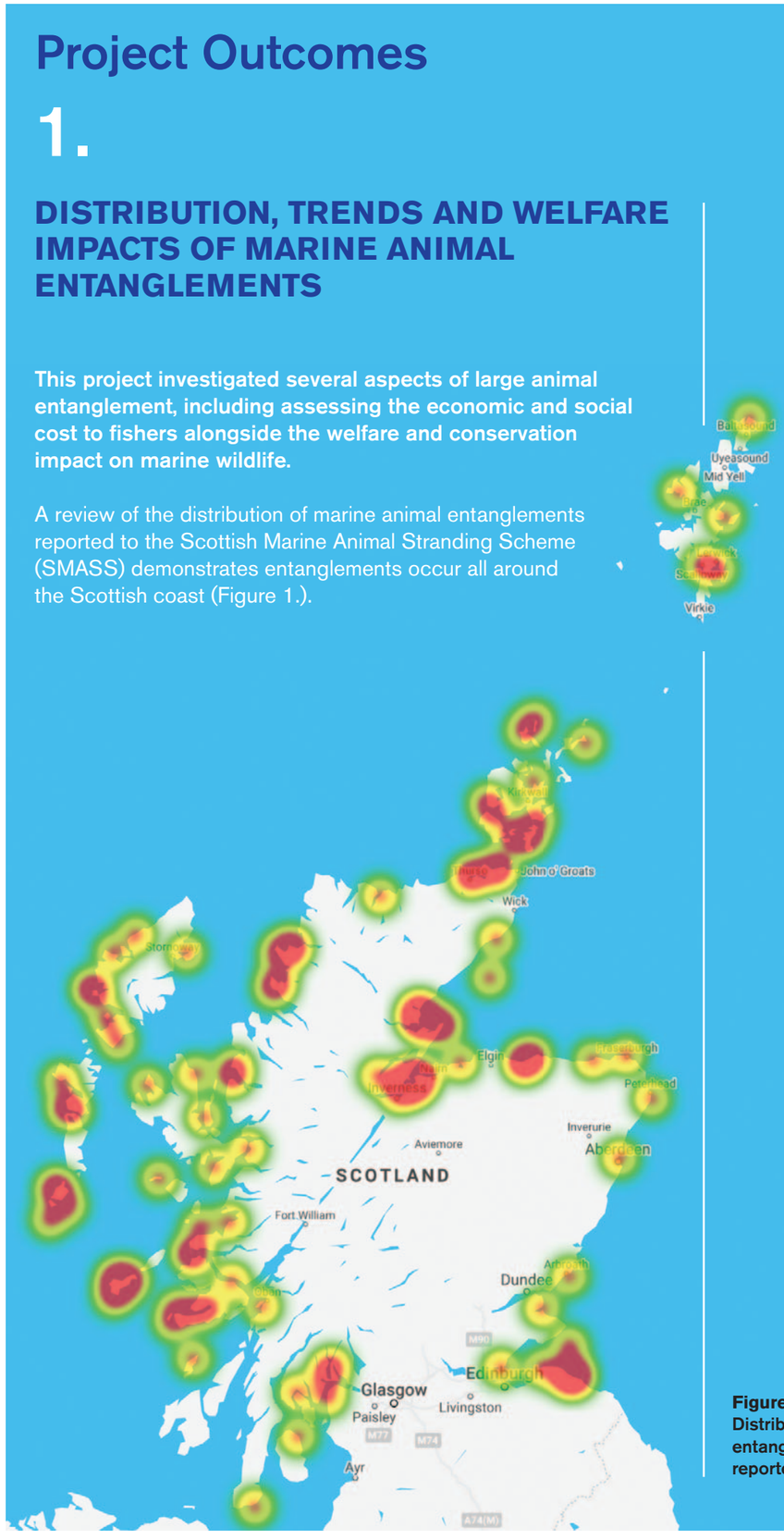


Figure 1:
Distribution of marine animal entanglements based on reported cases 1990-2020

The number of entanglement cases reported has been steadily increasing over the past decade.

However, there still appears to be a significant under-reporting of incidents.

Examination of entanglement cases reported in the past five years showed over 80% had been entangled in rope consistent with creel fishing.

It was not possible to assess if this was active or lost creel gear, and cases involving trawl netting, marine debris and monofilament line were also documented.

Minke whales are the most commonly reported entangled animal. From post-mortem records entanglement accounts for almost half of all diagnosed causes of death in minke and humpback whales and almost all those for basking shark and leatherback turtle.

While the full extent and incidence of entanglement events in Scottish waters remains uncertain, it may be sufficient to impact some species at a population level, which would raise a conservation concern.

Entanglement of marine animals in Scottish waters is also a severe welfare problem. Around 30% of examined cases carried severe injuries as a result of being entangled for weeks or months. These animals were in poor condition, had likely struggled to feed and swim resulting in significant long-term suffering.

Photos, left to right:
A humpback whale entangled in a creel endline in Orkney, successfully released by local fishers and BDMLR in 2018;
A minke whale entangled in a section of trawl netting in Orkney in 2018;
A leatherback turtle successfully released alive by fishermen off Skye in 2015.

2.

CAPTURING FISHERMEN'S KNOWLEDGE

"Working throughout the world on this issue of large whale entanglement, it's clear from all the experts that what you need to do is find champions in the fisheries. And it is clear here that the Scottish Entanglement Alliance has found some real champions in the Scottish creel sector."
David Mattila, co-ordinator of the Global Whale Entanglement Response Network

Interviews with 159 creel Fishermen (representing approximately 11% of the commercial fleet) revealed almost half had experienced at least one entanglement between 2008 - 2018.

146 entanglements were reported via interviews, involving at least 12 species of cetacean, shark and turtle.

Minke whales and basking sharks were the most commonly reported species, and most frequently entangled in groundlines, but incidents involving humpback whales, killer whales and harbour porpoises were also recorded.

Factors which appeared to be influential in entanglement risk were fishing depth, gear length, hauling frequency and target species.

Over 80% of fishers interviewed suggested measures they felt might reduce the risk of entanglement, and nearly 75% expressed willingness to test various mitigation measures.

Over 65% expressed interest in training to report entangled animals and/or disentangle them.

In response to requests for training in safe disentanglement practice, SEA delivered Europe's first disentanglement training workshop for over 20 fishers, in association with the International Whaling Commission's (IWC) Global Whale Entanglement Response Network.

The creel industry actively and positively engaged in this project, and support exists within the sector for further research into entanglement risks and possible mitigation measures. These include:

- assessing the behaviour of floating groundline near the seabed; the feasibility, costs and other implications associated with a move toward negatively buoyant ropes where safe and practical;
- trialling and refining technological advances in alternative fishing methods, for example on-call or 'ropeless' systems;
- developing clear and enforceable creel density limits at regional and local levels;
- continuing a programme of disentanglement training events specifically for fishers; and
- inviting other fishing sectors that may also pose a bycatch and/or entanglement risk to participate in future work.

Photo:
Fishers taking part in a disentanglement training course in Ullapool 2019, in association with the IWC Global Whale Entanglement Response Network.

QUOTES FROM INTERVIEWED FISHERS

"Compared to other issues in the marine environment I don't think entanglement is up there, but why not give solving this a go, it seems pretty achievable."

"All creel fishing is not the same and how to set gear changes with where its fished. So you're not looking for one solution, you're looking for several."

"The industry needs better regulated. It's a bit of a wild west out there, not just with creels but the mobile sector too especially the nomadic boats and Marine Scotland just don't have the capacity to police it. I don't know how folk would feel about new rules solely to reduce entanglements, a lot of guys have never seen it, but if the mobile and static sectors can either be separated or communicate a bit better, and some controls brought in on the amount of gear vessels can work, you'd by default probably solve your entanglement concerns so it would be a win-win. This would of course have to be policed though."

"The best conservationists are the fishermen themselves….I think you'd be surprised at all the good, un-noticed work fishermen are already doing to protect their water, its in our interests after all to have clean productive waters."

"Having experienced an entanglement myself, I never ever want to see that again. I can honestly say is 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."

"The quickest, easiest solution and probably least likely to attract too many objections is to cap creel numbers. The ground is saturated, I'm not surprised to hear how many animals are getting entangled."

"I don't often agree with or support a lot of this research but I appreciate this work and I like how you're doing it, it's nice to be asked for our opinion for once."

"I've seen numerous entanglements in different gears over the years and had a couple myself. I can assure you there's a lot more of it going on that you think."

3.

THE COST OF ENTANGLEMENT

In terms of the financial cost of entanglements to fishers, 27% of those interviewed had experienced gear loss and damage as a result of an entanglement. The average loss of income per event was estimated at nearly £240, with the highest loss of income due to a single entanglement event reported as £2000

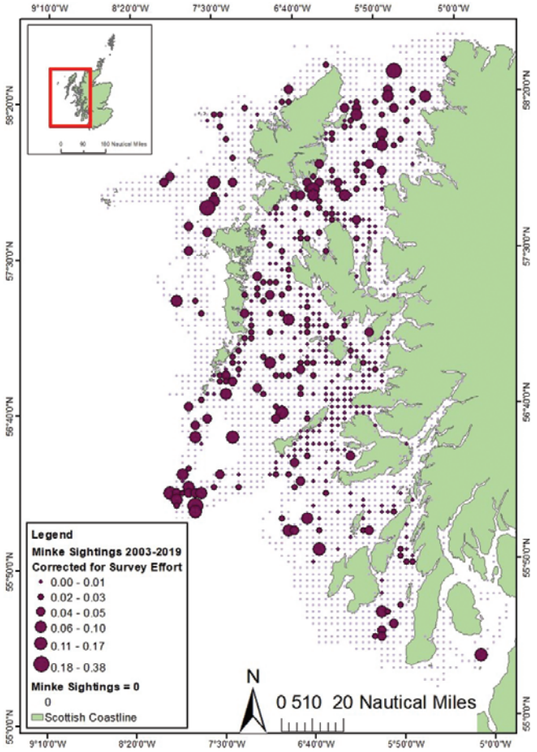
The total cost to the Scottish creel sector over a 10-year period was estimated at over £755,000. However this is considered a conservative estimate, and animal welfare was voiced a much greater concern for fishers than any financial costs resulting from entanglement.

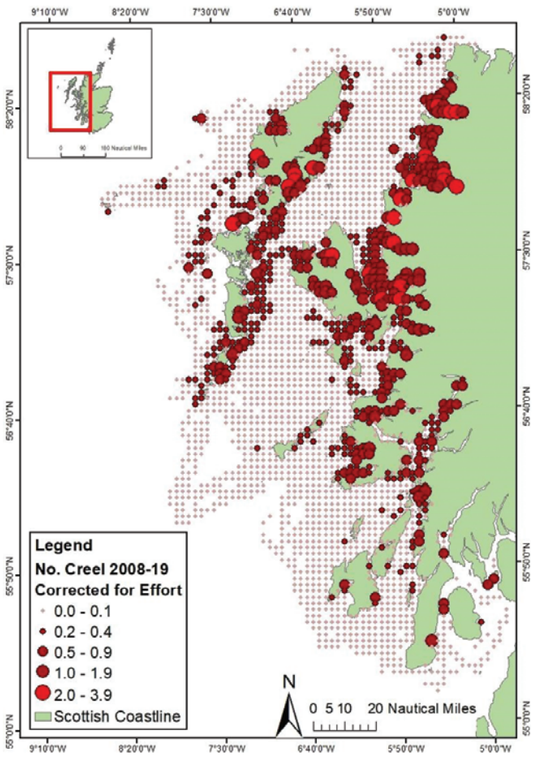
4.

ASSESSING THE SPATIAL DISTRIBUTION OF ENTANGLEMENT RISK TO MINKE WHALES OFF THE WEST COAST OF SCOTLAND

The distribution and density of minke whale sightings and the density of vertical creel lines recorded off the west coast of Scotland during surveys conducted by the Hebridean Whale and Dolphin Trust (HWDT) were combined and analysed to identify the areas of greatest overlap.

Creels were widespread throughout inshore waters off the west coast of Scotland. Areas of greatest co-occurrence of creels and whales, and therefore where interactions between the two that may result in an entanglement were considered most likely included to the east of the Outer Isles, coastal waters around Skye and Raasay, and around the Small Isles.





Top Figure:
Minke whale sighting rates 2003 to 2019.
Only cells where the total visual survey effort conducted in sea state ≤3 was greater than 10 km were included.

Bottom Figure:
Creel sighting rates 2008-2019.
Only cells where the total visual survey effort conducted in sea state ≤3 was greater than 10 km were included.

5.

ASSESSING THE EXTENT OF NON-LETHAL ENTANGLEMENT OFF THE WEST COAST OF SCOTLAND

The injuries caused by entanglement in fishing gear (e.g. line, netting, rope or other materials) are distinct, and scars and/or tissue damage remain visible long after the event.

This makes it possible to examine live individuals in the population for evidence of previous entanglement to provide an assessment of the frequency of these types of non-lethal interactions.

Photographic records for 256 individual minke whales recorded off the west coast of Scotland between 1990 and 2017 were assessed for scarring from interaction with ropes, strapping and other gear associated with fishing.

In total, 22.3% (n = 57) of the individuals assessed had entanglement related marks. The types of marks varied from those that had extensive tissue damage or deformation associated with entanglement to less severe linear scars or wounds that wrapped around parts of the body, indicating they may have previously been entangled.

Some cases showed evidence that they had been entangled in ropes or line, whereas others had been ensnared by straps associated with fish packing.

Photo:
Minke whale (BW30 taken on 10/07/2010) with fish packing strap embedded round the upper rostrum. © HWDT.org.

6.

CONCLUSIONS AND RECOMMENDATIONS

The findings of this research have demonstrated that measures are required to reduce entanglements. Throughout all Scottish waters marine animal entanglement is more prevalent, and impacts a wider range of species than previously thought.

There is however a significant drive to address the issue from the creel fishing industry and therefore opportunity to develop practical and sustainable solutions to this problem that are sensitive to the needs of both the creeling communities and species impacted.

ANIMAL WELFARE AND CONSERVATION

- Expanding and developing the range and detail in the data collected from future entanglement cases is needed to better quantify the prevalence and range of entanglement incidents, the mechanisms by which animals become entangled, and assess the impact of these events on animal welfare and conservation.

ENTANGLEMENT REPORTING

- Current monitoring and reporting mechanisms are insufficient to assess the true rate of entanglements in Scottish waters. Improved reporting systems and support for fishers to report and respond to both live and dead entanglements are required. This is essential to protect both fishers and animals.

ASSESSING ENTANGLEMENT RISK

- Robust risk maps that account for the distribution, behaviour and movements of animals and fishing gear are required to provide a better understanding of the spatial and temporal distribution of entanglement risk to inform and assess the efficacy of any proposed mitigation measures.
- Effort should continue to expand the photographic coverage of individual animals to allow assessments of entanglement-related scars. Using these data alongside data on mortalities will provide better estimates of the effects of entanglement on minke whale mortality rates.

FUTURE MANAGEMENT

- Entanglement has important implications for the conservation of marine animals in Scotland and should be considered in future management measures, including of MPAs and the fishing industry.
- Any future management measures will require careful consideration and consultation with all stakeholders to ensure these are practical, proportional, and effective. Any future prevention and mitigation methods will only be successful with support from the fishing industry.
- While this project focussed on entanglement in gears associated with the creel sector, incidents involving trawl and monofilament netting have also been observed. The project should be extended to include other fishing sectors such as trawls, purse-seines and static nets.

ACKNOWLEDGEMENTS

The project partners would like to thank every fisher who gave up their time to contribute to the project, without which this work would not have been possible. We would also like to acknowledge the support of the European Maritime and Fisheries Fund, Marine Scotland and NatureScot.

MORE INFORMATION

For more details on this project and to read the full project report please visit **www.scottishentanglement.org**

GET IN TOUCH

Tel: **07746 634757**
Email: **entanglement@strandings.org**

USEFUL LINKS

Scottish Entanglement Alliance (SEA) resources – including full project report, best practise guidance, and wheelhouse guide for creel fishers
https://www.scottishentanglement.org/downloads/

International Whaling Commission (IWC) entanglement response
https://iwc.int/entanglement-response-network

British Divers Marine Life Rescue (BDMLR)
https://bdmlr.org.uk/about-bdmlr

Scottish Creel Fishermen's Federation (SCFF)
http://www.scottishcreelfishermensfederation.co.uk/

Lyme Bay pot fishing trials
https://www.lymebayreserve.co.uk/science/potting-study.php

Fishing for Litter campaign
https://www.fishingforlitter.org.uk/

Hebridean Whale and Dolphin Trust (HWDT) Whale Track
https://whaletrack.hwdt.org/

Whale and Dolphin Conservation (WDC) Goodbye Bycatch campaign
https://uk.whales.org/our-4-goals/prevent-deaths-in-nets/goodbye-bycatch-what-you-need-to-know/

Scottish Marine Animal Stranding Scheme (SMASS) -
https://strandings.org/

Clean Catch UK and the Bycatch Mitigation Hub
https://www.cleancatchuk.com/

SIFIDS project
https://www.masts.ac.uk/media/36526/brochure-hannah-details-sifids.pdf

What can fishers do to help reduce entanglement risk?

USE BEST PRACTISE

- Adjust your endlines to the depth you are fishing to minimise excess rope in the water column or at the surface.
- Use weights or negatively buoyant rope on your endlines to minimise floating or looping line in the water column or at the surface
- Where safe and practical, use negatively buoyant rope on groundlines to reduce looping at the seabed
- Use clear surface markers
- Haul and maintain your gear regularly
- Avoid wet storage or prolonged soak times
- Do not shoot gear when animals are visible in the area
- Bring ashore and dispose of any litter and derelict gear found at sea

REPORT ENTANGLEMENT INCIDENTS

It is clear from the data available that entanglement is a concern in Scottish waters, impacting a wide range of species and posing a risk to fishers. It is also clearly visible that while fishers are actively and positively engaged in addressing this issue, they are not reporting entanglement incidents. This is resulting in large gaps in our understanding of the true incidence and nature of interactions between fishing gear and large marine animals.

Without accurate information it will not be possible to ensure that any potential future mitigation measures are appropriate, proportional, and acceptable to fishers.

Please be assured that entanglement is not an offence, reporting these incidents will not incriminate you or your fishery, and this information will not be used in enforcement. Any information shared will be treated sensitively, positively, and confidentially.

Entanglements can be reported to the Scottish Entanglement Alliance (SEA) by calling or texting 07746 634757 or by emailing entanglement@strandings.org

SCOTTISH ENTANGLEMENT ALLIANCE

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 its alive or dead.
- Description of the entanglement configuration.
- Photos and/or video of the incident.
- If you require any assistance.

We can dispatch a trained disentanglement team to assist you if required, and may be able to put you in contact with other fishermen in your area who have undertaken specialised disentanglement training.

www.scottishentanglement.org