

# Cetacean interactions with pot fisheries in New Zealand waters



CSP Project: MIT2021-02

Technical Working Group

18 July 2022

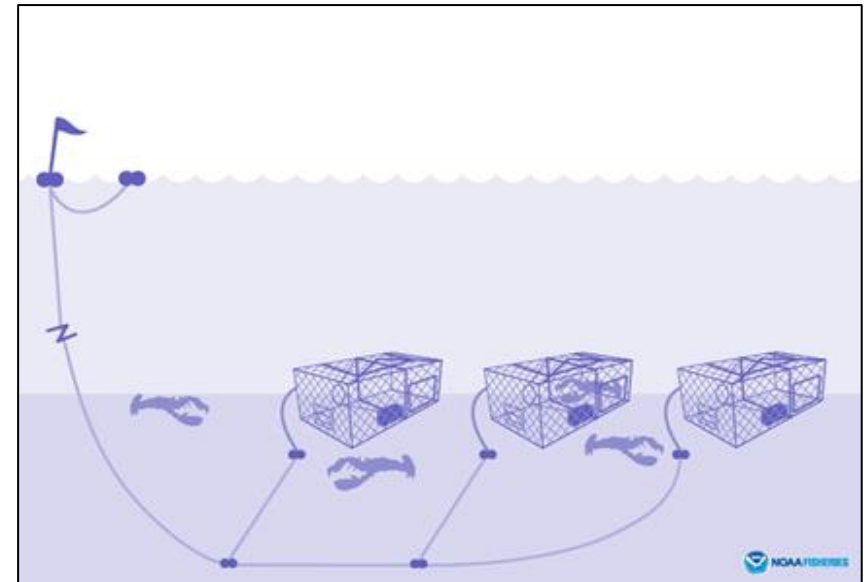
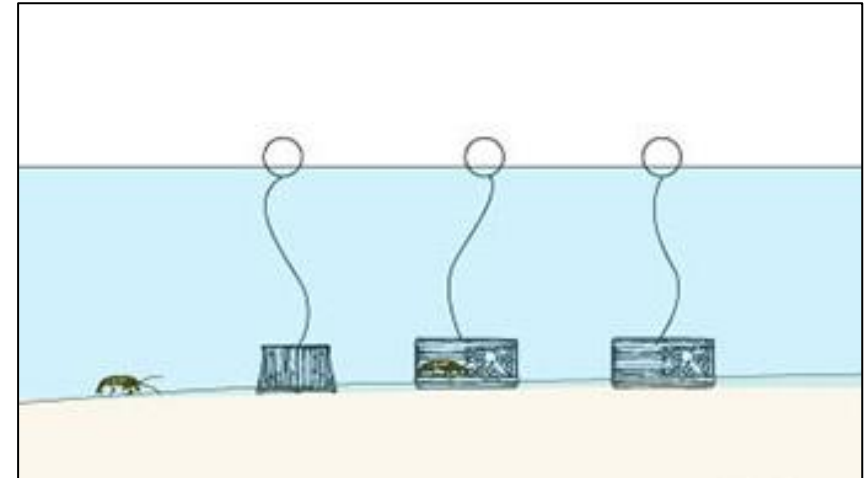
Johanna P. Pierre

Jason R. How

Alistair Dunn

# Introduction

- Cetacean interactions with pot and trap fisheries known to occur for decades
- Pot or trap fishing gear:
  - A cage-type unit designed to sit on the sea floor and hold target catch for retrieval
  - Key entangling element: buoy line (marks the gear location at the surface)
  - A range of configurations under the water
  - Project takes an inclusive approach considering pots and traps



# Introduction

## Entanglements:

- Potential for population level impacts
- Animal welfare issue
- Social licence impacts

## New Zealand context:

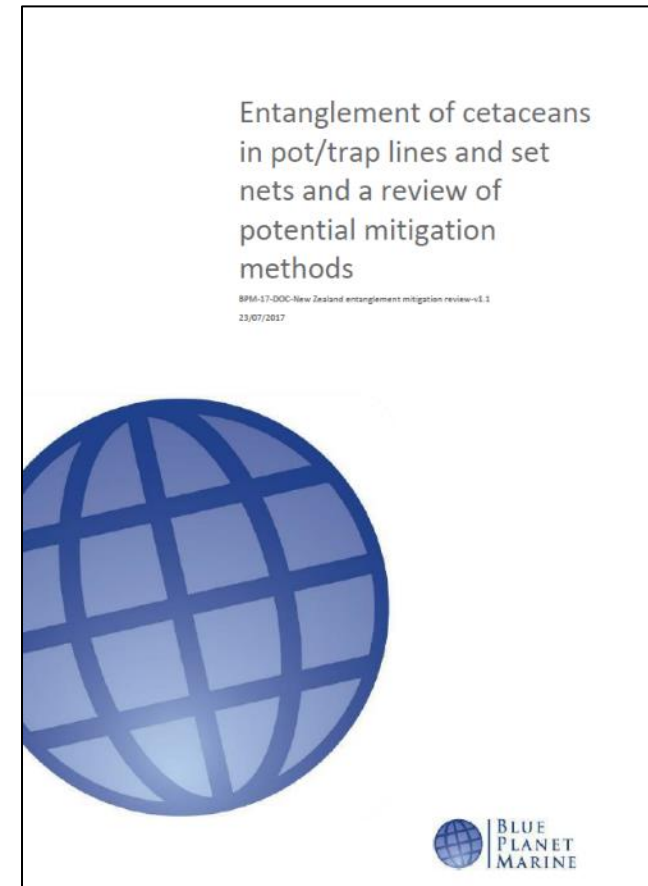
- Past prevalence of entanglements with pot fishing gear identified as 'cray'
- Ongoing spatial and temporal overlap with pot fisheries
- Potential for increasing entanglements
  - Post-whaling recovery of some populations



Photographed off Otago, 2019. Photo: W. Rayment, provided by DOC.

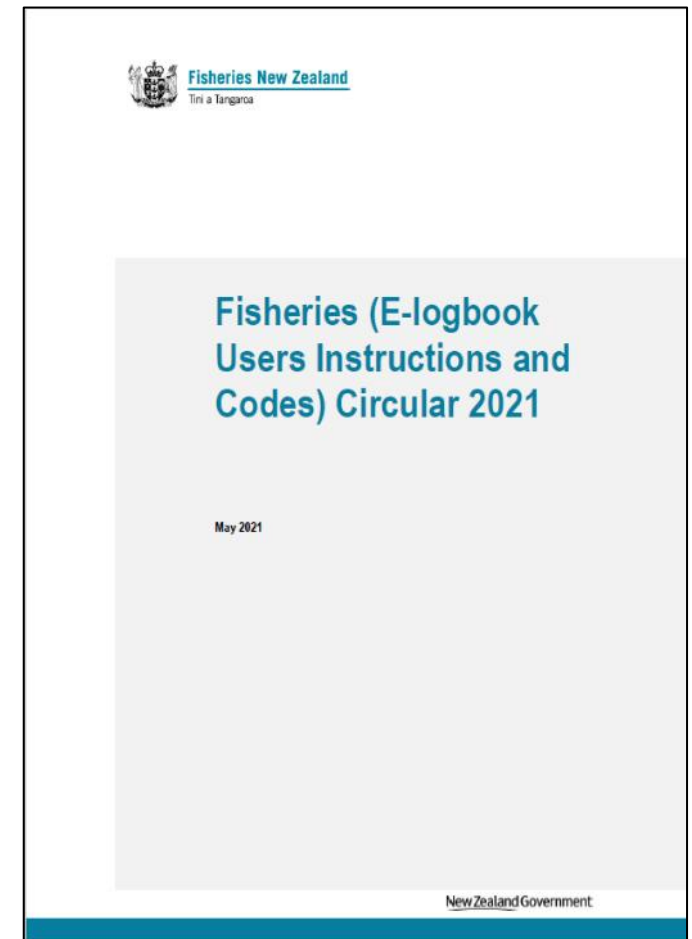
# This project

- Updates previous work: Laverick et al. 2017
- Fishing effort and catch in New Zealand pot fisheries
- Cetacean entanglements reported in New Zealand
- Recent developments in entanglement mitigation and management
- Workshop with rock lobster fishers, gear developers, fishery and wildlife managers, and researchers
- Identify next steps for management and mitigation of large cetacean entanglement risks in New Zealand pot fisheries.



# Methods: Fishery data

- Commercial fishery catch and effort data
- All New Zealand potting events
  - Ministry for Primary Industries REPLOG13962
  - 1 Oct 1989 – 30 Sept 2021
  - Catch Effort and Landing Return (CELR) and Electronic Reporting (ER)
    - Date, location, target, reported catch
    - Key effort metrics: pot lift, soak time
- Fisher reports of cetacean interactions with pot fishing events
  - Non-fish / Protected Species Catch Return and ER Non-fish or Protected Species (NFPS) catch reports
- Data processing in R



# Methods: Observer and entanglement data

- Observer records of cetacean interactions with pot fishing gear
  - Ministry for Primary Industries REPLOG13962
  - 1 Oct 1989 – 11 Oct 2021
  - Central Observer Database (COD)
    - Date, location, fishery, species, life and injury status
- Entanglement information held by DOC
  - 1980 – 31 Dec 2021
  - New Zealand Whale Strandings Database
    - filtered by 'Entanglement' in the 'Contributing Factor' field
  - Hector's and Māui Dolphin Incident Database
    - filtered by 'Entanglement' in the 'Observation Type' field
  - Large Mammal Entanglement Database
    - File: DOCDM-883260
- Additional records (media, personal contacts)

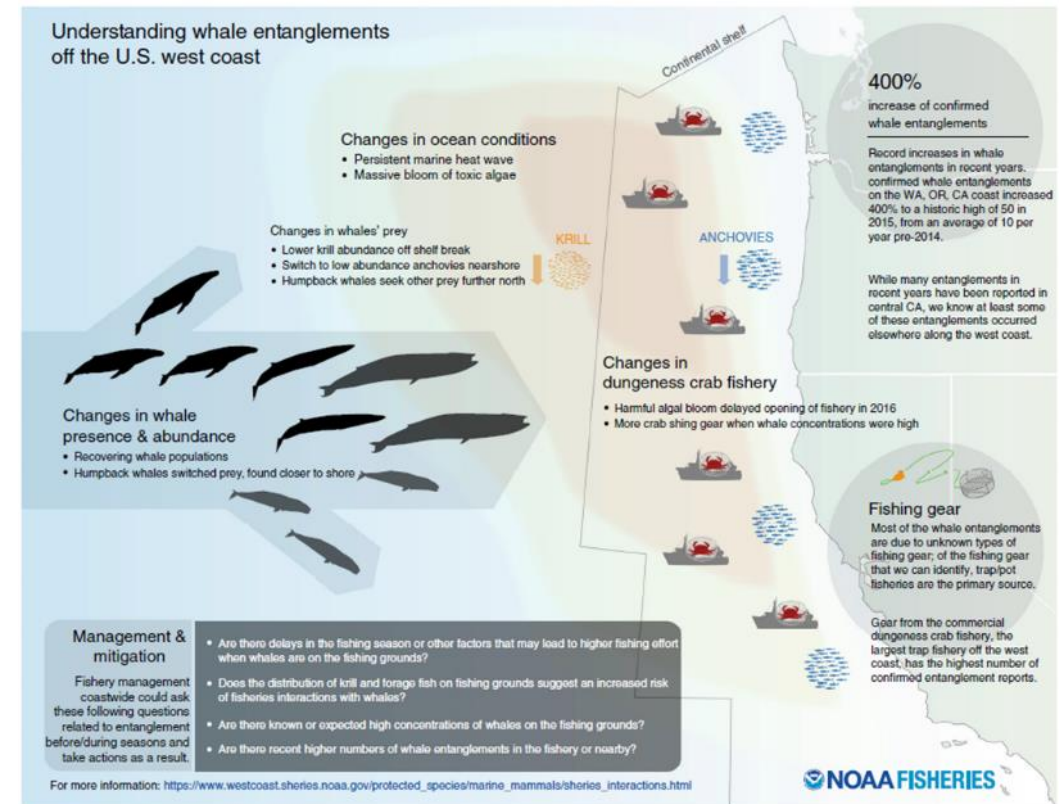


The screenshot shows a news article from 1News. The header includes the 1News logo and navigation links for Top Stories, Latest, New Zealand (highlighted), World, Sport, Te Ao Māori, and Politics. The article title is "Video: Hector's dolphin entangled in cray pot line rescued by boaties". The byline is "By Jane Nixon, 1News Digital Reporter" and the date is "Mon, Mar 14 • Source: 1News". There are social media sharing icons for Facebook, Twitter, YouTube, and a link icon. The main text describes how a Hector's dolphin was rescued by a sightseeing boat after becoming trapped in a cray pot line. It mentions that fishing and development are banned in marine reserves and that the crew on board an Akaroa Dolphins sightseeing boat came to the aid of the dolphin after spotting cray pots in Haylocks Bay on Friday. A quote from Julia Waghorn of Akaroa Dolphins is included, stating that she and others on the boat were able to free the mother dolphin, the calf of which was swimming around the boat. A partial quote from Natalie Stuart, guest Lol Bergman, and owner Julia Waghorn is also visible at the bottom of the article.

[www.1news.co.nz/2022/03/14/video-hectors-dolphin-entangled-in-cray-pot-line-rescued-by-boaties/](http://www.1news.co.nz/2022/03/14/video-hectors-dolphin-entangled-in-cray-pot-line-rescued-by-boaties/)

# Methods: Review and workshop

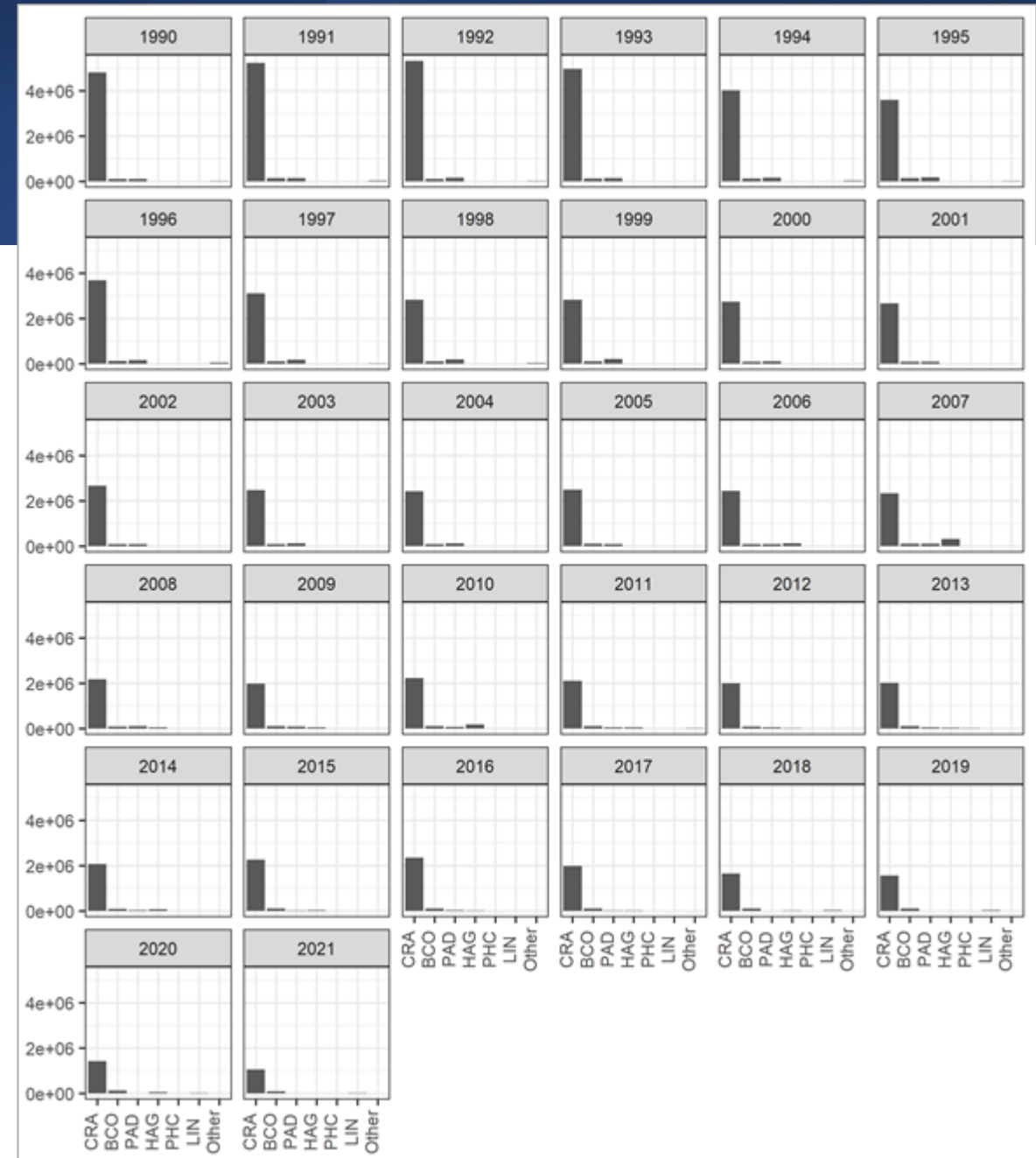
- Online information search
  - 2019 – present (period after Hamilton & Baker 2019, Tremblay-Boyer & Berkenbusch 2020)
  - Google, Google Scholar
    - Key words, wildcard search terms, Boolean operators
  - Bycatch information databases (bycatch.org)
  - Snowballing approach
- Workshop 22 March 2022
  - Recorded whale entanglements in New Zealand
  - Spatial and temporal patterns in pot fishing effort
  - International responses to entanglement risks and issues
  - Current and future actions to reduce entanglement risks
  - Key knowledge gaps for management



[https://wdfw.wa.gov/sites/default/files/2021-03/whale\\_entanglement\\_infographic.pdf](https://wdfw.wa.gov/sites/default/files/2021-03/whale_entanglement_infographic.pdf)

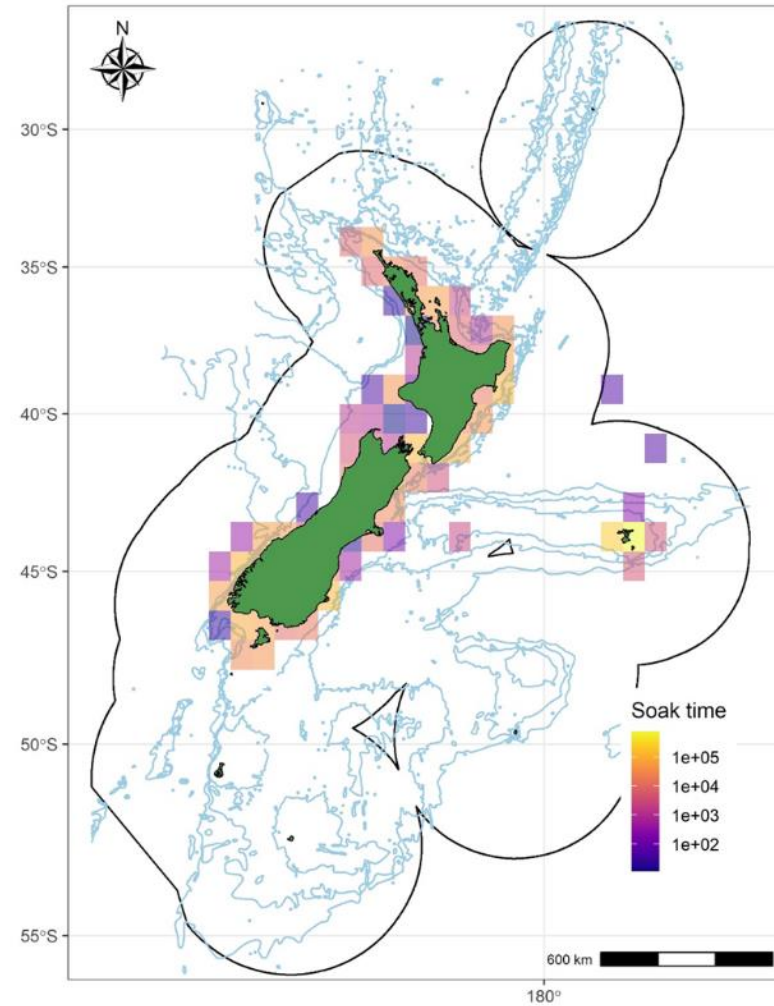
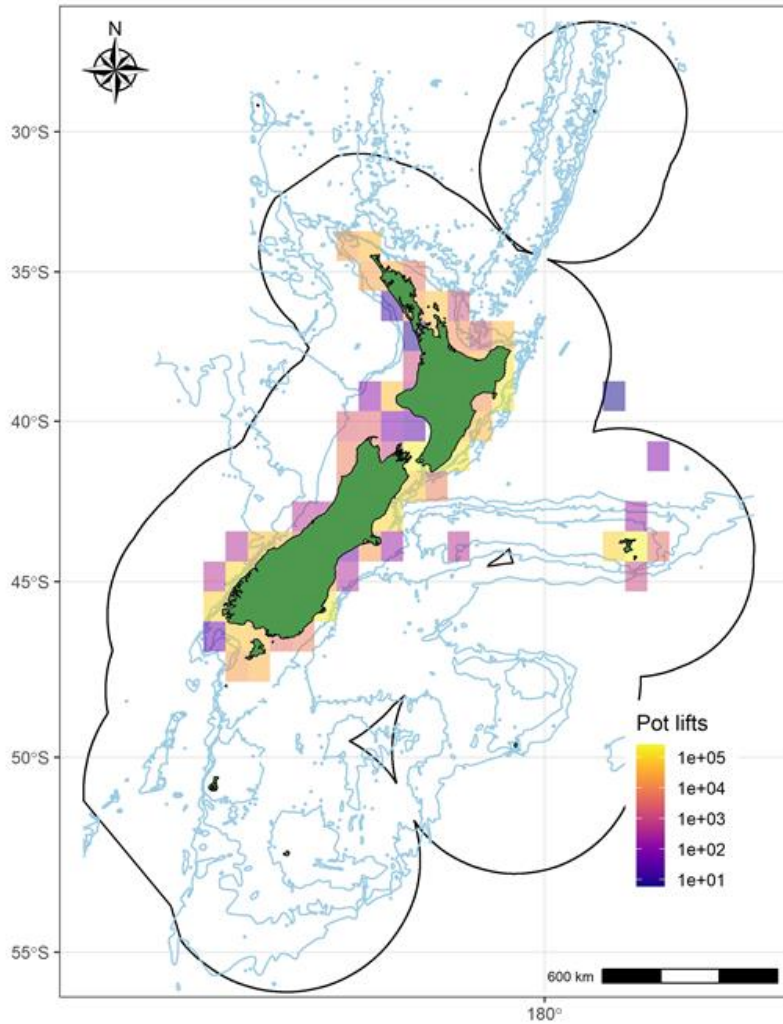
# Results: Fishing effort

- Pot fishing effort (pot lifts) has declined 1990 – 2021
- Trend is driven by reduction of effort targeting rock lobster
  - CRA: 90% of pot lifts on average
- Other target species: blue cod, packhorse lobster, ling, paddle crab and hagfish



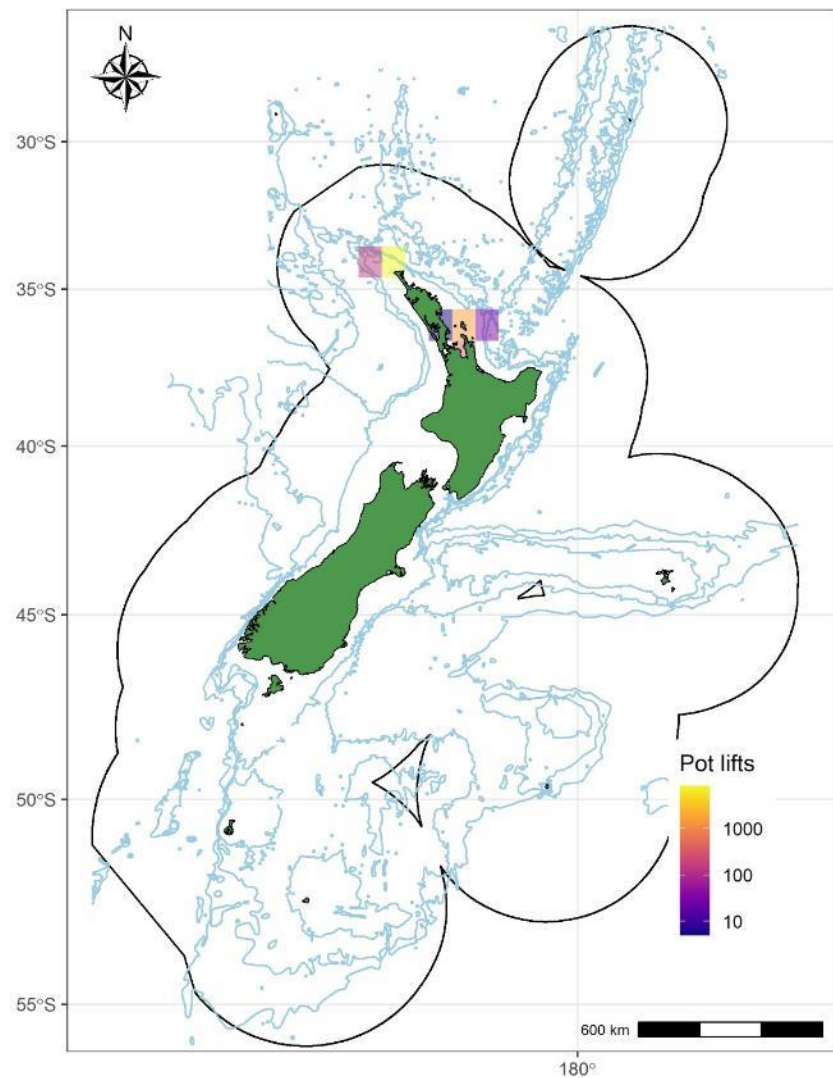


# Results: CRA fishing effort

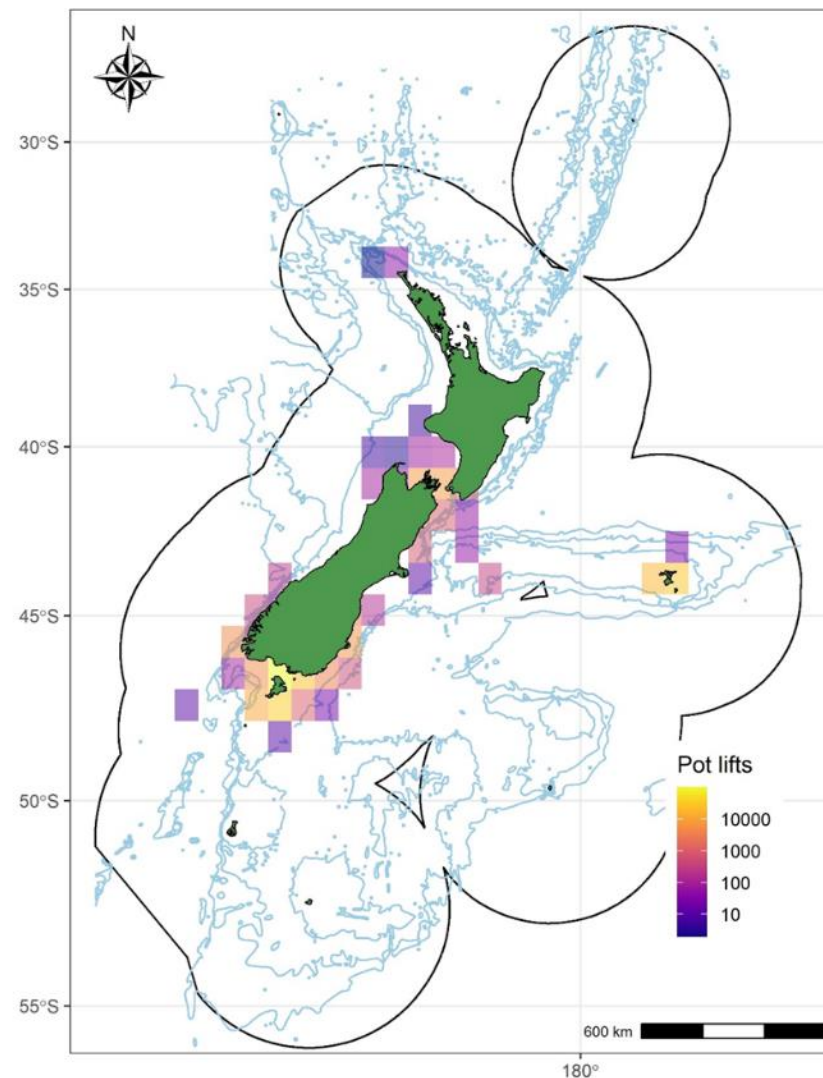


# Results: Other target species

Packhorse  
lobster

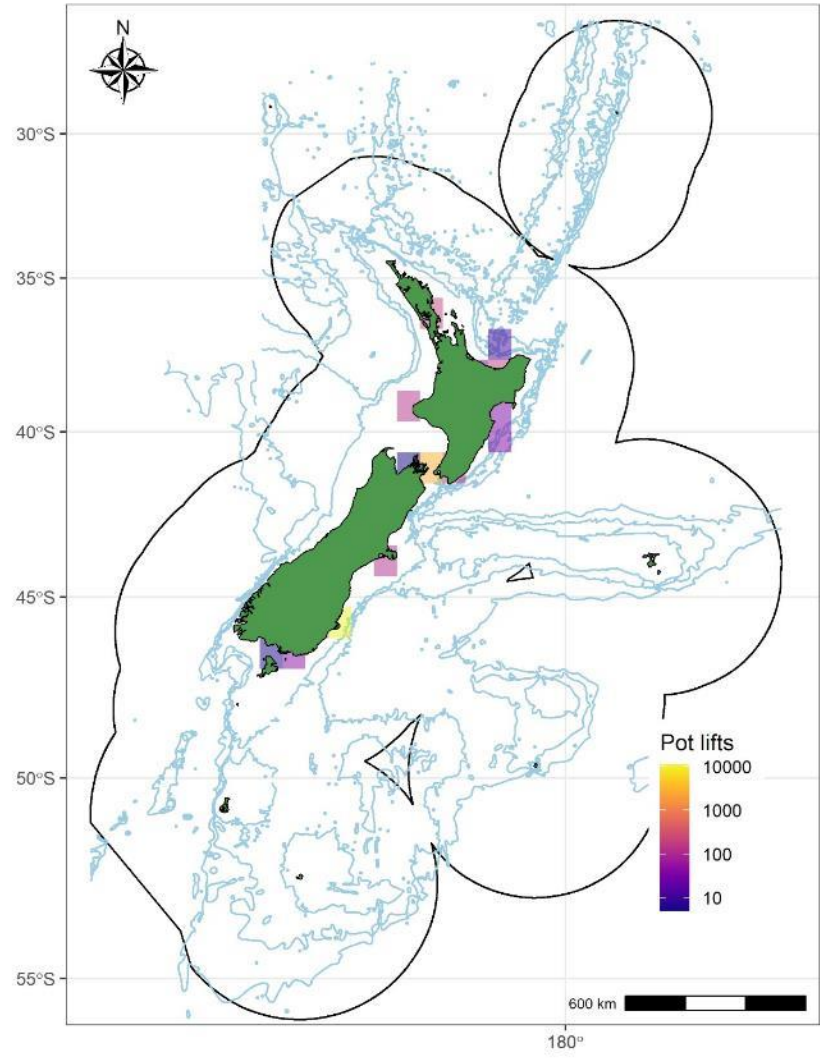


Blue cod

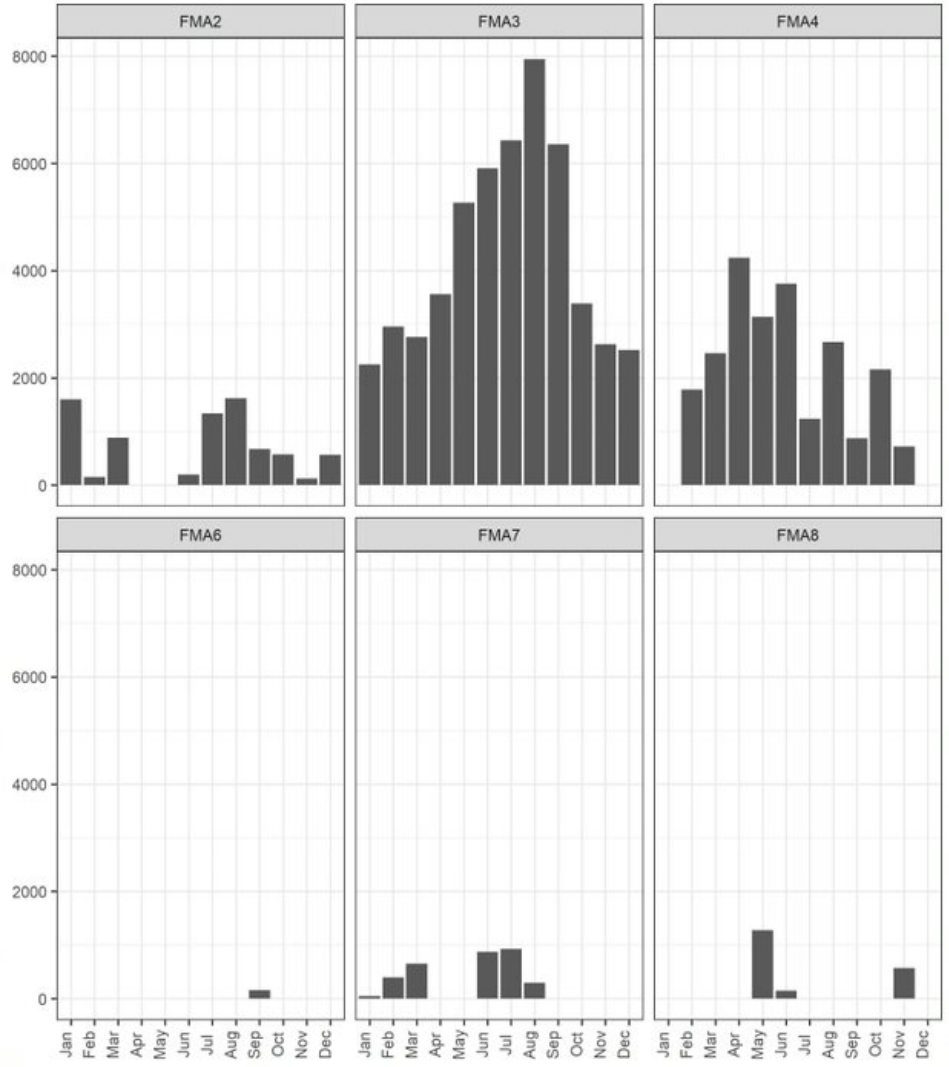


# Results: Other target species

Paddle crab



Ling



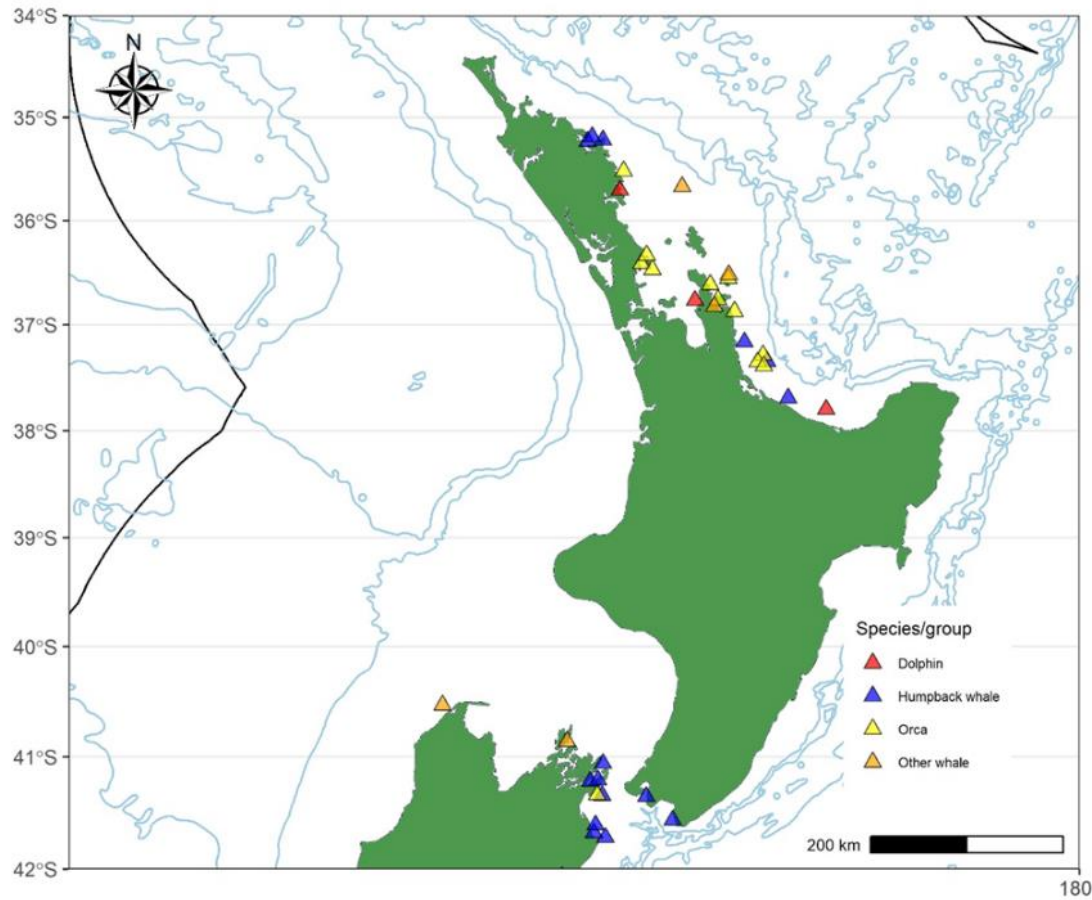
# Results: Entanglement events

- 82 entanglement records collated, 1980 – 14 March 2022
- Entanglements reported in every calendar month
- Humpback whales and orca most frequently reported
  - Humpbacks: most months March – October
  - Orca: spring and summer months
- 18 new records since 2017
  - Bryde's whale, pygmy right whale, southern right whale, humpback whale, *Balaenoptera* spp., orca, Hector's dolphin
- Humpback whales were single most reported taxa

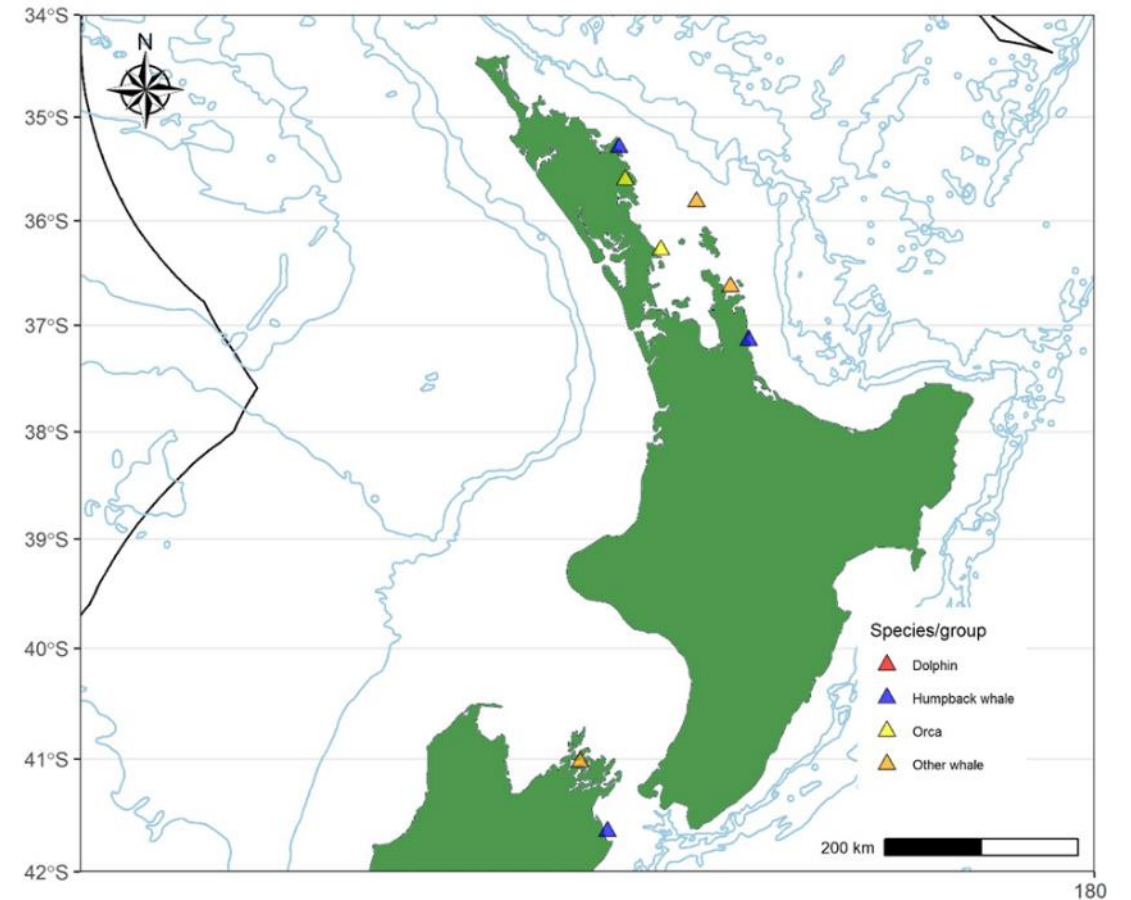


Photographed off Otago, 2019. Photo: W. Rayment, provided by DOC.

# Results: Entanglement events

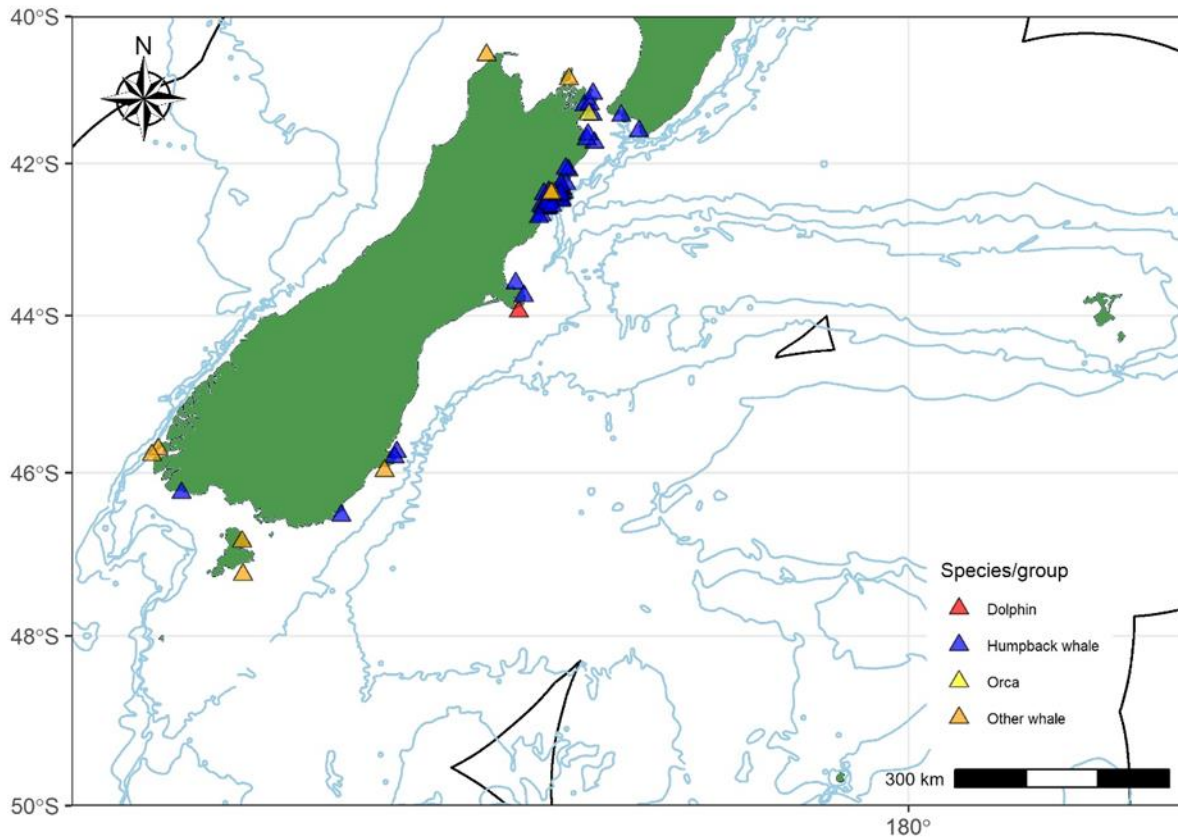


1980 – 14 March 2022

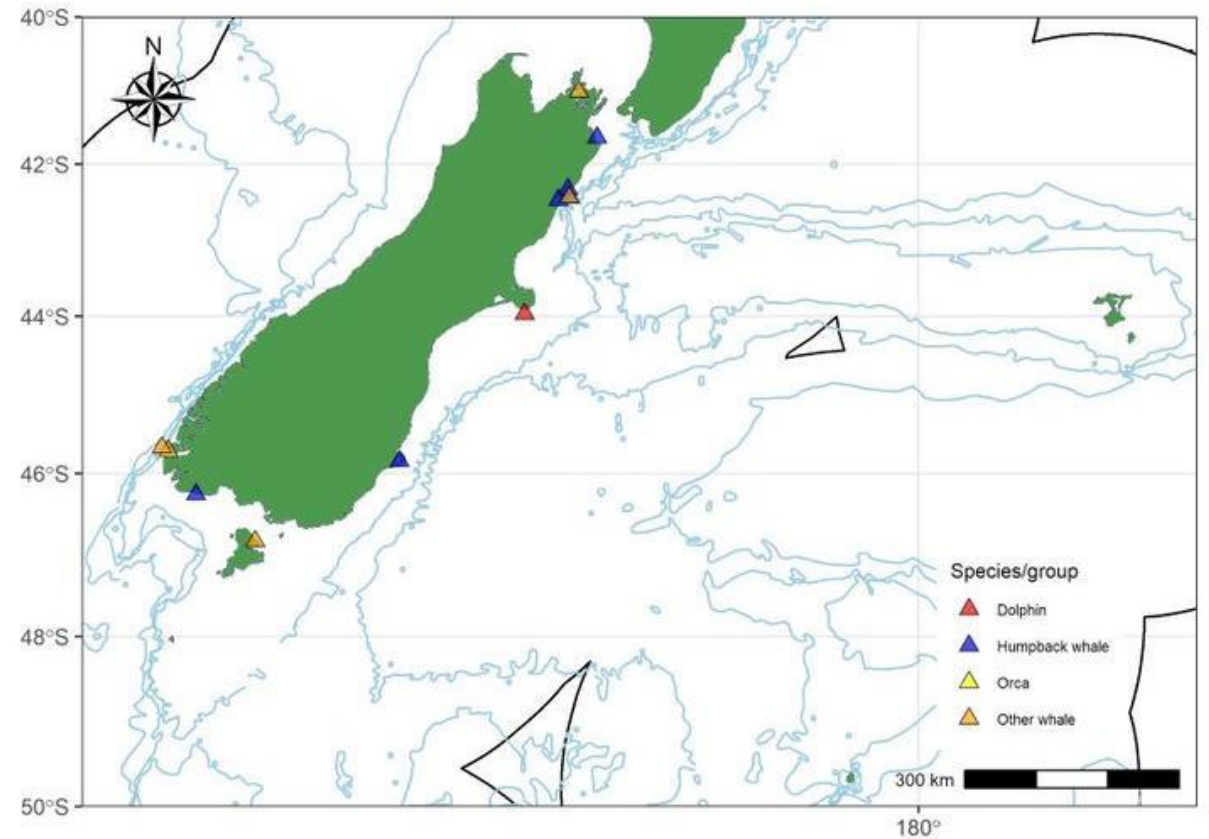


1 January 2017 – 14 March 2022

# Results: Entanglement events

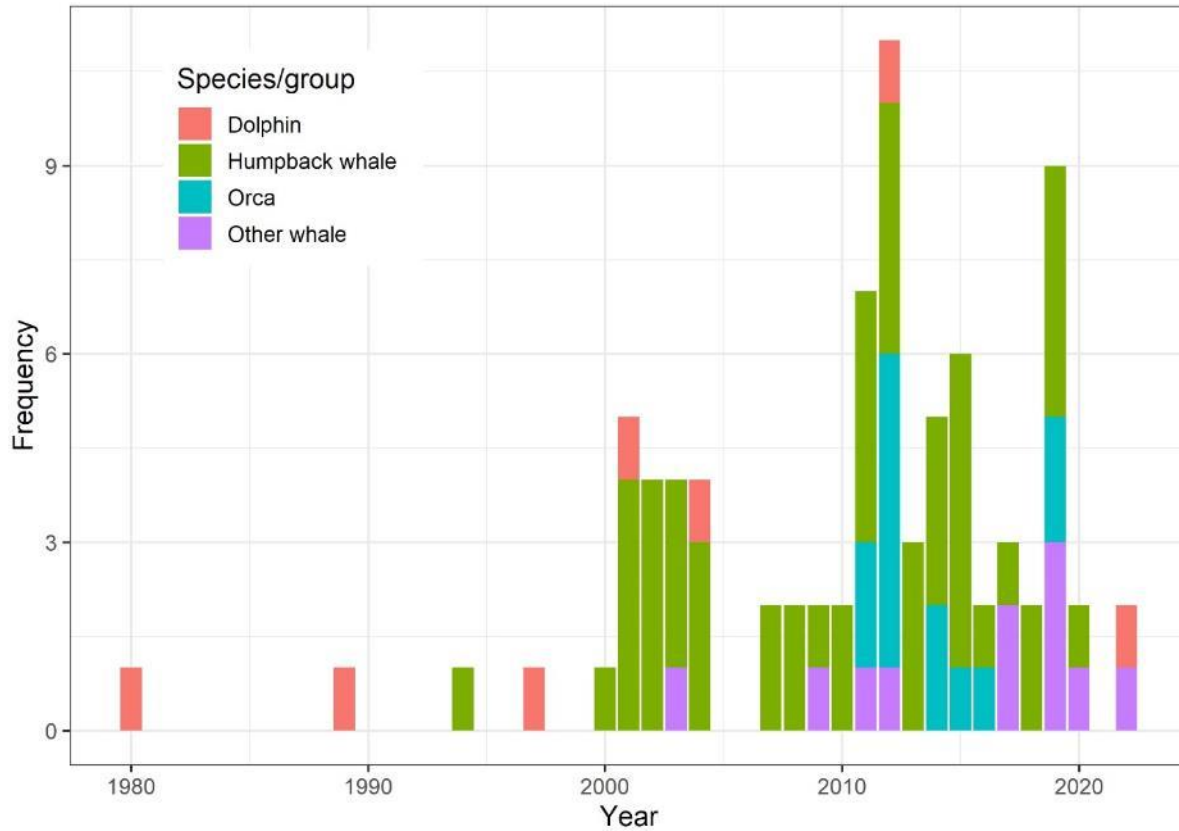


1980 – 14 March 2022

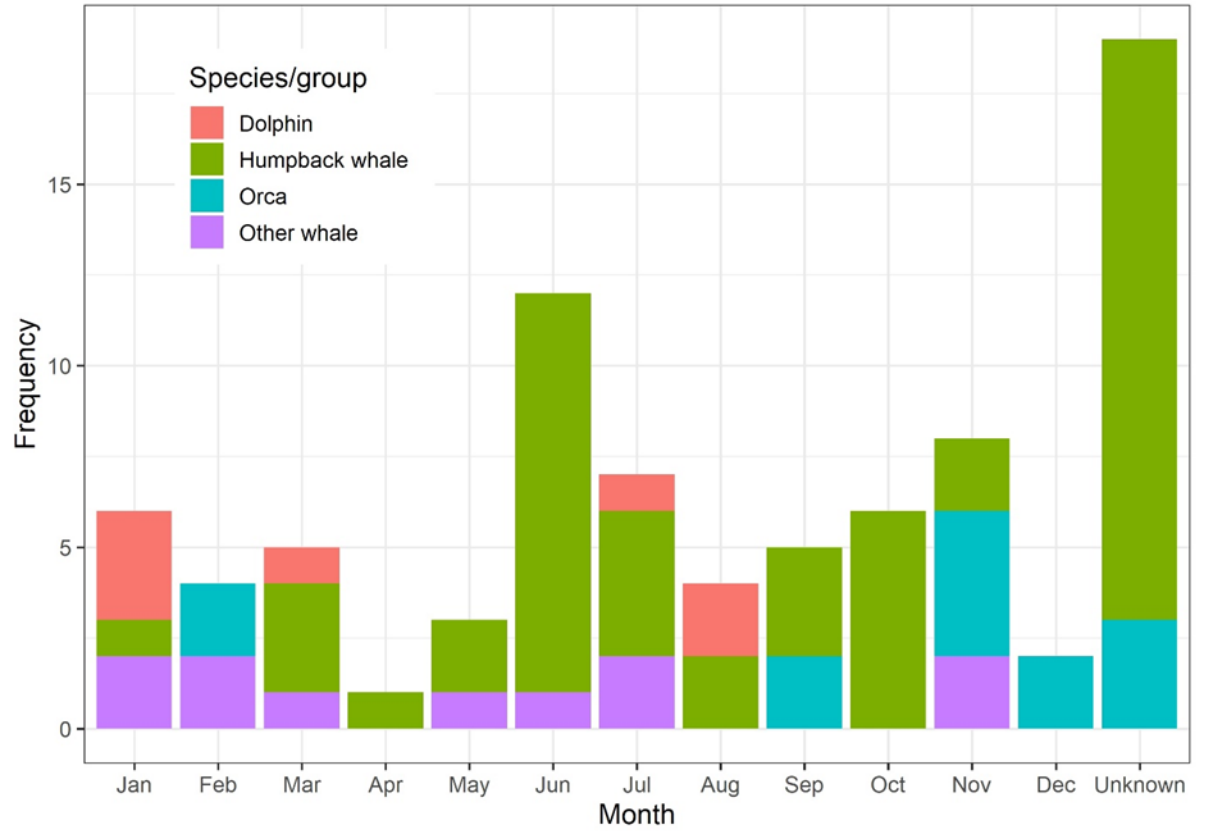


1 January 2017 – 14 March 2022

# Results: Entanglement events

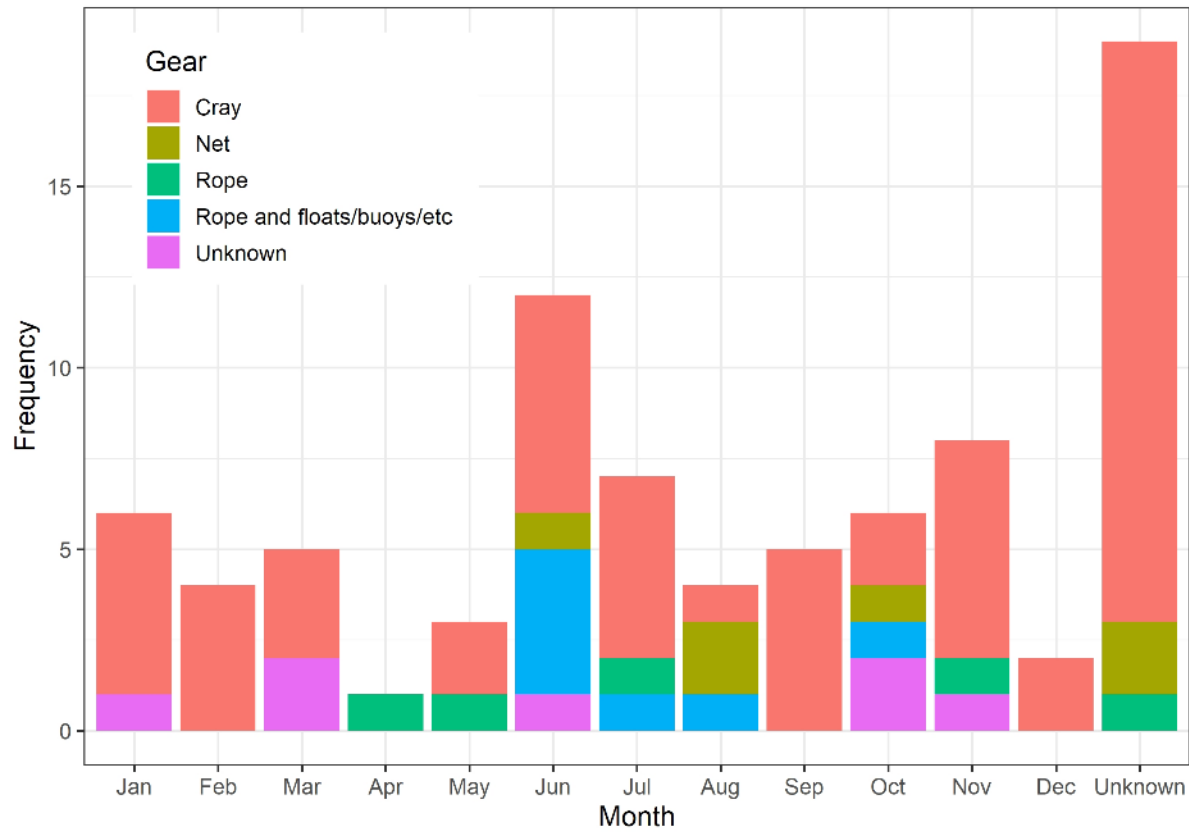


Species/group entanglements by year, 1980 – 14 March 2022

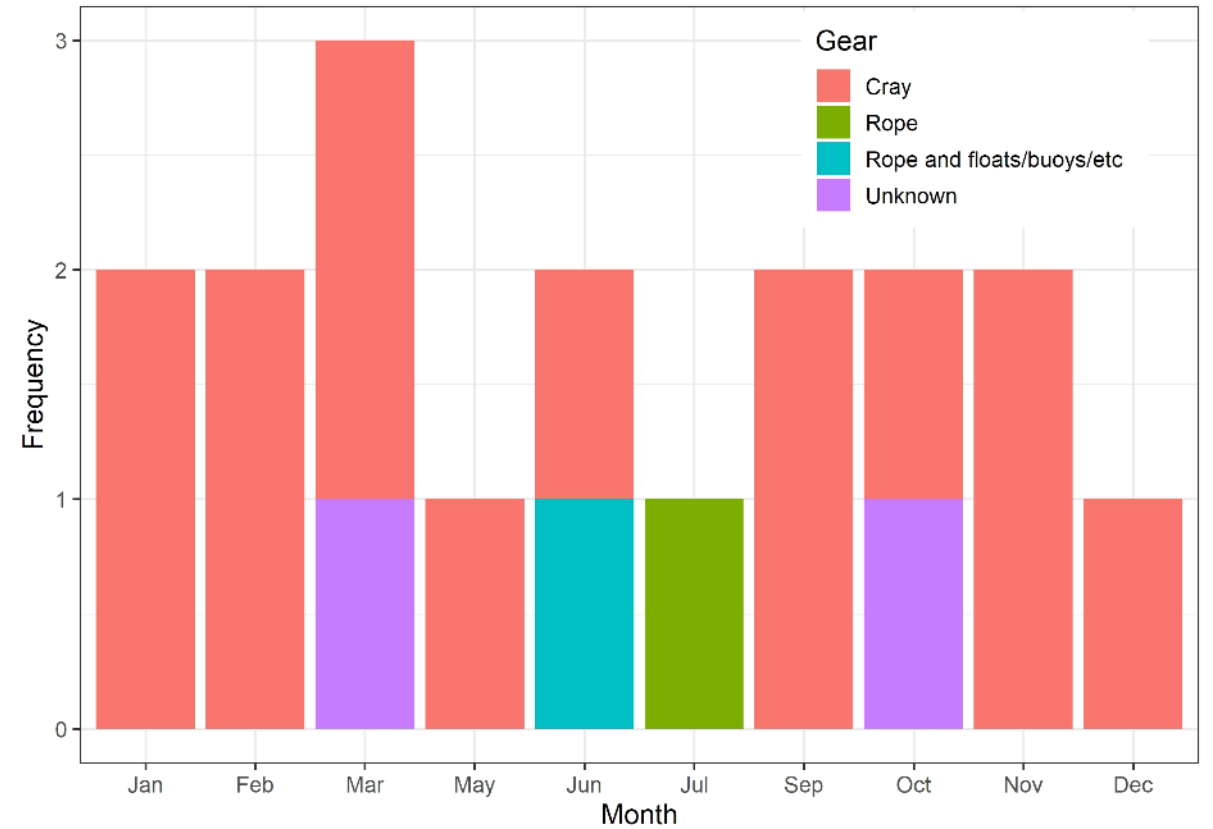


By month, 1980 – 14 March 2022

# Results: Entanglement events



Gear reported from entanglements: 1980 – 14 March 2022



1 January 2017 – 14 March 2022



# Results: Mitigation and management review

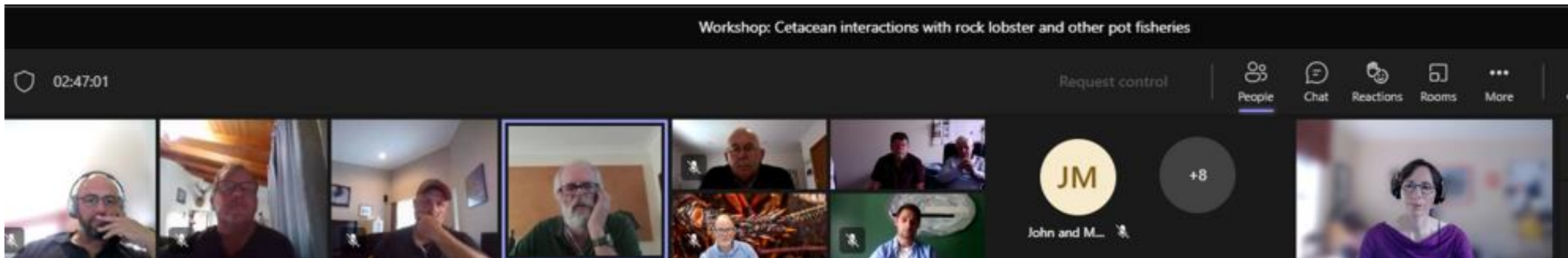
- Since 2019: 18 new sources
  - Characterising entanglements (1: Australia)
  - Identifying mitigation options (2: Australia)
  - Process for evaluating management options (2: USA, Ecuador)
  - Evaluation of mitigation options
    - Gear modifications (2: Australia, USA)
    - Acoustic deterrents (2: Australia, Iceland)
    - Ropeless fishing (3: USA)
    - Changing fishing effort, closures (2: Canada, USA)
    - Understanding migration dynamics (1: Australia)
    - Ecosystem shifts (1: USA)
  - Mitigation reviews (3: worldwide scope)
- Insights into how New Zealand could manage this issue



# Results: Workshop

## Discussion groups:

- Drivers for fishing effort peaks: markets and product state
  - Gear changes should be considered alongside operational impacts and the cost of mitigation measures
- Participants considered work in the short-term useful on:
    - Understanding whale migration corridors, how and why these change over time
    - Sharing whale sightings among vessel operators to increase awareness of risks in near-real time
    - Increasing awareness among rock lobster sectors fishing on risk-reduction approaches (e.g. minimising slack rope, removing pots when not fishing).



# Conclusions

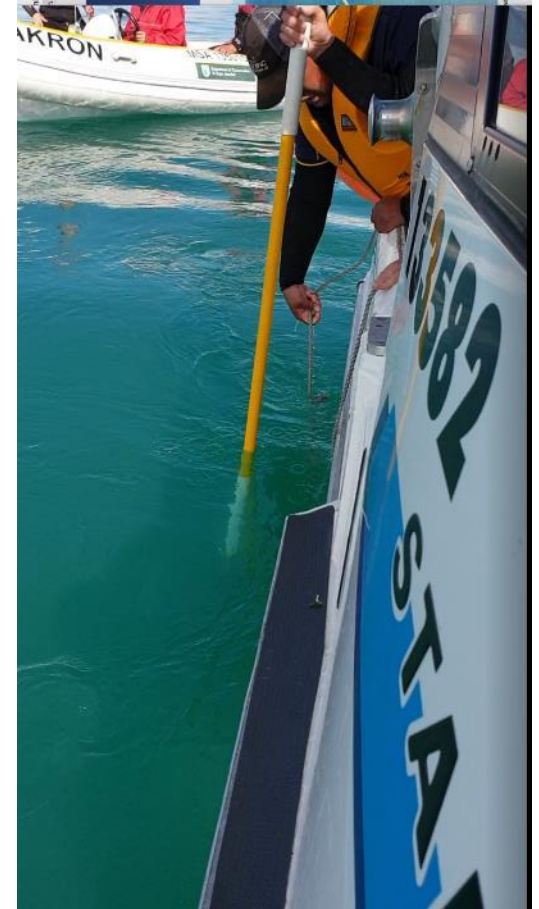
- Cetacean entanglement risks determined by spatial and temporal overlap with fishing gear
  - ER enables much better characterization of fishing effort than previously available information
  - Soak time warrants further investigation
    - Is it being reported as defined?
  - Relatively higher pot lifts targeting rock lobster continue to broadly coincide with humpback whale migration in key areas
  - Information available on cetacean distribution in space and time, not fishing, now constrains our understanding of entanglement risks



Humpback whale and rock lobster buoy at Washpool, Wairarapa, May 2022. Photo: N. Gasson.

# Conclusions

- 1 – 2 entanglements are reported per year. This is expected to be an underestimate of the true entanglement rate.
- Difficulty of detecting entanglements and under-reporting are well recognized internationally
- Most reports arise from the eastern coasts of the North and South Islands
- Humpback whales are most frequently identified in entanglement reports
  - Peaks in June and October, aligned with migration
  - Population increasing
- Orca entanglements
  - Where timing is known, mostly spring and summer
  - Population Nationally Critical



Orca disentanglement in progress, 2019. Photo: P. Gasson.

# Conclusions

- Most entanglements associated with 'cray' fishing gear
  - Little ability to verify records retrospectively
- Some pot fishers are implementing risk reduction practices
- Relatively low entanglement risk of other pot fisheries does not mean no risk
  - WA deep sea crab fishery:
    - < 100 buoy lines present at any time, 400 – 800 m depths
    - Humpbacks migrate along the 200 m isobath
    - 3 entanglements detected since 2014
- Potential for increased implementation of current risk reduction practices and opportunities for additional research.



Photo: J. Pierre

# Recommendations: Reporting

- Streamline reporting so entanglement events are:
  - Consistently reported to DOC
  - Captured within an appropriate DOC database
  - Recorded with unique identifying information including date and latitude/longitude
  - Include photos that support verification of species and gear.
- Grow relationships between fishing industry operators and DOC disentanglement teams, to facilitate reporting of entanglements and details critical to successful disentanglements
- Update NFPS reporting codes to include all cetacean taxa that are practically identifiable at sea and have been reported entangled to date.

# Recommendations: Cetacean distribution

- Build knowledge of cetacean distribution (spatial and temporal), through:
  - Ongoing collection of sightings information
  - Regular collation of sightings information
  - Characterising cetacean movements, including migrations, in time and space
  - Ensuring this information is available for future work, such as identifying hotspots for entanglement risk.
- When information on cetacean distribution has improved:
  - Re-examine environmental factors that may influence cetacean distribution to better understand entanglement hotspots and risk factors



[www.rnz.co.nz/news/national/445093/volunteers-count-whales-and-dolphins-for-snapshot-of-population](http://www.rnz.co.nz/news/national/445093/volunteers-count-whales-and-dolphins-for-snapshot-of-population)

# Recommendations: Fishing practices

- Characterise NZ pot fishing gear to provide a basis for future assessment of the feasibility and impacts of gear-related mitigation measures
- Investigate the use of pot strings to consider broader applicability of this approach to reducing the number of buoy lines and entanglement risk
- Investigate how fishers are reporting soak time, to ensure this is effectively representing fishing practices




<https://www.facebook.com/MPIFisheriesOtagoSouthland>



# Recommendations: Mitigation

- Foster the adoption of mitigation measures already used by some fishers
  - removing pots from the water when not fishing
  - minimising slack ropes attached to pots
  - removing rather than coiling excess rope
- Small-scale research testing of galvanic timed releases for rock lobster pots in orca and humpback entanglement hotspots
- Improve awareness of entanglement issues and ways to reduce entanglement risks, e.g. through codes of practice, recreational fishing apps, industry networks and social media channels during higher risk periods.



WATER TEMP	-2°C 30°F	2°C 35°F	4°C 40°F	7°C 45°F	10°C 50°F	13°C 55°F	16°C 60°F	18°C 65°F	21°C 70°F	24°C 75°F	27°C 80°F	HOURS OF BURN LOSS FROM LTOR.
1 DAY	A1		A2	A3		A4	A5		A6			6 HOURS
2 DAY	B1	B2	B3	B4			B5		B6			12 HOURS
3 DAY	C1	C2	C3	C3A		C4	C5		C6			12 HOURS
4 DAY	D1	D2	D2A	D3	D4	D5	D6	D7	D8			12 HOURS
5 DAY	E1	E1A	E2	E3	E4	E5	E6	E7	E8			12 HOURS
6 DAY	F1	F2	F3	F4	F5	F6	F7	F8		F8		12 HOURS
7 DAY	G1	G2	G3	G4	G5	G6	G7	G8	G9			12 HOURS
10 DAY	J1	J2	J3	J4	J5	J6	J7	J8	J9			12 HOURS
12 DAY	N6											12 HOURS
30 DAY	AK30				INQUIRE ABOUT THESE RANGES							12 HOURS

# Acknowledgements

- Workshop participants:  
D. McRae, P. Reinke, P. Cleall, J. Reinke, A. Sim, J. Robertson, M. Edwards, J. Hills, M. Lawson, L. Wichman, R. Chappell, J. Edwards, J. Fiotakis, M. Shegog, G. Liggins, C. Peters, J. Weir
- H. Tamarua, MPI Research Data Management team
- J. Robertson, M. Edwards, J. Hills: New Zealand Rock Lobster Industry Council
- S. Weaver and K. Middlemiss: DOC

# Questions?



Washpool, Wairarapa, May 2022. Photo: N. Gasson.