

Final Report

Protecting Humpback Whales

of the

Temperate East Marine Park

Phase 2: Enhancing fishing industry mitigation success along the humpback whale migration pathway

2024 Gear Trials and Action Plans



Australian Government



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1. Executive Summary

This report presents the outcomes of engaging Queensland, Tasmania, and New South Wales in the East Coast Whale Entanglement Mitigation Program to help identify potential opportunities to reduce humpback whale entanglement risk in Australian set-gear fisheries. Given the diversity of fishing operations across regions, no universal solution exists, necessitating vesselspecific approaches. Workshops, trial programs, and industry collaboration have helped identify strategies to mitigate entanglement while maintaining commercial viability.

Key Findings from each state include:

New South Wales

The NSW Ocean Trap and Line (OTL) fishery varies significantly between operations. Previous program participants indicated a need for vessel-specific whale safety management plans (SMPs). To address this, 30 active NSW OTL fishers received personalized whale SMPs aligned with the existing NSW Code of Practice. These plans provided tailored strategies, a checklist of entanglement mitigation measures each fishing operation employs during the humpback migration season, and quick-reference emergency protocols should they encounter an entangled whale.

Additionally, neutrally buoyant rope (NBR) trials were extended, with coils distributed to 10 NSW OTL fishers. While shipping delays prevented full testing during the 2024 whale migration season, early trials outside migration periods showed mixed results. Some fishers found NBR helpful in maintaining taut gear, but concerns emerged regarding rope durability and retrieval challenges. Further trials are scheduled to continue throughout the 2025 humpback migration season.

Queensland

A co-design workshop held in Brisbane gathered industry representatives, whale researchers, and government officials to evaluate risks in Queensland's spanner crab (SC), blue swimmer crab (BSC), and offshore gillnet (OG) fisheries. This led to the development of a Queensland Code of Practice for fishing during the humpback migration season.

Gear trials focused on negatively buoyant rope (NBR) and acoustic deterrents (pingers). While some fishers found NBR manageable for setting gear, hauling inefficiencies and wear concerns were reported, particularly in SC fisheries. Acoustic deterrents were tested primarily for ease of integration rather than effectiveness, with skepticism about their ability to deter whales, reinforcing the need for further research before industry-wide adoption.

Tasmania

Seafood Industry Tasmania facilitated a co-design workshop in March 2023, engaging industry bodies, fisheries managers, conservation authorities, and gear developers. The workshop assessed whale entanglement risks and explored best practices within the Southern Rock Lobster (SRL) fishery. A Tasmanian Code of Practice was developed for the SRL fishery.

Trials focused on acoustic release technology to reduce interactions with migrating whales. Sub Sea Sonics' acoustic release gear was tested in early 2025, integrating a submerged rope system with remote acoustic activation. Preliminary findings revealed significant operational challenges, including low catch rates, retrieval inefficiencies, and high costs. Given the low likelihood of whale entanglements in Tasmania, industry interest in mitigation technologies remains limited but will be reassessed annually.

Key Recommendations following gear trials and workshops include:

- Further Gear Trials and Research: Continue testing viable gear modifications, focusing on practical, low-cost solutions while refining the effectiveness of emerging technologies such as ropeless and rope-on-command fishing gear. Improve research on whale migration patterns and interactions with fishing gear.
- 2. Vessel-Specific Safety Management Plans and Industry Engagement: Expand the development of customized whale safety plans for Queensland and Tasmania while increasing fisher participation across NSW, Queensland, and Tasmania to identify and test effective solutions suited to diverse fishing operations.
- 3. Strengthened Collaboration & Public Communication: Foster stronger partnerships between fishers, government agencies, and conservation organizations. Develop a unified media strategy to ensure accurate representation of industry efforts during whale migration seasons and promote positive engagement with the public.
- 4. National Expansion of Best Practices: Extend outreach and Codes of Practice to other states facing similar entanglement challenges, such as South Australia, Victoria, and Western Australia, ensuring broad industry-wide adoption of effective mitigation strategies.

Conclusion

This report underscores the importance of adaptive solutions that promote coexistence between Australia's fishing industry and the healthy migrating humpback whale population. By continuing research, refining gear modification trials, and fostering industry collaboration and trust, the program can effectively help enhance entanglement mitigation efforts while supporting sustainable fishing practices.

2. Background

As whale populations in the southern hemisphere recover from past commercial whaling, there has been increasing community interest and economic activity associated with observing whale migrations, accompanied with a heightened community awareness of broader animal welfare issues. Concurrently, there has been an increase in media reports and community concern relating to whale entanglements in fishing gear.

Whale entanglements are complex and often dangerous incidents to respond to. Due to the size of whales, disentanglement operations require staff to have specialist training and skills. While disentanglement provides a means for dealing with incidents as they arise, the optimum solution to the problem involves reducing the risk of entanglement.

Humpback whales (*Megaptera novaeangliae*) migrate along the Australian East Coast between March and November, with a high percentage of the population found between 1 and 5 nm of the coast. The exact timing of the migration period can change from year to year, and may be influenced by water-temperature, the extent of sea ice, predation risk, prey abundance, and location of feeding grounds¹. The migrating whales tend to follow a corridor, colloquially called the "Humpback Highway," and spend the majority of their migration in shallow coastal waters less than 50m deep².

The population of humpback whales that migrate along the Australian East Coast has risen from an estimated 2,000 to about 40,000 individuals from 1994 to present². The population has seen a steady annual increase of about 10% since the commercial whaling ban was implemented³³ and is expected to reach it's carrying capacity by 2030, with a peak population between 2021-2026³.

Humpback whales have unique wart-like protuberances (bumps or tubercles) that occur on the head forward of their blowhole and on the edges of their flippers.

Southern Right Whales (*Eubalaena australis*) are typically encountered along the southern east Australian coast between May to November, spending most of their time in waters less than 10m depth. Their migration may extend north to Forster or Port Macquarie, with most records of sightings occurring south of Sydney.

Although entanglement incidences involving Southern Right whales are rare, they are of conservation interest due to their low population level, estimated at less than 300 individuals in the South Eastern Australian population.

2.1. Whale Protection Measures

International

The Humpback whale is afforded a degree of international protection through listing:

- On Appendix I of the Convention of International Trade in Endangered Species (CITES)
- On Appendix II of the Convention on Migratory Species, and

¹ Humpback Whale Recovery Plan 2005-2010, DCCEEW

² NSW NPWS Scoping Workshop Presentation, ECWEMP – Final Report 31 Dec 2020

³ Noad et. al, 2019 'Boom to bust? Implications for the continued rapid growth of the eastern Australian humpback whale population despite recovery.' Population Ecology, 61, 198-209. Doi: 10.1002/1438-390X.1014

• As vulnerable under the World Conservation Union's Red List

Additionally, Australia participates in several other international agreements that directly or indirectly relate to the conservation of marine mammals.

Australia is also a founding member of the International Whaling Commission, is the host country of the Convention on the Conservation of Antarctic Marine Living Resources, and is a key player in Antarctic Treaty Consultative Meetings⁴.

National

All cetaceans (whales and dolphins) are protected in Australian waters through the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).

Humpback whales are listed as a Vulnerable species within the EPBC Act and NSW Biodiversity Conservation Act 2016.

Southern Right Whales are listed as an Endangered species within the Commonwealth EPBC Act and NSW Biodiversity Conservation Act 2016.

2.2. New South Wales Ocean Trap and Line Fishery

A comprehensive Fishery Management Strategy (FMS) has been prepared for the NSW OTL Fishery and was approved by the Minister for Primary Industries in November 2006. Prior to finalisation, the FMS was subjected to a wide-ranging Environmental Impact Assessment process under the NSW Environmental Planning and Assessment Act 1979.

There are six types of NSW Ocean Trap and Line (NSW OTL) endorsements, with the WEM being focussed on NSW OTL Demersal Fish Trap (DFT) and NSW OTL Spanner Crab (SC) fishing methods which utilise buoy lines and surface floats attached to set demersal fishing gear as an integral component of the fishing operation.

NSW DPI Fisheries management regulations used to require Demersal Fish trap (DFT) and Spanner Crab (SC) set fishing gear to be marked with a buoy of minimum 100 mm diameter at the surface. However as a result of previous gear trials through the East Coast Whale Entanglement Mitigation Program, since September 2023, DFT and SC set fishing gear can be indicated by a buoy that is held below the surface of the water using either a galvanic time release or programmable time release mechanism (DFT) or has a tag attached to a subsurface horizontal rope (SC).

Demersal Fish Trap

A DFT endorsement authorises the holder to take fish from ocean waters by means of a fish trap set on the sea bed. DFTs are permitted in all NSW waters excluding Marine Parks.

The DFT sector of the NSW OTL fishery is managed by input controls which limit the fishing capacity of fishers, thereby indirectly controlling the amount of fish caught. These controls include restrictions on the number of endorsements, number of traps, design and dimensions of traps and the waters that may be worked.

There are strong regional differences in catch and effort. Effort reported in the fishery has been steadily declining, with 75% of current effort reported by 24 fishers. On average approximately 40% of the total value of the fishery is landed between July and September each year.⁴ Since

⁴ NSW DPI Fisheries Scoping Workshop presentation, ECWEMP – Final Report 31 Dec 2020

1998, the DFT sector has shown an estimated decline in fishing effort by about 66%, measured by comparing trap lifts with total trap days during the winter season. ⁵This change in fishing effort indicates there are significantly fewer traps fishing now during the winter humpback whale migration season than there have been historically.

Many OTL DFT fishers have fishery shareholdings that permit them to work more traps than is practical or efficient for their business.

Spanner Crab

A NSW OTL Spanner Crab (SC) Northern Zone or Southern Zone endorsement authorises the holder to use a spanner crab net, commonly referred to as a dilly, to take spanner crabs from ocean waters.

The SC sector of the NSW OTL fishery operates from Hat Head to the NSW/Queensland border and is managed through a Total Allowable Catch and input restrictions.

SC fishers are restricted to operating a maximum of 40 dillies. Fishers generally operate with between 10 and 14 dillies attached to a demersal trot line that runs for over 1km.

Seasonal closures are in place to protect spawning females between 21st October and 20th January the following year, and males between 21st November and 20th December.

Recently there has been a large decline in fishing effort, measured by both days fished and gear lifts. Currently, there are less than 650 days fishing reported from less than 20 fishing businesses per annum. On average, over 40% of the total value of the fishery is landed between July and September each year.⁵

2.3. Queensland Spanner Crab Fishery

The Queensland Spanner Crab (SC) fishery is a well-managed fishery primarily concentrated in south-east Queensland waters south of Yeppoon. A QLD SC endorsement authorises the holder to use baited tangle nets (dillies) to take their quota of spanner crabs from Queensland ocean waters.

SC fishers are restricted to operating a maximum of 45 dillies with one person on board or 75 dillies with two people on board. Fishers generally operate with between 10 and 14 dillies attached to demersal trot line that can run for over 1km from depths between 30-80m.

The fishery operates under strict regulations, including quota limits, seasonal closures, and restrictions on harvesting egg-bearing females to ensure sustainability. Seasonal closures are in place to protect spawning females between 1st November and 15th December.

Commercial catch rates have declined over recent fishing seasons, with around 50 vessels operating in the QLD SC fishery. Much of this declined effort is based around areas of significance to humpback whales, including Hervey Bay and Moreton Bay.

The spanner crab fishery plays a significant role in Queensland's seafood industry, providing high-quality crab to both domestic and international markets.

⁵ Schilling et. al, 2023

2.4. Tasmania Southern Rock Lobster Fishery

The Tasmania Southern Rock Lobster (SRL) fishery is a highly regulated commercial and recreational fishery of high market value. SRL endorsement holders are authorised to use cane "beehive" circular pots to catch their quota of southern rock lobster.

There are two specified zones (Northern and Southern) SRL fishers are able to fish in, with different size limits that reflect variations in lobster growth rates and egg production.

The fishery operates under strict management measures, including total allowable catch limits, seasonal closures, size restrictions, and gear regulations like size restrictions, escape gap requirements, and marking rules.

The TAS SRL fishery is a limited entry system, with only 312 commercial fishing endorsements available. The current fleet consists of just under 300 vessels.

The Eastern and Western regions of the fishery are closed annually during the winter season to help maintain healthy lobster populations and support long-term sustainability. The dates change annually based on lobster stock assessments, but primarily close between May through September.

2.5. Whale Entanglements

Humpback whales are vulnerable to entanglement with set fishing gear due to their morphology, behaviours and spatial distribution. As the population of Humpback whales on the East Coast of Australia has grown, the potential for interactions between whales and commercial fishing operations is increasing, with the majority of all entanglements occurring since 2006.

New South Wales Context

Humpback whales are present in New South Wales coastal waters between May and November each year as they migrate from their Antarctic feeding grounds to their tropical breeding grounds. Their presence peaks between June-September, which correlates with peak entanglement rates during those months. The humpback migration season has gotten longer over the years due to the increases in the population, with whales sighted along the NSW coastline beginning in April and late into December.

In 2019, whale entanglements in fishing gear saw a notable increase in NSW. The NSW OTL industry, with the help of the Professional Fishers' Association, called together an initial workshop to understand the issues associated with whale entanglement and processes to reduce those entanglement risks for set fishing gear like pots/traps. The workshop helped identify key gear modifications industry were interested to trial. These modifications included:

- Swapping polypropylene rope for lead core rope in trot line
- Swapping polypropylene rope for neutrally buoyant rope in head rope or trot line
- Using Galvanic Time Release submerged headgear bags
- Submerging headgear and grappling to retrieve

Additional workshops were held in 2021 and 2022, and further gear trials were conducted using:

- Desert Star time/acoustic release technology to submerge headgear
- Bronze hauling plates for NSW SC fishers

These gear trials showed varied success based on fishers' specific operations, and future gear trials were still deemed necessary to find options to suit both inshore and offshore operations. The trial results proved that there is no one-size-fits-all solution to effectively and viably reduce whale entanglement risk.

Queensland Context

Humpback whales are present in Queensland coastal waters between June and November each year as they migrate to their tropical breeding grounds. Their presence peaks between July-September, which correlates to Queensland strandings data that show strandings peaks between July-September. On their migration south, humpback whales use the protected waters of Hervey Bay and Moreton Bay as a resting stopover, particularly for mothers and calves to rest, nurse, and socialise before continuing their long journey south.

Following the collaborative success of the East Coast Whale Entanglement Mitigation Program, Queensland set-gear fisheries expressed interest in engaging with to more holistically understand their respective challenges with the humpback whale migration season and trial potential gear modifications to help reduce their entanglement risk.

Tasmania Context

Humpback whales are present in Queensland coastal waters between April and July each year as they migrate to their tropical breeding grounds, and between September-December as they migrate back to their Antarctic feeding grounds. The humpback whales primarily migrate along the Tasmanian East Coast, however some of the population have been found to travel through the Bass Strait and along the West Coast. The Southern Rock Lobster fishery has winter zone closures and other fishery regulations, such as maximum pot numbers and maximum soak times (48 hours), which assist in helping reduce fishery interactions with humpback whales. Additionally, the ongoing rock lobster stock rebuilding strategy is expected to further reduce total number of pot lifts across the fishery, meaning less overall fishing effort, however the humpback migration still poses unique challenges to the fishery.

Following the collaborative success of the East Coast Whale Entanglement Mitigation Program, the Tasmanian Southern Rock Lobster fishery expressed interest in engaging to more holistically understand their respective challenges with the humpback whale migration season and trial potential gear modifications to help reduce their entanglement risk.

3. Action Plans and Gear Trials

3.1. New South Wales

Findings from previous gear trials have proven that there is no one-size-fits-all solution to reducing whale entanglement risk within the NSW OTL fishery. Despite the overarching

regulations that guide sustainable practices in the fishery, each fishing operation within the NSW OTL fishery operate uniquely (e.g. each vessel is set up differently, fishers fish in different marine habitats, different crewing arrangements, etc.). This adds complexity to identifying viable options for fishers to use to reduce their entanglement risk. Following previous successful gear trials throughout New South Wales, engaged fishers indicated a desire for more vessel-specific information they could keep aboard their vessels to show what options work well for their respective fishing operations.

3.1.1. Vessel Specific Whale Safety Action Plans

Based off the existing NSW OTL Code of Practice for fishing during the humpback migration season, vessel-specific whale safety management plans (SMP) were designed and personalised for 30 active NSW OTL fishers from Tweed Heads to Eden. These account for:

- 34% Spanner Crab shares
- 24% Demersal Fish Trap shares
- 28% Eastern Rock Lobster shares (due to crossover between DFT and ERL endorsement holders)

The percentage of engaged active fishers is likely higher than these calculations, as the percent shares includes both shareholders who actively fish, and those who are inactive and lease out their shares to active fishers.

The safety management plans provide the fisher with a personalised checklist of the strategies identified in the Code of Practice that their specific fishing operation employs during the humpback migration season that can be updated as new gear modifications are found useful. There is also space within the SMP for fishers to identify other useful strategies they use during the whale season that may not be indicated within the Code of Practice itself.

Each SMP also gives the fisher a condensed version of the Code of Practice to reference as necessary. This includes the identified best practice operations for NSW OTL fishers, information on what to do should they encounter an entangled whale, reporting requirements for interactions with whales (and other threatened, endangered, and protected species), and how to add to citizen science knowledge of whale migration patterns in NSW.



With each SMP, fishers were also provided waterproof "responding to an entangled whale" stickers with the NSW NPWS hotline to affix on their vessel for quick response should they encounter an entangled whale.

3.1.2. Neutrally Buoyant Rope

Through the SMP distribution, NSW OTL fishers new to the program indicated an interest in trialling some of the neutrally buoyant rope (NBR) that some fishers involved in previous trials had found success with.

50 coils of 8mm neutrally buoyant rope arrived in late October 2024 (due to shipment delays) and were distributed to 10 NSW OTL fishers between November 2024 and February 2025. These included 9 fishers with DFT endorsement, and 1 fisher with SC endorsement. Due to the late arrival of the gear shipment, most of the fishers were unable to trial the NBR during the 2024 whale migration season.

However, 4 of the DFT fishers have trialled the gear outside of the humpback season. DFT fishers are trialling the NBR in sections of their headgear to help maintain a taut line and remove excess rope floating at the surface. Their initial feedback reflects that while the rope is somewhat more cumbersome to splice into their existing gear, it is a relatively simple gear modification. There have been some concerns regarding the quality of the rope and anticipated difficulties grappling to retrieve any cut-off gear (from shipping, etc.). As the fishers continue to use the NBR and get more accustomed to ways it may change their fishing operations, the reality of these initial concerns will be revealed.

The remainder of the DFT and SC fishers who were distributed the NBR are committed to trialling the gear modification throughout the 2025 humpback migration season.

3.2. Queensland

Queensland facilitators held a co-design workshop in Brisbane in March 2023 with industry representatives from the Queensland spanner crab (SC), blue swimmer crab (BSC), and offshore gillnet (OG) fisheries, Queensland Fisheries management, whale disentanglement teams, and whale researchers. The workshop explored how the humpback migration season impacts the involved fisheries and helped identify key gear areas where fishers may be able to reduce their risk of entanglement.

3.2.1. Code of Practice

Following the workshop in Queensland, a Code of Practice for fishing during the humpback whale migration season was developed.

The Queensland Code of Practice can be found below:



3.2.2. Gear Trials

Discussions at the workshop helped identify potential gear modifications for industry to trial. These included various sizes of negatively buoyant rope (NBR) and acoustic whale deterrents (pingers).

Negatively Buoyant Rope:

200 coils of NBR were purchased to distribute among 16 SC and 1 BSC operators from Bundaberg to the Gold Coast. SC fishers were provided coils of 8mm NBR, and the BSC fisher was provided 10mm NBR based on what suited their current operations and the size of polypropylene they traditionally use.

Due to delays in production, the coils were distributed in December 2023 to be trialled outside of the humpback whale migration season to assess whether it could be a suitable gear modification for fisher uptake during the migration season.

Fishery	Ease to modify	Setting Efficiency	Retrieval Efficiency	Impact on catch?	Impact on crew?	Impact time at sea?
Spanner Crab	Easy - Difficult	Similar	Very Difficult -Similar	Yes	No	Yes and No
Blue Swimmer Crab	Easy	Easier	Similar	No	No	No

Fishers assessed the utility of the NBR:

Fishers assessed safety aspects of using the NBR:

Fishery	Impact vessel survey?	Additional safety hazards?	Vessel Damage	Hauler Damage?	Gear Damage?	Overall Safety Ranking
Spanner Crab	No	Some	No	Some	Some	Unsure
Blue Swimmer Crab	No	No	No	No	No	Safe

Fishers assessed any impacts the NBR had on their lost gear:

Fishery	Lost Modified Gear?	Did NBR use contribute to loss?	Recovered lost gear?	Lost Normal Gear?	Recovered Normal gear?
Spanner Crab	Yes	No	Some	Yes	Yes
Blue Swimmer Crab	Yes	No	No	N/A	N/A

The NBR proved to have variable success with trial fishers.

SC fishers indicated that swapping to NBR was similar to the standard polypropylene rope they use when setting the gear, however it proved slower and more difficult for some during hauling. This was particularly due to their hauling plates not effectively grabbing the rope, causing rope slip ups while hauling. There was also a unified concern regarding the wear on the hauling plates, as the NBR picks up sand and sediment along the seafloor which may wear down the

hauler more quickly. They also noted that the NBR was easier to tangle along the seafloor and in the boat, which may add potential safety hazards for crew. An unexpected finding was that the NBR impacted some vessels' catch rates. One participant placed a camera on his gear to understand why the NBR might be impacting his catch, and found that the NBR trot line crawls along the seafloor and rubs atop the dillies, scaring away potential crabs from being caught. Only one SC operator is still using the NBR in their current fishing, and only uses it on their headline in offshore fishing.

On the other hand, the BSC fisher was happy with the 10mm NBR he was provided and is still using it at present. They found that swapping their polypropylene rope for NBR allowed for more efficient setting, as they didn't need to add lead weights which removed catch points while setting. Due to the nature of the BSC fishery, the NBR does not rub along the seafloor and they noted no major affects to their hauler and had no major concerns regarding their hauler plates. They also noted no noticeable difference in their catch rates.

Acoustic Deterrents ("Pingers")

50 total underwater acoustic deterrents (pingers) were purchased to distribute among interested SC and OG fishers. These comprised of:

- 25 x whale pingers (3 kHz frequency)
- 25 x dolphin & whale (3 kHz 12 kHz frequency)

The whale pingers were distributed among four SC fishing operations in the Gold Coast in May 2023. SC fishers were provided 5 pingers each, with 3 to be used along their headgear/trot lines and 2 spares. These were trialled by involved fishers for the 2023 and 2024 humpback whale migration seasons.

The dolphin and whale pingers were distributed to two OG fishing operations in the Sunshine Coast. OG fishers were provided 6 pingers each, to cover the length of their nets plus at least one spare.

Fishers assessed the utility of the whale pingers:

Ease to modify	Setting Efficiency	Retrieval Efficiency	Impact on catch?	Impact on crew?	Impact time at sea?
Very Easy	Similar	Similar	No	No	No

Fishers assessed safety aspects associated with the whale pingers:

Impact vessel survey?	Additional safety hazards?	Vessel Damage	Hauler Damage?	Gear Damage?	Overall Safety Ranking
No	Some	No	No	No	Safe

Fishers assessed any impacts the whale pingers had on their lost gear:

Lost Modified Gear?	Did pinger use contribute to loss?	Recovered lost gear?	Lost Normal Gear?	Recovered Normal gear?
Yes	No	Yes	Yes	Yes

Overall, the pingers were trialled to assess how easy they were to integrate in their fishing operations, not their effectiveness as whale deterrents. Some concerns arose with the short battery life of the pingers, and indicated fishers would need to come up with a good schedule to change the batteries every few months, as the pingers went flat by the end of the 6 month winter period. All trial participants indicated that the pingers were easy enough to use, however they were not confident in the pingers' ability and efficacy to deter whales from their gear. Both SC and OG fishers mentioned the pingers could be more widely implemented throughout their fisheries if they were found to effectively deter large whales.

Fishers felt that effective whale pingers could be a simple gear modification that could both reduce their whale entanglement risk and improve their industry's social licence. Unfortunately, there is limited evidence to suggest current whale pinger technology deters whales from traveling through the pinger's range. Thus, further research and development is necessary to develop acoustics that industry can feel confident will help reduce their risk of whale entanglement before broader industry uptake is possible.

3.3. Tasmania

Tasmanian facilitators (Seafood Industry Tasmania) held an initial co-design workshop in March 2023 with industry representatives from the Tasmanian Southern Rock Lobster fishery, the Tasmanian Rock Lobster Fishermen's Association, Tasmanian fisheries management, the Department of Natural Resources and Environment Tasmania, and local gear developers. The workshop aimed to explore the reality of the challenge that the annual humpback whale migration poses on the southern rock lobster (SRL) fishery in Tasmania, and identify areas the fishery is already excelling in terms of reducing entanglement risk and where there are still areas for progress to be made.

3.3.1. Code of Practice

Following the initial workshop in Tasmania, a Code of Practice for fishing during the humpback whale migration season was developed for the SRL fishery.

The Tasmanian SRL Code of Practice can be found below:



3.3.2. Acoustic Release Technology Gear Trials

FioMarine FioBuoy

Following the workshop, FioMarine, a local gear development company based in Hobart, was identified as having a potential acoustic release solution to help further reduce risk of Tasmanian SRL fishery interactions with whales. The technology worked as a buoyant spool which could effectively submerge headgear until fishers were ready to retrieve their pots. The technology, however, was initially designed for use in military naval operations, and thus the size and cost of the technology was more than what would be viable for the SRL fishery to trial. FioMarine was intended to develop a smaller, more cost-effective version of the spool system that SRL fishers could trial, however following delays in their development, Seafood Industry Tasmania cancelled the FioMarine gear trials and shifted focus to another gear developer's time/acoustic release technology.

Sub Sea Sonics

Sub Sea Sonics, a gear development company based in the United States in California, was identified by the SRL fishery as having some of the most cost-effective gear acoustic release rope-on-command technology.⁶ In early 2024, Sub Sea Sonics was engaged to help adapt their acoustic release system to better suit the unique cane "beehive" pots used in the Tasmanian SRL fishery. Several prototype ideas were proposed, and through collaboration and extensive discussions, a final design was agreed upon. This design (see figure on right) could be retrofitted on to existing SRL pots and housed headgear within a kayaking grab bag that was rigged to release when triggered by the acoustic system onboard.

The prototype was tested in August 2024 when the Sub Sea Sonics developers came to train the trial fishers on the gear. While there, minor adjustments were made to ensure the technology would better suit the SRL pots. Training trails were conducted in sheltered waters under specific research fishing permits to ensure trial fishers were comfortable in their use prior to implementing the



systems in their regular fishing operations. More about the training day can be seen in this video.

The gear trials experienced some further delays due to additional permitting required, and initial operational field trials were conducted by two SRL fishers beginning in February 2025, to last until December 2025. Both fishers were provided with gear to outfit three pots, an acoustic transceiver, a deck box, and a smart phone application to activate their gear. Fishers also had additional online training from the gear developers.

As gear trials only began in February 2025, the following results are viewed only as preliminary findings, and it is anticipated that as the trial fishers become more comfortable using the gear,

⁶ Ropeless Consortium Trip Report 2023, OceanWatch Australia

they may gain a better understanding of the potential (or lack thereof) for this gear in the SRL fishery.

As of 21 Feb 2025, between the two vessels trialling the gear, there had been 12 gear sets with 10 success and two failures. Causes of the failures are still unknown, but likely are attributed to the depths the fisher was working the gear in and too short of rope in the grab bag.

Fishers assessed the gear based on various considerations:

Gear Modification and Setting:

Both fishers managed modifying their pots well, with no identified storage issues. However, handling the modified pots became more challenging due to additional weight necessary to offset added buoyancy the submerged headgear provided. Fishers estimated an additional 20-30kg of weight per pot was required to ensure the pots descended properly.

Catch Rate Impacts:

The modified gear was found to severely impact catch rates during initial hauls (n=12). One fisher did not haul a legal-sized lobster in the modified traps, while the other saw significantly reduced success (12-37% of normal rates). Increased pot buoyancy was hypothesized to prevent the pots from remaining still on the seafloor, potentially making it more difficult for lobster to enter the pots.

Retrieval Issues:

Using phones to activate hauling mode was frustrating due to wet conditions, though a touchscreen pen may help solve that challenge. Delays in buoy surfacing also led to extra vessel manoeuvring, increasing fuel use. Retrieval also required two people instead of one due to the increased weight of the gear.

Lost Pots:

Both trial fishers experienced challenges with losing their modified pots. However, one fisher began the trials at extreme depths that the Sub Sea Sonics system was not necessarily equipped for (e.g. not enough rope in the grab bag).

Safety Concerns:

Neither fisher so far has found the gear totally safe for their fishing operations. One expressed concerns about the extra weight when setting pots, while the other highlighted increased crew fatigue and potential hazards around the hauler while retrieving heavier gear.

Following these initial trials, neither fisher has great confidence that the Sub Sea Sonics system will be suitable for fishers in the Tasmanian SRL to reduce their whale entanglement risk. This was particularly due to these initial poor catch rates recorded and extended hauling times. One fisher also noted that the modified gear was economically unviable for the fishery's single-set-pot fishing technique, as each acoustic unit and submerged headgear bag cost \$450 USD and each deck box (1 per vessel) cost \$500. To outfit a 60-pot boat would cost over \$43,000 AUD, which trial fishers and workshop participants have identified as major barriers to uptake.

Additionally, the low likelihood of humpback whale entanglement in Tasmania, a result of humpback migration patterns combined with the SRL current mitigation strategies, means there is minimal industry appetite to pursue entanglement mitigation technologies. However, the industry has committed to reviewing this annually, as there is widespread recognition that the challenge the annual humpback migration brings to the broader Australian fishing industry is and evolving one.

4. Workshops

As part of this project, three workshops were held to engage industry and other relevant stakeholders in Queensland, Tasmania, and New South Wales. Reports from these workshops can be found below.

2023 Queensland Co-design Workshop



2023 Tasmania Co-design Workshop



2025 National Workshop



5. Recommendations following Gear Trials and Final Workshop

Progress has certainly been made through the East Coast Whale Entanglement Mitigation Program in Queensland, New South Wales, and Tasmania to better identify potential solutions for reducing whale entanglement risk in East Coast fishing gear. However, there still remains many unknowns in this evolving challenge that industry is committed to pursuing.

Based on feedback from the multiple workshops and fishers engaged in gear trials along the east coast, key priorities for the ongoing development of promoting safe passage for both whales and Australian fishers were identified. The following recommendations have been made:

1. Further gear modification trials are necessary to find viable solutions for involved industry

Although, to date, a wide range of gear modifications have been trialled through the East Coast Whale Entanglement Mitigation Program, there is still a need to further explore and refine potential gear modifications that are viable for the fishing industry. Future emphasis should be on practical, low-cost solutions that fishers can feasibly implement without disrupting operations. However, innovations such as ropeless or rope-oncommand fishing technology should still be tested for effectiveness, with recognition that these options may not be suitable on an industry-wide scale, and may be more suitable as a option fishers can lease if ever necessary.

2. Extend the development of Vessel-Specific Safety Management Plans for Queensland and Tasmania

Recognition of the immense variability within and across Australian set-gear fisheries is crucial. These plans should align with the existing Codes of Practice in both states, incorporating best practices for reducing whale entanglement risk and identifying which solutions suit individual vessel operations.

3. Continue to strengthen collaboration among stakeholders involved in the East Coast Whale Entanglement Mitigation Program

There is a strong consensus on the need for continuous collaboration between fishers, government agencies, and conservation organisations. Open communication will ensure that emerging challenges are addressed collectively, fostering a balanced approach that supports both long-term fishing industry sustainability and conservation efforts for our migrating humpback whale population.

4. Refined research and monitoring of humpback whale behaviour along their migration routes

Ongoing collaborative research will provide valuable insights into humpback whale interactions with fishing gear, helping to better direct and refine entanglement mitigation strategies. Key research priorities include:

- Gaining a better understanding of whale migration patterns on a more localised scale along the East Coast of Australia
- Improve understanding and monitoring of real-time interactions between whales and fishing gear/vessels

5. Expanding the East Coast Whale Entanglement Mitigation Program's stakeholder engagement

Encouraging more participation from fishers across New South Wales, Queensland, and Tasmania is vital to better explore the complexities that fishing operation variability plays into gear modification viability. Industry-wide engagement would ensure best practices are widely adopted, strengthening the resilience of Australian set-gear fisheries. This would also assist in contributing to identifying new and creative gear modifications to trial, as more industry involvement will provide

6. Create a unified media and public communication strategy

To ensure balanced public discourse, discussions with peak industry bodies involved should establish an organised communication strategy for responding to media attention during the humpback whale migration season. This strategy should:

- Promote accurate representation of fishing industry efforts to mitigate whale entanglement
- o Provide clear messaging on best practices and regulatory commitments
- Encourage positive engagement with the conservation sector and general public

7. The East Coast Whale Entanglement Mitigation Program should strive to strengthen partnerships with the conservation sector

Greater collaboration between the fishing industry and conservation organisations can foster a more holistic understanding of the challenges the annual humpback whale migration brings and promote shared solutions. Initiatives should aim to demonstrate a commitment to coexistence between fishers and migrating humpback whales.

- 8. National expansion of best practices for fishing during the whale migration seasons Extending outreach efforts and developing Codes of Practice to other States that experience similar challenges with other whale species (e.g. southern right whales), like South Australia, Victoria, and Western Australia, can help reduce overall whale entanglement risk nationwide. Industry and management in these States should be further engaged to:
 - Exchange lessons learned from gear trials the East Coast Whale Entanglement Mitigation Program has led thus far
 - Strengthen cooperative efforts the fishing industry is engaged in towards marine conservation, ultimately helping to improve nationwide industry social licence