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**West Coast Rock Lobster Whale
Entanglement Mitigation Workshop**

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Important disclaimer

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1. Executive Summary

Whale entanglements in commercial fishing gear in Western Australia (WA) have occurred since the 1990s with the vast majority (> 95%) of entanglements being humpback whales (*Megaptera novaeanglia*). The humpback whale population off the Western Australian coast is increasing rapidly following the cessation of whaling in the 1960s. Recent estimates suggest that the whale population is doubling in size approximately every seven years.

The West Coast Rock Lobster Managed Fishery (rock lobster fishery) targets the spiny lobster *Panulirus cygnus* using baited wood-batten pots fished singularly (generally) with a pot line attached to a float rig. The rock lobster fishery is Australia's most valuable 'wild capture' single species fishery (GVP \$400 million annually). As part of a move to quota management, licence holders in the fishery began fishing year round in 2013 compared to the historic period of fishing (November to June). This resulted in an increase in fishing effort during the humpback whale migration season (e.g. May – November) and a resultant increase in entanglements.

In 2013, key stakeholders from government and the fishing industry came together to workshop the issue, with the aim of developing measures to reduce entanglements. A number of outcomes recommended by the workshop (primarily changes to gear) were implemented into legislation for the rock lobster fishery. An assessment of the effectiveness of gear modifications in reducing whale entanglements has subsequently been undertaken. Preliminary results highlight that there has been about a 60% reduction in entanglements in rock lobster fishery gear as a direct result of the implementation of gear modifications. However, due to the increasing numbers of humpback whales migrating along the Western Australian coast, the overall number of entanglements have increased in recent years. Therefore, it is now necessary to review the current management arrangements.

A workshop was held over 5 and 6 September 2019, and again brought together key stakeholders to consider the latest information regarding whale migration and the appropriateness of additional management measures to reduce entanglements. The workshop resulted in 15 practical options, and identified potential additional research areas. The 15 workshop options were grouped into low, medium or high categories, based on the level of impact they would have on fishing operations, should they be implemented.

The workshop participants suggested that the low impact options could be considered for the next season (2020-21, commencing 15 January 2020). Implementation of the medium and high impact options should be considered as part of a review, should the total number of reported entanglements in rock lobster fishery gear exceeded 10 and 15 entanglements respectively in any twelve month period.

The Department of Primary Industries and Regional Development (Department), and the Western Rock Lobster Council intends to consult with the rock lobster fishery licence

holders more broadly on the workshop outcomes, before providing a recommendation to the Minister for Fisheries regarding implementation of additional whale mitigation measures.

The Department and Council wishes to thank all workshop participants for their time, their willingness to engage and the leadership shown in developing practical options to help address this important issue.

2. Background

Whale entanglements in commercial fishing gear in Western Australia (WA) have occurred since the 1990s with the vast majority (> 95%) of entanglements being humpback whales (*Megaptera novaeanglia*). The humpback whale population off the Western Australian coast is increasing rapidly after the cessation of whaling in the 1960s. While absolute abundance estimates for this population are difficult to obtain, recent modeling suggesting a population size of approximately 20,000 (Ross-Gillespie et al. 2014). The population is estimated to be growing at a rate as high as 12% p.a. (Hedley et al. 2011; Jackson et al. 2015) – effectively doubling approximately every 7 years. This has resulted in some arguing that humpback whales should be down-listed from their current “vulnerable” status under Australian legislation (Bejder et al. 2016)

The population of humpback whales, which occur along the west coast of Australia (Breeding Stock D), migrate from Antarctic feeding ground between 70-130° E to calving and breeding grounds off the north coast of WA (Chittleborough, 1965). Humpback whales can be found in large numbers off WA during the autumn and spring (May – November) (Groom and Coughran 2012a). Recent satellite tracking has revealed a highly productive feeding ground around the Kerguelen Plateau, which coupled with its relatively close proximity to breeding / calving grounds, may explain their population increase (Bestley et al. submitted).

The West Coast Rock Lobster Managed Fishery (rock lobster fishery) targets the spiny lobster *Panulirus cygnus* using baited wood-batten pots fished singularly (generally) with a pot line attached to a float rig (see Definitions – Appendix 1). The rock lobster fishery is Australia’s most valuable ‘wild capture’ single species fishery (GVP valued at over \$400 million annually) (de Lestang and Rossbach 2017). Prior to 2010 the rock lobster fishery was managed through input-controls, including a closed season from 1 July to 14 November. However, in 2010 the rock lobster fishery transitioned to a quota management, and over 2011 – 2013, gradually moved to year round fishing to increase market access. This increase in season length saw greater fishing effort occurring during the humpback whale migration season (e.g. May – November) and a resultant increase in entanglements.

In 2012, the Commonwealth government placed a series of conditions on the fishery’s export approval, which were aimed at addressing and reducing the number of whale entanglements. These concerns were shared by state government, with the potential for seasonal closures to be reinstated to reduce whale entanglements should a suitable alternative mitigation measure not be found. To address this issue and develop possible mitigation measures the Western Rock Lobster (the Council), Western Australian Fishing Industry Council (WAFIC) and government (state and Commonwealth) held a workshop in early 2013. Also attending the workshop were commercial rock lobster and octopus fishers as well as cetacean and entanglement experts.

A report was developed from the 2013 workshop that identified 21 possible ways to address the issue of whale entanglements (Lunow et al. 2013). Options identified at this workshop included closures (spatial and temporal), options to reduce the number of vertical lines, methods to increase disentanglement rates and education programs. Of the 21 workshop options, six were potential gear modifications, which were assessed in terms of their cost and practicality of use through a series of gear trials with fishers in late 2013 (How et al. 2015). Outcomes from the workshop and gear trials resulted in a series of gear modifications being legislated in June 2014 which were aimed at reducing whale entanglements (Table 1).

An assessment of the management measures were reviewed annually by the Operational Whale Entanglement Reference Group (OWERG); whose membership comprised of fishers from the rock lobster and octopus fisheries as well as representatives from the Commonwealth Department of Environment and Energy and the then Department of Fisheries. A series of minor modifications (primarily around the length of unweighted rope fished) occurred in 2015 and in 2016 (Table 2). There was agreement at the OWERG that the changes made in 2016 would remain in place without modification for at least three years before discussion would occur on relaxing any of these arrangements. It was noted however, that should additional mitigation measures be required, they could be implemented prior. A summary of the gear modifications which have been in place since 2016 are provided in Table 1 and illustrated in Figure 1 (full management plan clauses are provided in Appendix 1 – Current Management Arrangements).

*Table 1 Summary of gear modification requirements for maximum rope length, surface rope, floats and float rig length and periods between pulling pots for both shallow and deep water. * Shallow water was defined by the depth that could be fished with the maximum unweighted rope component (see Table 2) (adapted from Bellchambers et al. 2017).*

	Shallow Water * (~< 20 m)	Deeper Water (> 20 m)
Rope length	No rope / water depth ratio	Rope (bridal-float) < 2x water depth
Surface rope	Surface rope permitted	No surface rope [negatively buoyant rope (top third)]
Float rig	Included in max. unweighted rope length	Max float rig 5 fathoms (incl. tail)
Floats	Max. 2 floats	Max. 2 floats (< 30 fathoms) Max. 3 floats (> 30 fathoms)
Pull Period	No max pull period	Pots pulled once every 7 days

Table 2 Changes to the maximum unweighted rope and season timings by season since the gear modifications were introduced. (adapted from Bellchambers et al. 2017).

Season	Maximum Unweighted Rope	Whale mitigation season
2014	15 fathoms	1 Jul – 14 November
2015	18 fathoms (inside whale zone ¹)	1 May – 14 November
2016 & 2017	18 fathoms	1 May – 31 October

¹ The 'whale zone' was a defined region within the fishery that generally encompassed waters less than 20 m

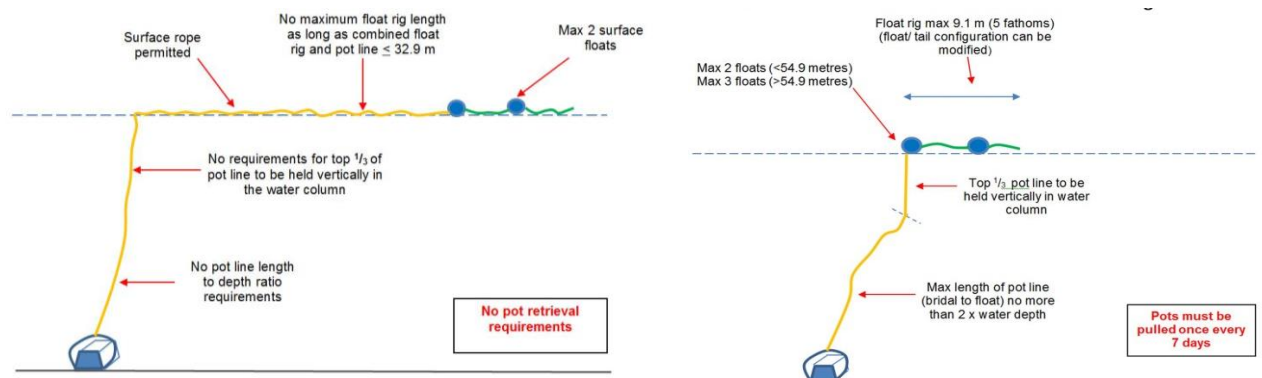


Figure 1 Diagrammatic representation of the gear modifications required in a) shallow (~< 20 m) and b) deep (~> 20 m) water depth

An assessment of the effectiveness of gear modifications in reducing whale entanglements has been undertaken (How et al. in prep). Preliminary results highlight that there has been about a 60% reduction in entanglements in rock lobster fishery gear as a direct result of the implementation of gear modifications. However, due to the increasing numbers of humpback whales migrating along the Western Australian coast, the overall number of entanglements have continued to increase. Therefore, it is now necessary to review the current management arrangements.

3. Review Process

The review of the current management arrangement and the identification of potential new management measures was done via a workshop, which was run in collaboration with the Council on the 5 & 6 September 2019. The workshop (Appendix 2 – Agenda) involved industry participants from the Council’s Board, Fishing Operations Committee and other fishers with expertise and special interest in whale interaction mitigation strategies (Appendix 3 – Participants). Fishers were presented with a range of information on Day 1 of the workshop (see Provision of Information). Workshop participants discussed a range of suggested options (see Workshop Discussions) before a series of outcomes (see Workshop Outcomes) and potential research projects (see Potential Research Projects) were provided.

The Department and the Council intends to consult with the rock lobster fishery licence holders more broadly on the workshop outcomes, before providing a recommendation to the Minister for Fisheries regarding implementation.

4. Provision of Information

There was a series of presentations on Day 1 of the workshop (5 September 2019).

Opening Remarks

- Nathan Harrison (Director Aquatic Resource Management, Department) opened the workshop, and welcomed and thanked participants. Mr Harrison provided context for the workshop by outlining the greater need for a social licence for commercial fishers across WA, and the need for industry to take the lead on managing interactions with endangered, threatened and protected species.
- Social licence issues were also highlighted in the opening remarks by the Chair of Western Rock Lobster (the Council) Mr Terry Lissiman, who asked participants to consider the political and social implications of increasing entanglements. Mr Lissiman also emphasised the need for industry to be proactive in addressing the issue of whale entanglements, despite the healthy recovery of the humpback whale population off the Western Australian coast. Mr Lissiman noted that although industry has made a number of positive steps to minimize entanglements of whales with gear to date, it is a growing issue which requires on-going assessment and review.

Whale entanglements – state of knowledge

Dr Jason How (Department) provided a presentation (Appendix 4) which outlined information on the population growth of the humpback whales, information on the pattern of whale migration, why the rock lobster fishery has an issue with humpback whale entanglements and how the issue is likely to increase in the future.

The presentation then outlined the results of a recent research project which demonstrated that the mitigation measures implemented to date have been effective (How et al. in prep), however with an increasing whale population additional steps are now required. This presentation concluded with results of the first entanglement mitigation workshop which highlighted potential mitigation measures (Lunow et al. 2013), and how industry viewed the practicality of introducing these measures (How et al. 2015).

Disentanglements – challenges and risks

A presentation on whale disentanglement operations was provided by John Edwards (Department of Biodiversity Conservation and Attractions (DBCA); Appendix 5). Key points included:

- acknowledgement of the contribution the Council and industry had made through the funding of 14 tracking buoys;
- there are 140 trained responders from Esperance to Broome (officers from DBCA's Parks and Wildlife Service and Department);
- fishers have not, and will not, be trained in disentanglement operations given the high risk to people involved in the operation, the risk of damage to vessels, liability issues and the legislated need for direct supervision of a wildlife officer;
- common misconceptions regarding disentanglements include; the whale knowing we are there to help, the need to get in the water to attempt a disentanglement, cutting off as much rope as possible is better than nothing, and that something must be done immediately;
- the tragic outcomes of some disentanglement operations were highlighted including the death of a Canadian fisherman; and
- the “dos” and “don'ts” of what fishers can do to help and how to report an entanglement.

Compliance implications

Compliance around the whale mitigation measures was presented by Mr Todd A'Vard (Department – Appendix 6). The number of fisheries offences committed against each of the management plan clauses was provided with the main issues being: i) too many floats and ii) insufficient or inappropriately positioned weights.

Key Considerations

The final session for the day consisted of presentations provided by Dr How and Mr Graeme Baudains (Department – Appendix 7). Dr How advised participants of the latest research information specific to the workshop sessions scheduled for the next day. This information included:

- the variation in the timing of the humpback whale migration from year to year;
- the earlier occurrence of the migration and entanglements; and

- the rock lobster fishery primarily entangles whales as part of their northern migration.

Several management measures were suggested including:

- earlier commencement of the whale entanglement mitigation period to 1 April;
- flexible start time for the management arrangements, triggered by the first reports of migrating whales; and
- increased gear modifications during the northern migration.

Information was also provided relating to where (i.e. what water depths) in the rock lobster fishery whales migrate, and potentially interact with rock lobster pots. The water depths in which whales migrate depends on the strength of the Leeuwin Current, as whales migrate inside the Leeuwin Current. This information included:

- there are minimal whales and entanglements in shallow waters (< 20 m);
- most entanglements were associated with fishing in 54.9 – 73.2 meters (30 – 39 fathoms) depth range (noting that this was an average over the whole fishery and 17-year time period); and
- greater entanglements may occur in years of stronger Leeuwin Current when whales are forced closer to shore earlier on their northern migration.

Some potential management arrangements were suggested on the basis of these data.

Finally, the issue of pot usage was examined. Reducing the number of pots (or vertical lines) in the water should help reduce the number of entanglements. Workshop participants were provided an interactive webpage where they were able to alter the maximum number (cap) or usage (currently 50%) of pots which could be used in any month. Changes could then be examined on the actual number of pots which were likely to be fished, how this may impact whale entanglement rates and also the viability of smaller operators.

Mr Baudains then highlighted the social impacts of whale entanglements, which include risks around the reaction of the public to entanglements and the potential for injury or death of a person involved in dis-entanglements. Mr Baudains recommended that industry take the lead in setting a limit / target level (i.e. number of entanglements / year) that would trigger further action. The best defence to this social issue is to demonstrate to the government and general community that the industry is working to keep reducing the number of entanglements.

5. Workshop Discussions

Mr Matt Taylor (Council) facilitated the workshop component on 6 September. He welcomed participants, then split the workshop participants into four groups (each group consistent of industry members and a Departmental representative). Each group was assigned one of four topics below for discussion:

1. Changes to current management options
2. Temporal changes
3. Spatial changes
4. Other options or other ideas

The ideas listed by each of these groups were then shared with all groups such that they could be discussed and any additional ideas captured. These discussion points were then captured and are provided below.

5.1 Gear Changes

Suggestion 1: Make the use of lead core rope (spliced into rope) mandatory

Current Arrangements: There is no stipulation on how clauses 26A-(2) (b) and (c) of the West Coast Rock Lobster Managed Fishery Management Plan 2012 (Plan) must be achieved.

Comment: Some fishers use a section of lead core rope within their pot line while others meet the management clause through the use of a lead weight spliced / clipped into the rope such that the weight hangs clear of the pot line. Industry workshop participants believed a weight clipped to the pot line provides an additional entanglement point which may result in more entanglements. Having additional knots on the line caused by using lead rope was seen as less concern than the lead weight hanging from the pot line.

Suggestion 2: Shorten the length of rope which can be used to 1.5 times the water depth

Current Arrangements: Clauses 26A-(2) (a) of the Plan; maximum length of the pot line is equal to two times the depth of the water being fished

Comment: A suggestion to shorten the maximum length of the pot line to 1.5 times the depth of water was raised by two groups. One group suggested this pot line reduction apply to water depths less than 30 fathoms. The idea of reduced rope length meant less “loose” rope in the water, hence reducing the potential for an entanglement.

Suggestion 3: Increase depth at which fishers are allowed to use 3 floats

Current Arrangements: Clauses 26A-(2) (3) of the Plan; the float rig is attached to – (ii) no more than three surface floats when used in waters greater than 54.9 meters in depth

Comment: Information provided during the presentations (Appendix 4) showed that entanglements were more associated with fishing in waters between 54.9 –73.2 meters (30–39 fathoms). As this is the depth at which fishers were permitted to use an additional float (only two floats are permitted to be used in waters < 54.9 m), workshop participants suggested that this depth should be increased. Initial suggestions were that it should be increased to 35 or 40 fathoms at which three floats could be used.

Suggestion 4: Adjust float rigs such that floats detach easily should a whale become entangled

Current Arrangements: There is no stipulation on how floats must be attached to the float rig

Comment: A number of fishers have adjusted how they attach floats to their float rig. These adjustments were designed such that the float closest to the pot line would “pop off” under pressure. Therefore, if a whale became entangled the float would “pop off”, increasing the chance that whale would be able to release itself. This is achieved through “lazy splicing” (two tucks) the float onto the float rig and a range of other methods. Some fishers have employed this technique voluntarily during the whale migration periods, and have found it to be successful. Some of their pots were recovered with a single float still attached away from where it was set, indicating that a whale may have come into contact with the rope, popped off the float and dragged the pot before coming free of the ropes.

Suggestion 5: Move to thicker rope

Current Arrangements: There are no management arrangements regarding rope thickness

Comment: A preliminary analysis was undertaken comparing the gear from entangled whales compared to its usage within the fishery (How et al. 2015). This indicated that thinner ropes were over-represented in entanglements. Fishers suggested that a thicker rope (10–14 mm) may be easier to see for a whale and therefore less likely to interact with the gear. However, other fishers noted that whales appear to seek out gear, particularly on calmer days, to rub on. Therefore, a thicker, more visible rope may increase entanglements.

Suggestion 6: Apply a 7 day pull rule to the shallow water

Current Arrangements: No maximum soak period currently exists when fishing with < 18 fathoms of rope

Comment: Modeling and data from satellite tagged whales indicated that the number of interactions in shallow water (< 20 m) was small compared to deeper depths. This permitted

an area with less gear restrictions (such as no requirement for pulling gear every seven days when fishing with < 18 fathoms of rope). Workshop participants thought that if fishers were not actively fishing (not retrieving their gear every 7 days) they should be required to remove pots from the water, regardless of water depth.

5.2 Definition of, and reduction in, pot usage rates

Discussions around changes to pot usage rates are provided below. However, in the context of these discussion it was noted that during calm periods whales seek out ropes to rub against. Therefore, the reduction in entanglements may not be proportional to the reduction in usage as it isn't a random encounter between whales and gear but rather they are actively sought by the whale.

Suggestion 7: Reduce pot usage rates during May to November; and implement a sliding scale of pot usage reductions such that smaller operators are still viable.

Current Arrangements: Clauses 68 (1) of the Plan; The maximum number of pots that may be operated under the authority of a licence is current entitlement times 0.05 (note slight difference for Zone B). An Instrument of Exemption allows for double this number of pots to be used from November to April.

Comment: It was recognised that additional reductions in pot usage may be necessary during the whale migration to reduce entanglements. Fishers were provided with an interactive webpage (developed by the Department) by which they could alter pot usage (by either a percentage of entitlement or as a maximum pot usage) to examine the effect on the number of pots in the water during each month. It was evident from this interactive webpage that fishers were already fishing below their current permitted 50% pot usage rate.

Any additional reductions in usage may have a significant social and economic impact unless arrangements are made to manage the impact on smaller licence holders, who may become unviable during the period of reduced pot usage. Industry workshop participants were of the view that the minimum number of pots that can be fished economically is ~60 pots, so any reduction in pot usage should not apply below this number of pots.

It was therefore resolved to undertake some modeling of effort levels based on a sliding scale of usage, such that smaller entitlement holders (~60 pots) were able to fish with their full entitlement while larger fishers experienced a great reduction in permitted number of pots. This modeling work undertaken with the industry will help determine the reduction in pots required whilst still maintaining the viability of small entitlement holders.

Suggestion 8: Implement more drastic reduction in pot usage rates during the northern whale migration (i.e. May – July)

Current Arrangements: Clauses 68 (1) of the Plan; The maximum number of pots that may be operated under the authority of a licence is current entitlement times 0.05 (note slight difference for Zone B). An Instrument of Exemption allows for double this number of pots to be used from November to April.

Comment: With greater entanglements of humpback whales in rock lobster fishery gear during the northern migration of humpback whales, there was discussion in terms of altering pot usage rates throughout the season. Participants suggested that greater usage restrictions (noting suggestion above) should occur during the northern migration period (May – July).

Suggestion 9: Decrease pot usage rates and re-define them in terms of the number of vertical lines

Current Arrangements: Using more than one pot per line is permitted, however fishers entitlement is based on the number of pots they are permitted to use, not the number of vertical lines.

Comment: Currently licence holders are restricted in terms of the number of pots that they can fish with, based on their entitlement. However, the entanglements in rock lobster gear occur in the pot line, so reducing the number of pot lines should be the primary objective. During the “whites” migration (see de Lestang et al. 2016 for details) fishers occasionally fish with more than one pot on a pot line. Should a drastic reduction in pot usage occur it may be economical for some fishers to fish more than one pot on a pot line. Therefore, fishers raised the possibility of usage rates being expressed as pot lines (as opposed to pots) to provide greater flexibility in their fishing operations.

Some fishers however, expressed concerns in fishing with multiple gear on a pot line saying it wasn't an option in winter as it could cause snagging between gear when fishers tend to fish “lumps” during this time. There was also concern that this form of fishing could increase the number of whales which were reported entangled as they would become anchored in the gear and hence more reported. It was noted that these situations tend to lead to an increased disentanglement rate.

5.3 Entanglement Mitigation Season

Suggestion 10: Extend the period when gear modifications are required to include the months of April and November

Current Arrangements: Clauses 26A-(1) of the Plan; This clause applies to the use of pot lines and float rigs used to fish for rock lobster during the period commencing on 1 May and ending on 31 October in any year

Comment: An entanglement on 20 March 2019 prompted the Department and Council to ask fishers to voluntarily implement gear modifications earlier than the legislated 1 May 2019 start date. Similarly, there was a request from industry to determine the status of the southern migration in 2018 to determine if the mitigation period should be extended past the 31 October end date. Workshop participants proposed to legislatively extend the whale mitigation period during both the northern and southern migration to run from 1 April to 30 November. It was the position of workshop participants that if this extension was done as a voluntary measure, it would not be sufficiently adhered to by fishers.

Workshop participants also suggested that the period of reduced fishing effort (currently 1 May to 31 October) should not be changed.

Suggestion 11: Industry to voluntarily undertake whale sightings surveys via the whale sightings App

Current Arrangements: Fishers are legislatively required to report interactions with protected species, but not sightings.

Comment: Workshop participants were willing to provide sightings of whales via comments on the catch disposal records. Explanation was provided on how this information was not as beneficial as providing that data through a purpose-built Marine Fauna Sightings App (which supersedes the current WhaleSightingsWA App). There was some reluctance about the need to use an additional App, however when a protocol of when and how to use it was explained (e.g. first trip each month when steaming back in from the gear) it was thought to be a valuable option to provide additional information on the humpback whale migration, on a voluntary basis.

5.4 Improved Disentanglements

Suggestion 12: Explore options for some commercial fishers to be trained to deploy tracking buoys on entangled whales

Current Arrangements: Under the Biodiversity Conservation Act 2016 and Biodiversity Conservation Regulations 2018 any interaction with an entangled whale must be under the direct supervision of a Wildlife Officer

Comment: There was a significant amount of information presented that highlighted the issues with fishers being involved in disentanglement operations, which included the attachment of tracking buoys. However, workshop participants were keen to explore options that would enable some fishers in each port to be trained to attach a tracking buoy to a whale under certain conditions (e.g. > 20 fathoms of trailing gear).

Suggestion 13: Recognition or reimbursement for fishers who remain with an entangled whale

Current Arrangements: Fishers are not compelled to remain with an entangled whale which they encounter

The importance of reporting and remaining with an entangled whale was presented to participants by John Edwards (Appendix 5). When a fisher is able to remain with the whale, the likelihood of being able to attach a tracking buoy and subsequently disentangle the whale increases dramatically and benefits the industry as a whole. It was noted however, that it can be a costly exercise for a fisher to standby as they may be unable to complete fishing operations on that day. It was suggested that fishers who remained with an entangled whale until a DBCA whale disentanglement team arrives should be recognised either through financial contribution or broader industry recognition of their efforts.

5.5 Spatial Closures

Suggestion 14: Implement a water depth-based fishing closure during the northern migration

Current Arrangements: There are currently no spatial fishing closures for the purpose of whale entanglement mitigation

Comment: Modeling of whale entanglement mitigation measures indicated that entanglements were mostly associated with fishing in the 54.9 – 73.2 meters (30 – 39 fathoms) water depth range. Participants suggested that a closure in this water depth range during the northern migration may be an effective management strategy. Discussions around this mitigation measure highlighted that the modelled results were averaged over 17 years and the entirety of the fishery. Satellite tracking of free-swimming whales indicated that there is likely variation from year to year in the location of northern migration, so additional information may be required to refine this management option.

5.6 Other

Suggestion 15: Undertake a program to promote the positive measures undertaken by industry to mitigate interactions with whales

Current Arrangements: No such program is in place

Comment: This was one of the mitigations options identified as part of the initial whale entanglement mitigation workshop (Lunow et al. 2013) which wasn't progressed.

Participants believed that industry should take the lead in highlighting the mitigation measures that they have adopted to date, and how they are actively working to reduce entanglements and increase disentanglements in the face of a rapidly recovery whale population.

5.7 Research

Some research projects were identified during these discussions and are presented below (see Workshop Outcomes; Potential Research Projects)

6. Workshop Outcomes

The possible actions identified through the workshop were then assessed by participants. Those which were deemed not suitable / impractical were not scored, with the remaining options ranked as low, moderate or high in terms of their impact on fishing operations.

6.1 Low Impact Options

1. Extend the period when gear modifications are required to include the months of April and November
2. Apply a 7 day pull rule to the shallow water
3. Industry to undertake voluntary whale sightings surveys, using the whale sightings app
4. Explore options for some fishers to be trained and to deploy tracking buoys on entangled whales
5. Undertake a program to promote the positive measures undertaken by industry to mitigate interactions with whales

6.2 Moderate Impact Options

6. Reduce pot usage rates during May to November; and implement a sliding scale of pot usage reductions such that smaller operators are still viable.
7. Implement more drastic reduction in pot usage rates during the northern whale migration (i.e. May – July)
8. Make the use of lead core rope (spliced into rope) mandatory

6.3 High Impact Options

9. Implement a water depth-based fishing closure during the northern migration
10. Increase depth at which fishers are allowed to use 3 floats
11. Shorten the length of rope which can be used to 1.5 times the water depth
12. Adjust float rigs such that floats detach easily should a whale become entangled
1. Decrease pot usage rates and re-define them in terms of the number of vertical lines

6.4 Implementation of Options

The implementation of the various levels of options was discussed with recommendations that low impact options could be implemented for the 2020/21 season, following broader industry consultation. Moderate and high impact options could be examined if the annual number of entanglements were to exceed 10 and 15 respectively. However, should these levels be breached, a review of the years entanglements and the suggested mitigation options would occur in the first instance.

7. Potential Research Projects

A series of research projects were also proposed to provide additional data to inform future decisions.

7.1 Spatial Distribution of Migrating Humpback Whales

Information was presented on the movement of humpback whale inside the southward flowing Leeuwin Current on their northern migration. It was noted that these data came from relatively weak Leeuwin Current years and that the greatest number of entanglements occurred during a relatively strong Leeuwin Current. Fishers wanted to better understand the year to year variation in the location of the migration. A potential research project could be additional satellite tagging or aerial surveys.

7.2 Population Estimates of Breeding Stock D Humpback Whales

It has been noted that while relative abundances can be determined for Breeding Stock D humpback whales, an estimate of population sizes has been difficult (Hedley et al. 2011; Jackson et al. 2015). Fishers believed that obtaining this information would greatly assist in assessing the magnitude of future entanglement rates and also assist in their broader education program (Low Impact Options #5).

7.3 Entanglement Dynamics

The dynamics by which a whale becomes entangled in ropes and floats has not been determined. An assessment of entanglements of the North Atlantic Right Whale has been used to develop a computer simulation to determine the dynamics of the entanglements of that species (Howle et al. 2019). With possible changes to rope configurations (Moderate Impact Options #3 and High Impact Options #2-4) workshop participants thought it prudent to examine the impact that these may have on future entanglement rates.

7.4 Technical Innovation for Large Whale Disentanglement

Whale disentanglement operations are undertaken by teams from the Department of Biodiversity Conservation and Attractions (DBCA). Details of these operations were presented by John Edwards (Appendix 5 – Presentation by John Edwards). Industry has currently assisted these teams through the provision of tracking buoys with an aim to increase disentanglement rates. Workshop participants thought it beneficial to explore future technological advances with DBCA which they may be able to fund and develop further to improve disentanglement rates.

7.5 Float Transmitters

Whales have been known to move pots through interactions and entanglements. Entangled whales can move pots considerable distances. Currently these whales can only be tracked through the attachment of tracking buoys. A project looking at the development of buoys which have an in-built relocating feature, so that pots that are moved or become entangled

can be found. This will help to alleviate the financial burden of lost pots which may have been moved. It also will provide a tracking capacity for entangled whales which may not require the attachment of a tracking buoy.

7.6 Applicability of Sunken Head Gear for the WCRLMF

Sunken head gear (where the pot line and float rig are fully submerged) has been shown to be an effective mitigation strategy for whale entanglements. This option was suggested by industry in 2013 (Lunow et al. 2013), though testing revealed it to be an expensive and impractical mitigation measure for the rock lobster fishery (How et al. 2015). However, workshop participants suggested revisiting this option to see if technological advances may have been made. This technology is being implemented in other fisheries (e.g. Dungeness crab, California) to address the issue of whale entanglements.

7.7 Increased Efficiency Through Pot Design

There were proposals to potentially reduce pot usage rates further during May to October (Moderate Impact Options #1). With reduced usage rates, economic efficiencies are reduced, and at very low usage rates it may become un-economical to fish. This could be overcome through changes to how usage rates are defined (i.e. a maximum number of ropes rather than pots). Alternate pot designs could be developed which have a greater fishing efficiency than current regulated pots. Therefore, with a more efficient pot, it may be economically viable to continue fishing during periods of significantly reduced pot (or line) usage rates.

8. Acknowledgement

The Department and Council wishes to thank all workshop participants for their time, their willingness to engage and the leadership shown in developing potential outcomes to help address this important issue.

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10. Appendices

10.1 Appendix 1 – Current Management Arrangements

The management arrangements for the mitigation of entanglement of migrating whales in WCRLMF gear is imbedded within the *West Coast Rock Lobster Managed Fishery Management Plan 2012*¹

10.1.1 Definitions

float rig means the rope on the surface of the water that is connected to the first surface float and the last surface float, including any rope beyond the last surface float;

pot line means the length of rope between the first surface float and the bridle;

10.1.2 Applicable Clauses

26A. Use of pot lines and float rigs

(1) This clause applies to the use of pot lines and float rigs used to fish for rock lobster during the period commencing on 1 May and ending on 31 October in any year.

(2) The master of an authorised boat must ensure that

(a) the maximum length of the pot line is equal to two times the depth of the water being fished;

(b) the top third of the length of the pot line is held vertically in the water column;

(c) the float rig attached to the pot line is the only rope on the surface of the water;

(d) the float rig is no more than 9.1 metres long; and

(e) the float rig is attached to –

(i) no more than two surface floats when used in waters less than or equal to 54.9 metres in depth; or

(ii) no more than three surface floats when used in waters greater than 54.9 metres in depth.

(3) The master of an authorised boat must ensure that a pot line is pulled a minimum of once every seven days.

(4) Subclauses (2) and (3) do not apply to the use of a pot line used to fish for rock lobster that is less than or equal to 32.9 metres long.

(5) When a pot line used to fish for rock lobster is less than or equal to 32.9 metres long, the master of an authorised boat must ensure that –

(a) the combined pot line and float rig used to fish for rock lobster is less than or

¹ This compilation incorporates amendments up to and including the West Coast Rock Lobster Managed Fishery Management Plan Amendment 2018 published in Government Gazette No. 101 on 29/06/2018; [https://www.slp.wa.gov.au/statutes/subsiduary.nsf/0/C6997A9013323AC1482582E20015CC85/\\$file/43.11+wcrlmfmp+2012+-+29.06.18.pdf](https://www.slp.wa.gov.au/statutes/subsiduary.nsf/0/C6997A9013323AC1482582E20015CC85/$file/43.11+wcrlmfmp+2012+-+29.06.18.pdf) (accessed 9/10/2019)

equal to 32.9 metres in length; and

(b) no more than two surface floats are attached to the float rig

68. Prohibition on operating with more than the maximum number of pots

(1) The maximum number of pots that may be operated under the authority of a license is –

(a) in Zone A, the sum of –

- (i) the current entitlement of Zone A units multiplied by 0.05;
- (ii) the current entitlement of Zone B units multiplied by 0; and
- (iii) the current entitlement of Zone C units multiplied by 0;

(b) in Zone B, the sum of –

- (i) the current entitlement of Zone A units multiplied by 0.028;
- (ii) the current entitlement of Zone B units multiplied by 0.05; and
- (iii) the current entitlement of Zone C units multiplied by 0;

(c) in Zone C, the sum of –

- (i) the current entitlement of Zone A units multiplied by 0;
- (ii) the current entitlement of Zone B units multiplied by 0; and
- (iii) the current entitlement of Zone C units multiplied by 0.05

10.2 Appendix 2 – Agenda

West Coast Rock Lobster Whale Entanglement Mitigation Workshop 2019

DPIRD Hillarys – Meeting Room 2

5 & 6 September 2019

Agenda – Thursday 5 September

Time	Item	
13:00	Welcome and apologies	Chair; Nathan Harrison (DPIRD)
13:15	WRL – Challenge to industry	Terry Lissiman (WRL)
13:30	Whale entanglements – state of knowledge	Jason How (DPIRD)
14:15	Disentanglements – challenges and risks	John Edwards (DBCA)
14:45	Afternoon tea	
15:00	Compliance update	Todd A'Vard (DPIRD)
15:30	Key considerations & shiny app	Jason How / Graeme Baudains (DPIRD)
16:15	Wrap up	Chair
16:30	Close	

Agenda – Friday 6 September

Time	Item	
8:30	Welcome and recap	Chair
8:40	Facilitated workshop	Matt Taylor (WRL)
	Suggest splitting people into groups eg:	
	• Consider changes to timing of whale mitigation arrangements	
	• Consider spatial issues and pot usage rates	
	• Consider changes to current gear configuration	
	• New fishing gear and whale mitigation technology/ other ideas	
10:15	Morning tea	
10:30	Groups present findings / recommendations / identify research requirements	Matt Taylor
11:15	Setting a target	Graeme Baudains
12:00	Summary and actions	Chair
12:30	Close	Chair

10.3 Appendix 3 – Participants

Name	Organisation	Position	Attendance	
			Thursday	Friday
Nathan Harrison	DPIRD	Director Aquatic Management	Y	Y
Jason How	DPIRD	Research Scientist (Rock lobster)	Y	Y
Laura Orme	DPIRD	Management (Rock lobster)	Y	Y
Pia Dobson	DPIRD	Management (Rock lobster)	Y	Y
Simon de Lestang	DPIRD	Principal Research Scientist (Rock lobster)	Y	Y
Graeme Baudains	DPIRD	Management (Rock lobster)	Y	Y
Todd A'Vard	DPIRD	Compliance	Y	N
Jaymon Tonkin	DPIRD	Compliance	Y	N
Paula Kalinowski	DPIRD	Management (Octopus)	Y	N
Linda Wiberg	DPIRD	Management (Octopus)	Y	N
Peter Bailey	Industry (WRL)	WRLC Director; WRL A Zone	Y	Y
Ryan Labruyere	Industry (WRL)	FOC North	Y	Y
Adam Radford	Industry (WRL)	FOC C Zone	Y	Y
David Thompson	Industry (WRL)	FOC C Zone	Y	Y
Clay Bass	Industry (WRL)	WRLC Director; WRL B Zone	Y	Y
Peter Stanich	Industry (WRL)	FOC C Zone	Y	Y
Nic Sofoulis	Industry (WRL)	Original Task Force Member	Y	Y
Sam Koncurat	Industry (WRL)	Original Task Force Member	Y	Y
Terry Lissiman	Industry (WRL)	WRLC Chair	Y	Y
Matt Taylor	Industry (WRL)	WRLC CEO	Y	Y
James Cowe	Industry (WRL)	WRLC Communications	Y	N
Linda Williams	Industry (WRL)	WRLC Director; WRL C Zone	Y	Y
Clinton Moss	Industry (WRL)	Fisherman Lancelin	N	Y
Marc Jurinovich	Industry (WRL)	Fisherman Lancelin	N	Y
John Edwards	DBCA	Senior Marine Operations Manager	Y	N

10.4 Appendix 4 – Presentation by Jason How

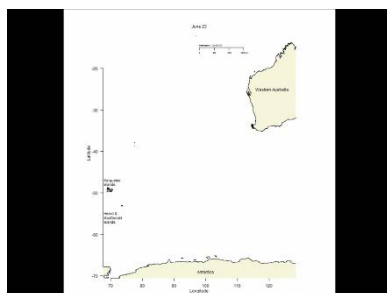
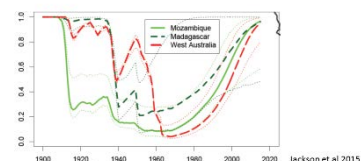
Whale Entanglement
Mitigation Workshop

State of Knowledge



Population Trajectory

- Absolute numbers difficult to estimate
- Strong recovery (10-12% p.a.)
- Population doubles every 7 years

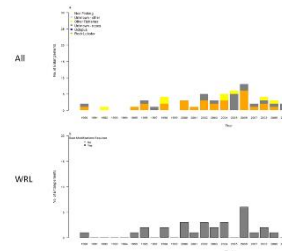


Migration pathway

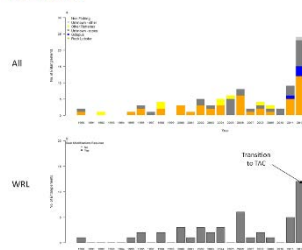
- Northern migration (May-August)
- Calve in the north
- Southern migration (August – Oct)
- Rich Feeding Grounds



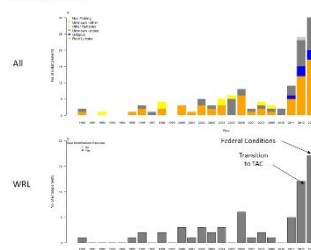
Timeline



Timeline



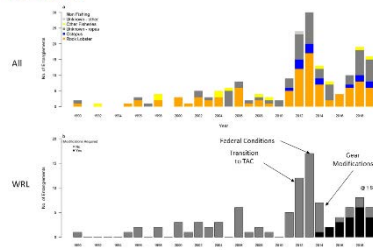
Timeline



The Response

- Federal Government
 - Remove from LENS; Grant WTO
 - Condition relating to whale entanglements
 - 2 years
- State Government
 - Require action or possible closure without approved gear modifications

Timeline



Regulation Changes

Spatial Changes ("shallow water")

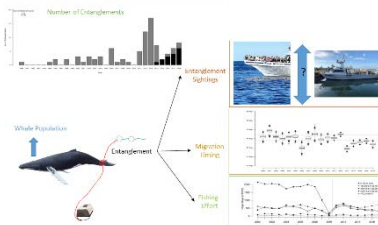
- 2014 - 15 fathoms total unweighted
- 2015 - 18 fathoms total unweighted inside (whale zone)
- 2016 - 18 fathoms total unweighted
- 2017 onwards (as per 2016)

Temporal Changes

- 2014 Jun/Jul – 14 Nov
- 2015 1 May – 14 Nov
- 2016 1 May – 31 Oct
- 2017 onwards (as per 2016)

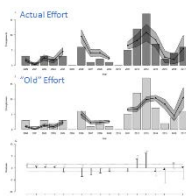


Gear Modification Assessment

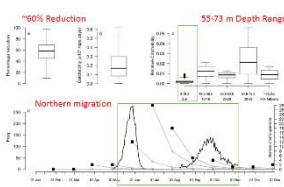


Gear Modification Assessment

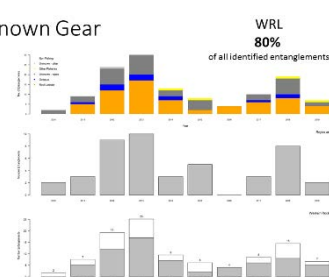
- Model fit data well
- Doesn't hit 2012-2013 peak
- Old Season worse
 - Closure 1 July – 14 November
 - Greater effort levels
- 2017
 - 6 WRL entanglements
 - > 10 WRL entanglements with old effort



Gear Modification Assessment




Unknown Gear



Levels of Accreditation Level 2

- Take up one of the three key roles appropriate to the individuals skill/qualification set in the disentanglement point vessel




- Helmsman (positioning of vessel around whale)
- Centre (safety anchor for Cutter)
- Cutter (Principle strategist)

Levels of Accreditation Level 3

- Lead a disentanglement operation
- There must be at least 1 level 3 in the Point Boat at all times when conducting a live operation.

This person will have a clear understanding of the process and also the roles and functions of all team members with the capacity to manage the operation.



Levels of Accreditation Level 4

- Undertake/lead a disentanglement operation involving a Southern Right Whale.
- Whales like all other species have a flight or fight response when under duress. Southern Right whales have more of a tendency to fight than take flight.



So why don't we train Industry?

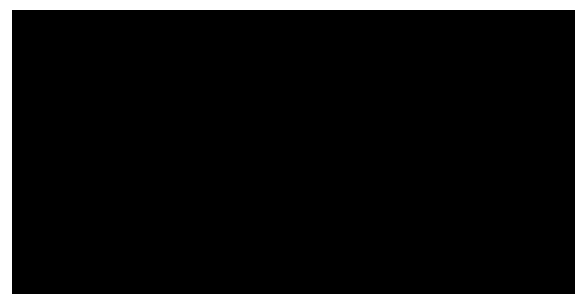
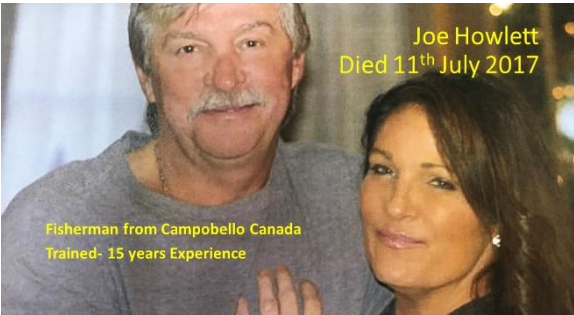
- High risk of injury to responders
- Risk of damage to vessel and fishing equipment
- Liability- who covers the individual/vessel in case of an accident?
- AMSA requirements- SMS
- Applicable legislation- 'under the direct supervision of a Wildlife Officer'
- Specialist equipment required- boats/knives



Common misconceptions



- Whales know that we are here to help and will cooperate....
- Getting in the water is usually necessary
- Something must be done immediately
- Cut as much of the entanglement off as you can, its better than nothing.

Joe Howlett
Died 11th July 2017

Fisherman from Campobello Canada
Trained- 15 years Experience



Doug
Coughran



Legislation

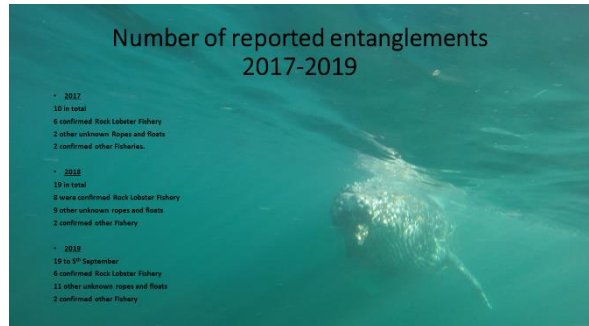
Under the Biodiversity Conservation Act 2016 and the Biodiversity Conservation Regulations 2018, any attempt to disentangle a whale must be under the direct supervision of a Wildlife Officer.



Vessels should approach no closer than 100m to a whale. Penalties can apply.

Number of reported entanglements 2017-2019

- 2017
10 in total
6 confirmed Rock Lobster Fishery
2 other unknown Ropes and Floats
2 confirmed other Fisheries
- 2018
19 in total
8 were confirmed Rock Lobster Fishery
9 other unknown ropes and floats
2 confirmed other Fishery
- 2019
19 to 27 September
6 confirmed Rock Lobster Fishery
11 other unknown ropes and floats
2 confirmed other Fishery



Media

Whale entanglements are visual, emotive and often dynamic, three key ingredients for a great story. DBCA works closely with DPIRD Fisheries to manage any media that surrounds an entanglement.

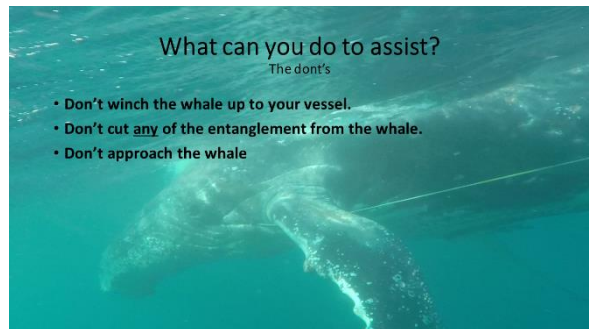
- DBCA takes the position that no blame should be levelled at a legitimate, managed fishery, that makes all efforts to mitigate interaction with marine fauna.
- Every effort will be made to not allow identification of an individual fisher in any media undertaken by the department.
- The department will continue to publicly promote a positive and collaborative working relationship between the industry, DPIRD and DBCA to mitigate the number of entanglements.



What can you do to assist?

The don't's

- Don't winch the whale up to your vessel.
- Don't cut any of the entanglement from the whale.
- Don't approach the whale



What can you do to assist?

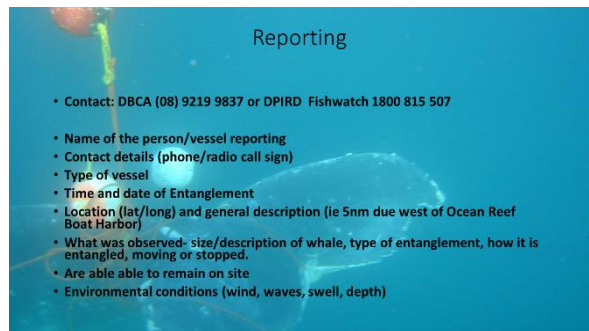
The do's

- Apply all mitigation strategies outlined in the Management Plan
- Report all entanglements as soon as possible
- Contact DBCA or DPIRD
- Standby entangled whale until response teams can arrive



Reporting

- Contact: DBCA (08) 9219 9837 or DPIRD Fishwatch 1800 815 507
- Name of the person/vessel reporting
- Contact details (phone/radio call sign)
- Type of vessel
- Time and date of Entanglement
- Location (lat/long) and general description (ie 5nm due west of Ocean Reef Boat Harbor)
- What was observed- size/description of whale, type of entanglement, how it is entangled, moving or stopped.
- Are able to remain on site
- Environmental conditions (wind, waves, swell, depth)



Response time by DBCA

- We continue to work on improving response times, the reality is that DBCA staff are not standing by on a vessel to respond to a report of an entangled whale.
 - Staff will need to be pulled off other works (possibly terrestrial) to attend, or back into work if on days off.
 - Appropriately certified staff must be available (at least one level 3)
- We require a minimum of 3 trained responders to man the point boat and at least two trained responders on the support vessel.
 - The both vessels must have appropriate survey to operate in the area of the entanglement
 - Vessels may need to be trailered and launched.
- Equipment is stored in regional and district offices around the state, these locations are often not located on the coast.

QUESTIONS?



10.6 Appendix 6 – Presentation by Todd A'Vard



Compliance Summary

Whale mitigation gear requirements –
West Coast Rock Lobster Fishery



Management plan offences:

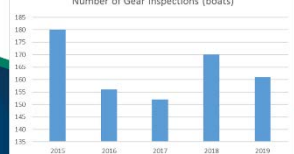
Number of offences	Offence	Clause
4	exceeded maximum pot line length for depth of water	d.26A(2)(a)
3	failed to ensure top third of pot line held vertical in the water	d.26A(2)(b)
13	failed to ensure only float rig of pot line on the surface of water	d.26A(2)(c)
2	failed to ensure float rig not greater than 9.1m in length	d.26A(2)(d)
7	failed to ensure that permitted number of surface floats not exceeded	d.26A(2)(e)
8	failed to ensure that pot line pulled a minimum once in seven days	d.26A(3)
9	failed to ensure pot line & float rig less than 32.9m in length	d.26A(5)(a)
8	failed to ensure not more than two floats attached to float rig	d.26A(5)(b)

Main compliance issues

- Negatively buoyant rope attached between float rig and pot line
- Weights used not heavy enough to hold rope vertical
- Too many floats on float rig
- Insufficient negatively buoyant rope used to hold rope vertical
- Failing to clip weights on rope when setting gear
- Surface Rope
- Weights positioned too low on pot line
- Significantly changing depths and not adjusting gear



Number of Gear Inspections (boats)

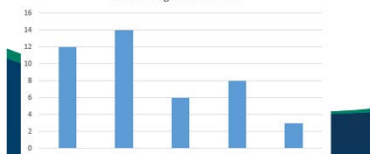


Pot inspections (number of individual boats where gear was inspected)

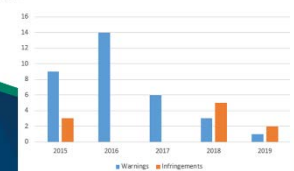


Offences detected

Whale mitigation Offences



Infringements and Warnings issued.



Non Compliance rate



Weight attached to close to pot.

Thank you

Visit dpird.wa.gov.au

Important disclaimer

The Chief Executive Officer of the Department of Primary Industries and Regional Development and the State of Western Australia accept no liability whatsoever by reason of negligence or otherwise arising from the use or release of this information or any part of it.
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10.7 Appendix 7 – Presentation by Jason How and Graeme Baudains

Whale Entanglement Mitigation Workshop

Key Considerations



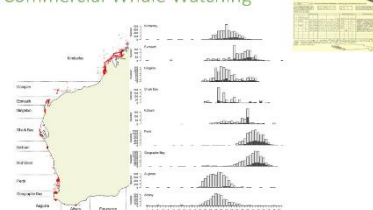
Breakout Groups

1. Temporal Changes
2. Spatial Changes
3. Changes to Current Gear Modifications
4. New Fishing Gear / Other Ideas

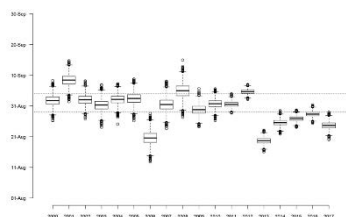
Process

- Background data / tools
- Group Workshopping of Options
 - Identify Options (pros and cons)
 - Additional research / information / regulation required
- Presentation of Options

Commercial Whale Watching



Migration Timing



Dynamic Reporting

- Industry interested in voluntary modification extension
- Provided anecdotal information to WRL in 2018

Commercial Whale Watching



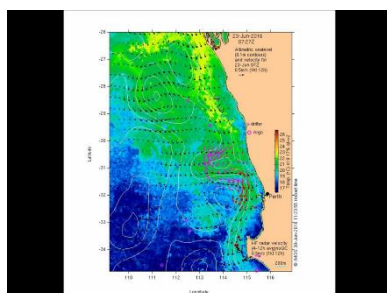
- Consider management arrangements around this
- Require investment and liaison with DBCA

Summary

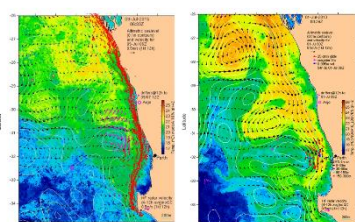
- Modification period 1 May – 31 Oct
 - Northern Migration (May – August)
 - Southern Migration (August – October)
- Variation in migration timing (weeks)
- Earlier migrations & entanglements
- WRL Entanglements mostly northern migration

Temporal Options

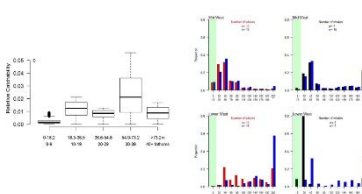
- Extend to 1 April (earlier entanglements)
- Dynamic activation of entanglement mitigation period
- Increased modifications for northern migration



Leeuwin Current



Depth



Summary

- Modifications more in deeper water (>15 fathoms)
- Minimal association with shallow (<10 fathoms) effort
- Strong association with 30-39 fathoms
 - Three floats
- Minimal detections in < 10 fathoms
- Leeuwin Current impact (strong current bigger issue?)

Spatial Options

- Two floats in all depths (currently 3 in >30 fathoms)
- Dynamic – More needed in shallow water in strong LC
- Sink head gear in deep water on northern migration
- Spatial closure (increased shallows fishing)

Other Options

Original Workshop Assessment – Not suitable??

- Seasonal closure during peak migration (i.e. June - July for northern and October for southern migration)
- Using bio-degradable ropes
- Use of remote float releases such as acoustic releases or anode timed releases
- "Dog and bone" slack in float lines
- Weak link in lead-line to allow it to break if an entanglement is about to occur
- Use of acoustic pingers??

Pot usage

- Currently 50 % of entitlement
- Vertical lines
 - Change of thinking – longlining / multiples

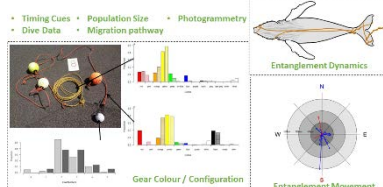
Options

- Change usage
 - By Depth
 - By Month
- Shift from % usage to number (limit) of lines
 - Increased social benefit
 - Coastal communities
 - Small operators

Shiny App



Future Research



Industry Assistance

- Driven by FRDC
- Partnership DPIRD – DBCA – AMMC
- Extension of WhaleSightings WA
- Increased species and spatial coverage
- Data provision to end-users (management)
- Provide "survey" data



Sustainability vs Social Issue

Closed Fisheries



Social Issue

Dead on Beach



Social Issue

Human Factor



Impact on Individuals Social Issue



The Issue - WCRL

- Sustainability
 - NE USA – Potential Biological Removal level
 - Population sustainability (extinction)
 - Not the case for Humpback whales off WA
- Human Activities
 - MSC and Export Approval maintained, but watching
 - Cost to Fishers and Government more broadly
 - Suffering to individual HBW & Social License
- When do we act?

Setting a Target or Limit?

- A challenge for industry and government
- Performance measure "No increase in the rate of interactions (between 0 and 6)". Historical range pre quota and no winter fishing
- After good success, now seeing increase again with 8 in 2018
- 2019 currently at 6....
- But whale popn increasing – **do nothing and entanglements will also increase**

NZ Zero Marine Mammal Bycatch

A DISCUSSION DOCUMENT ON PROPOSALS FOR A BIODIVERSITY STRATEGY FOR AOTEAROA NEW ZEALAND

- By 2050, if we have been successful, we will see:
- Overall, the net extent of indigenous ecosystems is increasing.
 - The extent of our ungraded rare and naturally uncommon terrestrial indigenous habitat (active sand dunes, braided riverbeds, estuaries, cloud forests etc) is increasing.
 - The number and extent of our freshwater and coastal wetlands is increasing.
 - Ten key freshwater pest species and ten key land-based weed species have been eradicated.
 - Aotearoa New Zealand is free from stoats, possums and rats.
 - All established pests are reduced to the level where ecological integrity is not diminishing.
 - Populations are increasing for all our threatened species.
 - Bycatch of seabirds, corals, and marine mammals is reduced to zero.
- <https://www.dpi.govt.nz/globalassets/documents/conservation/protecting-and-restoring/biodiversity-discussion-document.pdf>

Determining a new limit

- Can we set an arbitrary limit – eg we think 15 is ok?
 - Govt prefer a science based approach.
- Can we incrementally increase limit parallel to increase in popn ?
- Noting social risk, could "1" be too many?
- Should we be looking at a long term goal of "0" like NZ?
- **Best defense = strategies in place to demonstrate continuous improvement**