



OCEANWATCH
AUSTRALIA

WetFEET Project

Activity 1.1 Report: East Coast Whale Entanglement Mitigation Program

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Australian Government

**National
Landcare
Program**



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OceanWatch Australia would like to thank the presenters, professional fishermen, industry representatives and government scientists and management representatives who attended the workshop at the Sydney Fish Market on the 13th September 2019 – and in particular, for the generous spirit of collaboration and innovation shown.

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Contents

EXECUTIVE SUMMARY	4
1. Introduction	6
2. Background	6
3. Management of the NSW OTL Fishery	7
3.1 Demersal Fish Trap	8
3.2 Spanner Crab - Northern Zone and Southern Zone	8
3.3 Permits for gear trials.....	8
4. Stakeholder Workshop	9
4.1 Workshop Objectives	9
4.2 Workshop Method.....	9
4.3 Workshop Results.....	10
4.3a Presentations	10
4.3b Stakeholder Discussions at Workshop.....	18
4.3c Recommendations from Stakeholders.....	21
4.3d Evaluation of Gear Types by Fishers.....	22
Table 1. List of Gear Types and Techniques	22
Table 2. Rating System Used by Workshop Attendees	22
Table 3. Ranking of Importance of Testing Gear Types and Techniques.....	23
Table 5. Ranking of Importance of Testing Gear Types or Techniques for Spanner Crab.....	24
Table 6. Ranking of Importance of Testing Gear Types or Techniques for NSW Lobster.....	24
4.3e Code of Practice	24
4.3f Call for Volunteers to Test Gear Types	25
Table 7. Summary of Gear Types and Fishers Interest in Testing	25
5. Recommendations	25
5.1 Code of Practice.....	25
5.2 Gear Trials.....	26
5.3 Gear Survey.....	26
Appendix. Workshop Attendees.....	27

EXECUTIVE SUMMARY

As Humpback whale populations in the southern hemisphere recover from past commercial whaling, the potential for interactions between whales and commercial fishing operations is increasing, with most entanglements occurring since 2006. Most entanglement incidents involve Humpback whales, a species listed as a Vulnerable within the Commonwealth EPBC Act and NSW Biodiversity Conservation Act 2016.

In the past few years, there has been an increase in media reports relating to whale entanglement in fishing gear. Preliminary assessment of reported whale entanglements in New South Wales has confirmed a variety of sources. These comprise of set fishing gear of unknown origin, e.g. rope and floats, or rope only, set fishing gear not consistent with NSW, rope only not consistent with NSW fishing gear, NSW and QLD shark mitigation gear, interstate set fishing gear, longline gear of unknown origin and gear associated with aquaculture.

Entanglements associated with NSW set fishing gear include configurations used in the demersal fish trap, spanner crab, demersal setline and lobster trap fisheries. Preliminary results indicate that the level of interaction between the NSW demersal fish trap sector and whales, is greater than the combined interactions from the NSW spanner crab, demersal setline and lobster fisheries.

The East Coast Whale Entanglement Mitigation Program has been initiated in NSW to respond to the issue of entanglement with NSW set fishing gear. OceanWatch Australia (OceanWatch) partnered with the Professional Fishermen's Association (PFA) to host a workshop as the first stage of the East Coast Whale Entanglement Mitigation Program.

The workshop objectives identified a range of fishing gears and techniques suitable for the mitigation of whale entanglements to be tested by commercial fishers, and considered modification of existing NSW OTL Fishery Codes of Practice to include specific practices to mitigate whale entanglement.

There was strong agreement among attendees for the following four actions to be progressed:

1. Trial gear and techniques to reduce whale entanglements.
2. Develop a NSW OTL Code of Practice for whale entanglements.
3. Develop and complete a gear survey throughout the NSW OTL.
4. Investigate options for funding of further research.

A list of 12 modified gear type and techniques most likely to be useful in whale mitigation in NSW Demersal fish trap, Spanner crab and Lobster fisheries were established. Fishers demonstrated interest in trialling most of the proposed modifications, however the priorities were identified as:

1. Time release devices with approximate or exact time of activation to remove surface head gear
2. Techniques that involved grappling a subsurface horizontal rope

3. Use of negatively buoyant rope

Allowing for limitations in budget and timeframe, the report recommends that initial gear trials should introduce industry to a range of mitigation measures, including modifications not currently permitted under current NSW OTL fisheries management arrangements through an agreed permit process.

Gear trials should be undertaken to determine the practical utility and safety aspects of gear modifications that may potentially minimise whale entanglement. Trials will determine potential uptake by endorsed fishers and provide focus for further scientific trials to determine whale entanglement mitigation.

East Coast Whale Entanglement Mitigation Program

1. Introduction

As Humpback whale populations in the southern hemisphere recover from past commercial whaling, the potential for interactions between whales and commercial fishing operations is increasing, with most entanglements occurring since 2006. Most entanglement incidents involve Humpback whales, a species listed as a Vulnerable within the Commonwealth EPBC Act and NSW Biodiversity Conservation Act 2016.

In the past few years, there has been an increase in media reports relating to whale entanglement in fishing gear. There has also been an increase in community awareness and concern for animal welfare and bycatch issues.

Whale entanglements are complex and often dangerous incidents to respond to. Due to the size of whales, disentangling operations require staff to have specialist training and skills. To date, 46 whales have been successfully disentangled. While disentangling provides a means for dealing with incidents as they arise, the optimum solution to the problem involves reducing the risk of the entanglement.

The East Coast Whale Entanglement Mitigation Program has been initiated in NSW. Two individual projects funded by the Australian Government's National Landcare Program and the Australian Government Marine Park Fisheries Assistance Extension Program are currently active to assist fishers to reduce the incidence of, and risks associated with, whale entanglement in NSW OTL fishing gear.

2. Background

Humpback whales migrate through NSW waters between March and November, with a high percentage of the population found between 1nm and 5nm offshore.

They are vulnerable to entanglement with fishing gear due to their body shape, habitat use, distribution and behaviours. Unique to Humpback whales are wart like round protuberances (bumps or tubercles) that occur on the head forward of the blowhole and on the edges of the flippers, increasing the potential for entanglement with set fishing gear.

The population of Humpback whales has risen from an estimated 2,000 individuals to 35,000 over the 25-year period from 1994 to the present. This recent recovery of the population of Humpback whales has led to increasing community interest and economic activity associated with observing whale migrations. Over the same 25-year period there have been 259 whale entanglements recorded in NSW waters. Humpback whales comprise 255 of these entanglement incidents, with two entanglements attributed to Southern Right whales.

Southern Right Whales generally have a shorter season in NSW waters than Humpback whales, typically between June and September. Their migration may extend north to Forster or Port

Macquarie, but generally most records of sightings occur south of Sydney. They spend approximately 90% of their time in waters less than 10m depth (Crocetti, workshop presentation).

Southern Right Whales are of conservation interest due to the low population level, estimated at less than 300 individuals in the South Eastern Australia population. They are listed as an Endangered species within the Commonwealth EPBC Act and NSW Biodiversity Conservation Act 2016.

Preliminary assessment of recorded whale entanglements in New South Wales confirmed a variety of sources contributing to whale entanglements recorded in NSW. These sources include: set fishing gear of unknown origin, e.g. rope and floats, or rope only; set fishing gear not consistent with NSW; rope only (not consistent with NSW fishing gear); NSW and QLD shark mitigation gears; interstate set fishing gear; longline gear of unknown origin and gear associated with aquaculture. Entanglements associated with NSW set fishing gear include configurations used in the demersal fish trap, spanner crab, demersal setline and lobster trap fisheries. Preliminary results indicate that the level of interaction between the NSW demersal fish trap sector and whales, is greater than the combined interactions from the NSW spanner crab, demersal setline and lobster fisheries.

It is likely that a proportion of these interactions are attributable to the inadvertent contact of whales with rope associated with some set fishing gears used in New South Wales coastal waters. Contact with buoy lines may result in rope and attached fishing gear becoming lodged or wrapped around the tail, body, fins or jaw of the whale. This can compromise a whale's ability to swim, feed and breathe and result in mortality.

Fishers have already made concerted efforts to minimise interaction and decrease likelihood of entanglement in fishing gear. For example, Lobster fishers have made efforts to trial acoustic release devices, galvanic time release devices and various grappling configurations to minimise ropes and floats in the water column. Demersal fish trap fishers have trialled sections of rope of reduced breaking strength. Spanner crab fishers have also trialled neutral or negatively buoyant rope within the trotline of spanner crab fishing gear, but have identified challenges including damage to line haulers resulting from the use of soft lay leaded rope.

3. Management of the NSW OTL 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 comprehensive Environmental Impact Assessment process under the NSW Environmental Planning and Assessment Act 1979.

There are six types of Ocean Trap and Line endorsements in NSW waters. The East Coast Whale Entanglement Mitigation Program is focussed on Demersal fish trap (3.1) and Spanner crab and (3.2) endorsement types which utilise buoy lines attached to set fishing gear as an integral component of the fishing operation.

Current fishery management regulations require fish traps and spanner crab trot lines to be marked with a buoy of minimum 150 mm diameter at the surface. This regulation prohibits the use of

technologies currently in use in the NSW Lobster fishery to mitigate risk of whale entanglement by removing ropes from the water column.

3.1 Demersal Fish Trap

A demersal fish trap endorsement authorises the holder to take fish from ocean waters by means of a fish trap set on the sea bed.

Demersal fish traps are permitted in all NSW waters excluding Marine Parks. The demersal fish trap endorsement within the NSW OTL fishery is managed by input controls which limit the fishing capacity of fishers, and thereby indirectly controlling the amount of fish caught. These controls include restrictions on the number of endorsements, number of traps, design and dimensions 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 (Daniel Johnson, workshop presentation).

3.2 Spanner Crab - Northern Zone and Southern Zone

A Spanner Crab 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 fishery operates from Hat Head to the NSW/Queensland border. The fishery is managed through a Total Allowable Catch and input restrictions. Fishers are restricted to operating a maximum of 40 dillies, with generally 10 dillies attached to each trot line.

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 net lifts. Currently, there are less than 650 days fishing reported from less than 20 fishing businesses. On average, over 40% of the total value of the fishery is landed between July and September (Daniel Johnson, workshop presentation).

3.3 Permits for gear trials

The process whereby industry-initiated proposals for trialling modifications or alternatives to existing lawful commercial fishing gears, requires formal assessment to determine whether or not they may assist in the long-term sustainability and viability of commercial fishing. Clear guidelines are used for managing and granting permits issued under section 37 of the Fisheries Management Act 1994. The process involves a proposal stage, preliminary trial stage, assessment stage and assessment analysis and consultation stage.

Trialling modified fishing gear configurations that are not permitted under the current FMA is a complex and extensive exercise. Complexity is increased when a project may potentially interact with Threatened, Endangered and Protected (TEP) species.

The issuing of a research permit for modified gear trials generally requires the design of scientifically rigorous field trials to support the assessment of the permit gear. The design must be considered robust and reliable following intensive departmental review. In this case, designing gear trials at a scientifically robust level will be limited due to the low level of whale interactions with NSW OTL set fishing gear.

NSW DPIE have informed support for the project, and will assist by expediting assessment and issue of permits where appropriate. This agreement will provide a less formal and detailed process.

4. Stakeholder Workshop

OceanWatch partnered with the Professional Fishermen's Association (PFA) to host a workshop as the first stage of the East Coast Whale Entanglement Mitigation Program. The workshop was held at the Sydney Fish Market Conference Room on Friday 13th September 2019 and was funded through OceanWatch's WetFEET Project (Activity 1.1) under the Marine NRM Grant awarded by the Australian Government Department of Agriculture National Landcare Program.

4.1 Workshop Objectives

The workshop objectives were:

1. Evaluate fisher's awareness of whale entanglement and inform behaviour/practice change
2. Identify a range of fishing gears and techniques, suitable for the mitigation of whale entanglements, to be tested by commercial fishers.
3. Consider modification of existing NSW OTL Fishery Codes of Practice to include specific practices to mitigate whale entanglement.

4.2 Workshop Method

Key industry stakeholders were identified from around Australia through accessing the latest industry shareholder data available on the NSW DPIE website and through PFA, OceanWatch and NSW DPIE contact lists. Invitations were developed to encourage stakeholder involvement and participation in a facilitated workshop.

The workshop was attended by 34 participants, including NSW fishers and scientists as well as representatives from Western Australia, Victoria, Tasmania, Queensland and the Commonwealth. A list of workshop attendees is shown in the Appendix.

A short attitudinal survey was conducted the morning of the workshop to establish fishers' awareness of various aspects of whale entanglements in fishing gear.

A series of expert presentations (section 4.3) were delivered on a range of topics including:

- East Coast Whale populations, Susan Crocetti OEH
- Source of entanglements in NSW, Daniel Johnson NSW DPIE
- NSW Lobster Fishery, why is interaction so low?, Geoff Liggins NSW DPIE
- Western Rock Lobster Fishery maintaining social licence, Jason How WA Fisheries and,
- An overview of potential mitigation measures for NSW demersal trap and spanner crab fisheries, Daniel Johnson NSW DPIE.

Fishers were then tasked with identifying issues associated with whale entanglements. Open workshop discussions encouraged workshop participants to consider currently available solutions, both within and outside current fishery practices and management regulations.

Fishers also ranked the importance of trialling individual modifications at a fishery practice level and volunteered for involvement in the proposed trialling and evaluation of gear types and techniques.

An attitudinal survey was completed in the afternoon to establish changes in fishers' concerns and awareness of mitigation opportunities, as well as changes to their perception of risk to their businesses as a result of the workshop.

4.3 Workshop Results

4.3a Presentations

A series of presentations were delivered by key industry stakeholders and government to outline the issues and questions to be resolved.

Presentations are briefly summarised (boxed) with details listed in point form.

Setting the Scene for Industry

The PFA presented to attendees on three main points:

1. Community perception and social licence,
2. International implications of whale entanglement with fishing gear, and
3. Encouraging industry to workshop suggestions of potential entanglement mitigation solutions.

Tricia Beatty, CEO Professional Fishermen's Association (PFA)

The industry is under pressure as a result of news media reporting of activism by environmental groups and community concerns.

While commercial fishers themselves have no wish to see whales entangled, they come under fire following the reporting of any entanglement, the implication being that fishing gear is responsible.

The industry needs to do more to address this concern.

As an example, the Dungeness crab fishery, on the west coast of USA, was closed in 2017 based on interactions with TEP species. Some Australian NGOs look at this as precedent.

In addition to the funding received from the Commonwealth for this project, funding may also be available from the NSW Marine Estate Management Authority (MEMA) and the Fisheries R&D Corporation (FRDC).

There are gear mitigation trials currently occurring domestically and internationally. This workshop aims to encourage fishers to make their own suggestions about improvements that could be made in the East Coast fishery

Understanding the Problem to be Solved

The National Parks and Wildlife Service presented on data relating to:

1. Whale population surveys,
2. Reported whale entanglements in NSW,
3. NPWS whale disentanglement response teams.

Susan Crocetti Marine Wildlife Team Leader, NSW National Parks and Wildlife Service

Group E (east coast) Humpback whale population is the primary population being entangled. Southern Right Whales are of greatest conservation concern.

Whale media in NSW in 2018/19 had a public reach of 223 million. Public concern is as much about welfare as it is about conserving the species.

Tacking Point off the NSW coast is the best location for estimating whale populations. Aerial surveys are also used.

NPWS presentation continued

The most common species involved in entanglements due to body shape, habitat use, distribution & behaviour:

- Humpback whale
 - Population is approx. 35,000 and increasing about 11% a year
 - Transiting through NSW waters, heading to QLD
 - Vulnerable status
- Southern right whale
 - population is approx. 300 and is not increasing
 - Remain in VIC, NSW, TAS waters for extended periods for breeding
 - Endangered status
- Other possibilities for entanglements:
 - Brydes whales
 - Minke whales
 - Sperm whales
 - Blue whales
 - Fin whales

Historically 259 recorded entanglement events; mostly humpback whales.

Based on photos that have been analysed by scientific staff, the causes of entanglement have been:

- 85% ropes
- 6 % nets/mesh
- 2% longline
- 7% heavy ropes, FADs, anchors, others
- Data is available on rope colour and float type

There are 3 trained whale entanglement response teams employed by NSW NPWS.

NPWS presentation continued

Experience with Humpback whales

- In 1965, the population was only 104 (due to commercial whaling). Rapid population recovery since then. Ultimate population size unknown. Scientific estimates of future krill populations, the primary food source, means the status of *vulnerable* for humpbacks will not be reduced.
- 60 reports of entanglements to 13 September this year in NSW over 35 individual whales.
- Most entanglements result in death, if entangled for more than 7-10 days.
- Better survival chance with rapid response.
- June / July / Aug – peak times for entanglements
- Humpback peak migration north June / July, peak migration south Sept / Oct
 - window widening February-December
 - 1-5nm offshore

Southern Right Whale

- Shorter season in NSW waters – June /Sept

Understanding Entanglement in NSW

NSW DPI Fisheries presented on data relating to 73 cases of whale entanglement in NSW, including determining the contribution of NSW set fishing gear to those entanglements.

Daniel Johnson, NSW DPIE

Reviewed 73 cases from photographs and discussions with fishers and department staff.

Preliminary results indicate that the level of interaction between the NSW demersal fish trap sector and whales, is greater than the combined interactions from the NSW spanner crab, demersal setline and lobster fisheries. Other sources of interaction included: shark mitigation gear (NSW and QLD), set fishing gear interstate and surface longline gear.

Following the collection of entanglement data over the current whale migration season (May-October), more detailed analyses will be completed to determine the source of observed interactions, i.e. percentage entanglement by source.

NSW Lobster Fishery

Geoff Liggins, NSW DPI Fisheries

NSW DPI Fisheries presented on data relating to NSW Lobster Fishery whale entanglement.

Investigation of the reasons why interactions between the NSW Lobster fishery and whales are so low.

Annually the fishery conducts 90,000 trap lifts over 523,565 days total soak time.

Reasons for so few entanglements:

- Less than 10m depth – almost no risk of entanglement
- Very little fishing effort along the south coast between 10-30m depth
- At depths greater than 30m along the South coast there is very little overlap between whale season and fishing effort

Gear used to minimise entanglements includes:

- Opportunity to use Galvanic Time Release (GTR) for last 25 years. Different GTR release time depends on salinity & temperature.
- Acoustic releases to submerge head-gear
- Short, anchored ropes to submerge head gear – use grapple to retrieve
- Horizontal line with depth-float and anchor (eliminates head gear) – grapple to retrieve.

These 4 gear methods achieve two important outcomes

- Reduced amount of rope in column (length & time)
- Reduced amount of slack and surface rope

The cost of these gear types are:

- Acoustic releases are expensive. \$13k for the surface station and each release costs \$3,250. If 20 units used, and usually many more needed, cost would be around \$80k.
- GTR moderate (~\$1.50/\$4.00 ea.)
- Rope solutions inexpensive

Cost vs. benefit better for lobster than OTL

- Long soak,
- Big catches & value per trap.
- Minimal spatial overlap between fishers

NSW DPIE Lobster continued

Details of the major 6 motivations for use of submerged gear can be found in the presentation.

Future implementation of a Code of Practice for reducing risk of entanglements is encouraged. The format could be based on similar codes developed in NZ and WA.

The Western Australia Experience of Mitigating Whale Entanglement

WA Department of Fisheries presented on the history of whale entanglement issues in WA, Code of Practice development and discussion of potential solutions identified at an industry workshop.

Jason How, WA Fisheries

The main emphasis is on the Western Rock Lobster fishery, valued at over \$400million per annum.

Concerns are twofold:

- Social, humaneness and conservation
- Possible loss or modification of Marine Stewardship Council certification of the fishery.

Main time of year is May – Nov when whales are migrating close to coast. Problem became worse when the fishery was restructured, resulting in a longer fishing season, following the introduction of quotas.

Code of Practice developed in 2006 to decrease entanglements in rock lobster fishery.

2013 – Federal government stepped in with threat to remove export approval and state government pressed industry for action.

A workshop to reduce whale entanglement in Western Australia resulted in the following options.

- 7 gear modifications:
 - Acoustic releases
 - Biodegradable rope
 - Negatively buoyant rope
 - Neg. buoy single large float
 - Future ocean whale pinger
 - Banana whale pinger

- Regulations – mainly deeper water (+20m).
 - No surface rope, so tight all the time
 - Negatively buoyant top 1/3
 - Active fishing – pull every 7 days.

The key message is to get ropes out of the water column.

Gear modifications started 2014 and resulted in a significant reduction in entanglements (~60%). But entanglements are creeping up again.

Considerable detail can be found in the presentation about correlations between different colours and strengths of rope. The use of pingers were highlighted as not successful and biodegradable rope was considered as a potential safety hazard and additionally may result in lost gear and ghost fishing issues.

Snap Shot of the NSW Fish Trap and Spanner Crab Fisheries

Daniel Johnson, NSW DPIE

NSW DPIE presented a snapshot of fishing effort and input NSW Demersal Fish Trap and Spanner Crab Fisheries and potential gear types for use in mitigation.

Demersal Fish Trap

Timing of OTL peak productivity and peak whale migration coincides.

Demersal fish traps are an input controlled fishing method limiting the number of traps that may be used by individually endorsed licence holders. There are 140 licence endorsements, with 75% of effort is reported by 24 fishers.

Spanner Crab Fishery

A quota managed fishery with periods of high value & effort from July to September overlapping with peak whale migration.

Less than 650 days effort reported from < 20 fishing businesses. There has been a reduction in effort days & net lifts in the fishery.

- Most effort north of Yamba

NSW DPIE Continued

Potential Gear Types for Use in Mitigation

- Reduced breaking strength rope
- Negatively buoyant rope
 - Issue with hauler wearing out more quickly with leaded rope
- Biodegradable rope
- Weak links (legislated in many US fisheries)
 - Atlantic Large Whale Take Reduction Plan.
 - Didn't fit in WA fishery – dismissed.
- Time tension line cutter (industrial razor in unit)
 - Results inconclusive
- Acoustic deterrent devices (ADDs) – pingers
 - WA tested pingers, massive variation, results inconclusive
- Galvanic Time Release
 - available from 1 day release (\$2), up to 30 days (\$4)
- Acoustic release technology
- Grappling a subsurface vertical or horizontal rope
- Ropeless fishing app for use with submerged floats
 - Fisher can determine distance, regulators see all.
 - Android only.

What Might a Code of Practice Look Like

OceanWatch discussed the potential for an industry wide Code of Practice to provide guidance and document best practice for current fishers and new entrants.

Michael Wooden, OceanWatch Australia

The OTL fishery has a current Code of Practice (CoP).

- OceanWatch Master Fishermen are currently trained through the OTL CoP
- Specific, whale focussed actions can be developed as an appendix to the current OTL CoP

An OTL CoP for whale entanglements would be recognised as a positive step forward

- Document best practice for current fishers and new entrants

During discussions the range of operational actions suggested for possible inclusion in the CoP included:

- Be vigilant of increased numbers of whales during migratory period
- Minimise length of rope in the water
- Check pots regularly and minimise soak time
- Avoid setting in clusters
- Alert other fishers if whales migrate close to fishing grounds
- Report entanglements
- Collect and report on lost and found fishing gear

4.3b Stakeholder Discussions at Workshop

Open workshop discussion encouraged fishers to consider solutions, both within and outside current fishery practices and management regulations. Comments and questions from the audience are recorded below in note form.

The OTL has unnecessary restrictions applied by regulations. For example, not allowed to use short ropes and grapple retrieves. Does this contribute to the industry's slow response to making change? Fishers should be able to obtain conditional permits in the NSW OTL as part of this study.

Need government commitment to enable fishers to change. Why aren't people from compliance or management here today?

Acoustic options are expensive but can still be profitable.

- Fisher 1 and Fisher 2 have spent \$800k on acoustic release devices over 6 years as they consider it the best way to do business, to overcome pot losses due to theft and interaction with boats as well as whales.
- NSW Government needs to consider loans/funds for fishers to invest in this technology. Perhaps a Seafood Innovation Fund?

Lots of head gear thought to be lost through shipping.

WA has currently purchased satellite tags exclusively for tracking entangled whales.

Acoustic technology considered too expensive for fish traps.

Geoff Liggins - Perhaps a northern and southern project for fish traps.

- Submerged gear out of the question in the north due to strong currents.
- North uses heavier head gear, perhaps a solution is horizontal lines for grappling.

Queensland gets around some of this in net fisheries due to shorter periods of set time due to attendance rules.

Fisher 3- Sink rope for the spanner crab

- Using trot lines
- Trialled different ropes
- Sink rope damaging hauler

Fisher 4 – sees as management/compliance issue, can grapple up to 50 fathoms

Comments on 1 day GTR for the Northern Trap Fishery.

- Experiences strong currents,
- Retrieval takes longer with strong current,
- Extra fuel use,
- Rope tension a big problem.

Fisher 5 Could we use compressed air, like in a life jacket in a trap? Acoustic remote activated, air filled bag canister release (like diving, salvage lift bag).

Questions regarding satellite tracking gear

- Find out if entanglement occurs when gear is attached to rope, or if shipping cuts rope and then entanglement occurs.
- Most entanglements associated with fishing gear in Hunter region which has a high concentration of shipping.

Disentanglement response has cost NSW government \$500,000 year-to-date

Some fish traps pulled twice a day at the moment, so complex systems are not feasible.

Grappling horizontal gear fine

- But don't have permission from DPIE.
- Acoustic devices fine with lobster, fish traps don't have funds.

Northern trappers – horizontal rope possible solution

- Short rope would only work if tide not running

Spanner crab – sink rope could work but need to solve the hauler issue.

North coast issues because current runs too quick with the AEC.

Whales migrate close to the coast on their northern migration.

Fisher 6 – Thicker rope at bottom, then thinner rope at top, but need to understand where the entanglement occurs (top, bottom or middle). I run 30 fathoms of 7 mm rope thickness at the surface, and then goes to 10mm. My trap won't break off near the bridle, it will break 70 fathoms off the bottom so I can give myself a chance of grappling my trap back. It all depends where the whale might pick up the gear. If the majority are entangled at the surface, you could use 5 fathoms of 7mm and then normal (10mm) to the trap.

Fisher 7- We currently have restrictions on the thickness of trap ropes near the cable zones in Sydney (submarine cables), if we hook up the rope breaks (max 8mm rope).

Biodegradable rope

- Fisher 8 concerned ghost fishing issue.
- Expensive option that doesn't offer much.
- Trialled in WA – negatively buoyant, but don't know when it's going to snap leading to safety concerns.
- No understanding of strength rating or how long it lasts or reduced strength overtime.

Daniel Johnson – a detailed gear survey would assist in determining the suite of gear configurations (temporal and spatial variations) and operational aspects and utility of solutions. It may be that operational aspects are just as important as the gear. This could involve:

- Documenting the difference between north & south and season of the year.
- Ask what fishers already do to mitigate whale entanglements.
- WA have already completed 2 fleet wide detailed gear surveys as a start.

Geoff Liggins - Knowledge of the configurations can assist the debate on management of mitigation strategies.

- Pre-trial work, gear surveys could be funded by FRDC or others
- Smart drum lines use weak links at the top.
- Potential to construct an experiment to withstand weather conditions but break nearer the trap (in the event a whale is hooked in heavier rope).
- Fisher 9 and Fisher 10 concerned that traps may break off in heavy sea conditions.

Investigate the use of cardinal marks to designate fishing areas on shipping navigation systems.

4.3c Recommendations from Stakeholders

Following the discussion there was strong agreement among workshop attendees for the following four actions:

1. Trial gear and techniques to reduce entanglements
 - a. Described in detail in Section 4.6
2. Develop a NSW OTL Code of Practice for whale entanglements.
 - a. OceanWatch in consultation with fishers and government
3. Develop and complete a gear survey throughout the NSW OTL.
 - a. A project leader and funding will be sought for this work, which was given high priority by all workshop attendees.
4. Investigate options for funding of further research, including:
 - a. Development of a more durable hauler for use with lead-line.
 - b. Documenting commercial vessel operations to determine if they are a cause of broken gear.
 - c. Obtaining access to the rope loss fishing app, for use by fishers using submerged floats and horizontal lines.
 - d. Tracking cut-off gear.
 - e. Accurate and timely whale tracking on the NSW East Coast.

4.3d Evaluation of Gear Types by Fishers

The workshop identified the following list of gear types and techniques (Table 1).

Table 1. List of Gear Types and Techniques

a. Minimising ropes and floats in the water column
Acoustic time release programmable (exact)
GTR time release (approximate)
Grappling a subsurface short vertical rope
Grappling a subsurface horizontal rope
Compressed air canister release
b. Rope alternatives
Negatively buoyant rope
Reduced breaking strength rope
Biodegradable rope
c. Other
Time tension line cutter
Weak links
Acoustic deterrent device (Pingers)

The system used by attendees (Table 2) ranked the importance of gear types and techniques for trial.

Table 2. Rating System Used by Workshop Attendees

4	Very Important
3	Fairly important
2	Not very important
1	Not important

Fishers ranked importance of modifications to gear types and techniques for the demersal fish trap, spanner crab and lobster fisheries (Table 3).

The number of industry participants that ranked the listed gear types or techniques were; Demersal Fish Trap (10), Spanner Crab (2) and Lobster Trap (8). Using the scoring system in Table 2, the maximum score for each sector was 40, 8 and 32 respectively. A percentage score is also displayed.

Table 3. Ranking of Importance of Testing Gear Types and Techniques

Gear type or technique	DFT	DFT%	SPC	SPC%	L	L %
Minimising ropes and floats in the water column						
Acoustic release	17	43	2	25	15	47
Time release programmable (exact)	19	48	2	25	24	75
GTR time release (approximate)	24	60	2	25	19	59
Grappling with a subsurface horizontal rope	30	75	2	25	21	66
Compressed air canister release	16	40	2	25	11	34
Grappling of a subsurface short vertical rope	12	30	2	25	13	41
Rope alternatives						
Negatively buoyant rope	20	50	5	63	16	50
Reduced breaking strength rope	29	73	6	75	19	59
Biodegradable rope	10	25	2	25	8	25
Other						
Weak links	14	35	4	50	14	43
Time tension line cutter	10	25	2	25	10	31
Acoustic deterrent device	20	50	5	63	14	44
Maximum score	40	100	8	100	32	100

The highest ranking modification for demersal fish trap comprised techniques or gear that minimises rope and floats in the water column including grappling and use of time releases. Rope alternatives and acoustic deterrent devices were also ranked with potential.

Fishers ranked the importance of the gear types for NSW OTL Demersal Fish Trap (Table 4).

Table 4. Ranking of Importance of Testing Gear Types or Techniques for Demersal Fish Trap

Gear Type or technique	Score
Grappling with a subsurface horizontal rope	30
Reduced breaking strength rope	29*
GTR time release (approximate)	24
Negatively buoyant rope	20
Acoustic deterrent devices	20*

*Although use of head rope with reduced breaking strength was identified as a potential mitigation measure worth trialling (ranking score 29), the learned experience from the room identified this technique would most likely be unsuccessful and potentially lead to concomitant problems in any disentanglement opportunity. The safety of the use of biodegradable rope was questioned with

supplementary concerns regarding the potential to lose fishing gear resulting in ghost fishing. Additionally, although the use of acoustic deterrent devices (Pingers) received interest (ranking score 20), however comments were raised regarding their suitability and effectiveness.

Fishers ranked the importance of the gear types for NSW OTL Spanner Crab (Table 5).

Table 5. Ranking of Importance of Testing Gear Types or Techniques for Spanner Crab

Gear Type	Score
Reduced breaking strength head rope	6
Negatively buoyant rope	5
Acoustic deterrent device (Pingers)	5*
Weak links	4

In contrast to demersal fish trap, highest ranking gear modifications for the Spanner Crab fishery included reduced breaking strength and negatively buoyant rope.

Although discussion was had on the effectiveness of acoustic deterrent devices, spanner crab fishers ranked acoustic deterrents as potentially logistically and operationally appropriate. Weak links were ranked by fishers as having some potential merit.

Fishers ranked the importance of the identified gear types for the NSW Lobster Fishery (Table 6).

Table 6. Ranking of Importance of Testing Gear Types or Techniques for NSW Lobster

Gear Type	Score
Time release programmable (exact)	24
Grappling with a subsurface rope -horizontal rope	21
GTR time release (approximate)	19
Rope thickness (reduced breaking strength) head rope	19*
Acoustic release	17

Some Lobster fishers have already made efforts to trial acoustic release devices. Additional or optional measures were discussed and ranked with gear configurations comprising programmable time release devices, GTRs and acoustic release as highest importance for further testing. There was also interest in the trialling of reduced breaking strength rope, although as previously described there is concern for concomitant impacts.

4.3e Code of Practice

Fishers participating in the workshop communicated full support for the development of a NSW whale entanglement code of practice. The development of a code was viewed as an initial positive step to reduce the incidence of, and risk associated with, whale entanglement in NSW fishing gear.

4.3f Call for Volunteers to Test Gear Types

Fishers expressed interest in testing gear on their own boats. Table 7 indicates the numbers of fishers interested in the trialling the modified gear types.

Table 7. Summary of Gear Types and Fishers Interest in Testing

Gear Type	Votes	Names of interested Fishers
Acoustic time release	9	6 fisher
Time release - programmable (exact)	6	4 fishers
Grappling with a subsurface horizontal rope	15	2 fishers
Negatively buoyant rope	9	3 fishers
Reduced breaking strength rope	8	3 fishers
Acoustic deterrent device (Pingers)	5	3 fishers
GTR time release (approximate)	4	1 fisher
Grappling with a subsurface short vertical rope -short rope	1	1 fisher
Weak links	1	1 fisher
Compressed air canister release	1	1 fisher
Biodegradable rope	0	No interest
Time tension line cutter	0	No interest

Table 7 results contrast with those indicated in Tables 3, 4, 5 and 6. In part this was because some fishers voted for gear they thought might be supplied by the project at reduced cost. For example, fishers would welcome the chance to test devices that minimise rope and floats from the water column, if the costs were supported by the program.

5. Recommendations

5.1 Code of Practice

The NSW OTL Whale Code of Practice (WCoP) should be developed through a collaborative approach between PFA, OceanWatch, NSW fishers and NSW DPIE.

The WCoP should:

1. Document whale specific best practice fishing operations for NSW fishers
2. Provide information on the appropriate course of action when encountering an entangled whale
3. Highlight reporting requirements for interactions with TEP species

4. Highlight opportunities for NSW fishers to add to the knowledge base concerning whale migrations in NSW waters

The WCoP should supplement existing guidelines outlined in the NSW Ocean Trap and Line Fishery Code of Practice (NSW OTL CoP) previously developed by OceanWatch and adopted by NSW OTL fishers through the OceanWatch Master Fishermen training and assessment program.

5.2 Gear Trials

Gear trials should be undertaken to determine the practical utility and safety aspects of gear modifications that may potentially minimise whale entanglement. Trials will determine potential uptake by endorsed fishers and provide focus for further scientific trials to determine whale entanglement mitigation.

Workshop rankings and fishers' expressed interest in testing gear on their own boats, should be used to guide and prioritise proposed field trials. Gear trials should introduce fishers to a range of mitigation measures focussed primarily on the demersal fish trap and spanner crab fisheries. Gear trials will provide fishermen with the gear to trial (within program budget and scope) and instruction on recording information to assess operational performance. Data collected will provide sufficient detail and rigour to meet the proposed aims of the trials, and inform recommendations for progression to further trials.

Gear trials may include potential modifications not currently permitted under current fisheries management arrangements, proceeding only through an agreed permit process.

Trials that require removal of surface head gear should also incorporate trials of a rope-less fishing App. The App should be used to identify the location of set fishing gears, both for compliance outcomes and to reduce conflict between fishers and gear types.

5.3 Gear Survey

There are known variations in the spatial and temporal use of fishing gears within NSW OTL endorsement types, i.e. gear configurations are modified periodically to respond to sea conditions, seasons, area, depth, current etc.

A detailed survey design would need to measure across the various spatial and temporal conditions to be able to provide data that can describe a typical gear configuration. A fishery wide gear survey is considered a major body of work and is outside the current scope of this project.

Appendix 1. Workshop Attendees

Name	Sector	Area
Len Stephens	Facilitator	NA

Industry representatives

Name	Relevant Fishery	Area
Gary Bordin	OTL Spanner crab	Ballina
Paul Porter	OTL Spanner crab	Yamba
Troy Billin	OTL - Line	Yamba
Danny Stewart	OTL – Line, DFT and Lobster	Coffs Harbour
Mitchell Sanders	OTL – Line, DFT and Lobster	Newcastle
Danny Green	OTL – Line, DFT	Coffs Harbour
Mark Cranstone	Lobster and COMMFISH	Newcastle
Scott Westley	Lobster	South coast
Dan Gogerly	OTL – Line, DFT and Lobster	Wallis
Noel Gogerly	Lobster	Wallis
Steve Rosskelly	OTL – Line, DFT and Lobster	Wallis
Chris Judd	OTL - DFT	Central Coast
Paul Sullivan	OTL – Line, DFT	Sydney
Tricia Beatty	PFA - CEO	Coffs Harbour
Glen Foxtan	WA Octopus	WA
Glen Fisk	SIV fisher	Victoria
Leah Powell	SIV fisher	Victoria
Darryl Grey	TSIC rep	Launceston
Emma Woodcock	TSIC rep	Hobart
Margaret Stevenson	QSIA rep	Bundaberg
Graham Stevenson	QSIA rep	Bundaberg

Government

Name	Sector	Area
Susan Crocetti	NSW NPWS	NSW
Simon Walsh	DPIE	NSW
Daniel Johnson	DPIE	NSW
Jason How	WA Fisheries	WA
Geoff Liggins	NSW DPIE	NSW
John Pritchard	A/G Department of Environment	Canberra

OceanWatch Australia

Name	Sector	Area
Lowri Pryce	OceanWatch - CEO	Sydney
Michael Wooden	Program Manager	Sydney
Simon Rowe	Program Manager	Sydney
Brad Warren	Project Extension	Newcastle
Andy Myers	Program Manager	Newcastle