

**BEFORE THE WHANGAREI DISTRICT COUNCIL AND NORTHLAND REGIONAL
COUNCIL**

IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of a resource consent application by Northport
Limited under section 88 of the Resource
Management 1991 for a port expansion project
at Marsden Point

APPLICATION NO. APP.005055.38.01

LU 2200107

**STATEMENT OF REBUTTAL EVIDENCE OF DEANNA MARIE CLEMENT
(POTENTIAL EFFECTS OF PROPOSED NORTHPORT RECLAMATION ON MARINE
MAMMALS)**

3 October 2023

INTRODUCTION

Qualifications and experience

1. My full name is Deanna Marie Clement. My qualifications and experience are set out in my Evidence-in-Chief, dated 24 August 2023. As outlined in my Evidence-in-Chief, I confirm that I have read the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note (2023) and agree to comply with it.

SCOPE

2. I have read and set out below a response to the following points raised by Dr Tom Brough in his statement of primary evidence dated 18 September 2023:
 - (a) Overall assessment of effects;
 - (b) Marine mammal information deficiencies;
 - (c) Shipping traffic; and
 - (d) Marine mammal management plan (MMMP).
3. I have also reviewed and responded to Ms Helen McConnell's memorandum to Blair Masefield dated 21 September 2023 related to marine mammal conditions.

OVERALL ASSESSMENT OF EFFECTS

4. Despite Dr Brough devoting a large proportion of his evidence towards addressing what he considers to be the inadequacy of information used in my marine mammal assessment report¹, I note that Dr Brough's overall conclusion of the effects from Northport's reclamation proposal on marine mammals is in generally agreement with the findings of my report. In particular:
 - (a) In paragraph 10.1, Dr Brough states, "*...I agree that the ecological effects on marine mammals from the proposed activities in the harbour are likely negligible...*".
 - (b) Dr Brough also notes in paragraph 5.1 that, "*I agree with the listing of particular species of interest for the Whangārei Harbour and wider Bream Bay area which*

¹ Clement D 2022. Potential effects of the proposed Northport reclamation on marine mammals in the Whangārei Harbour region. Prepared for Northport Limited. Cawthron Report No. 3652. 56 p. plus appendices.

rightly includes bottlenose dolphins, common dolphins, Orca and Bryde's whales. These are the most common species in coastal waters in north-east New Zealand."

- (c) Dr Brough is in agreement with all of the individual effects conclusions from my report (paragraphs 7.1, 7.2, 8.3 and 9.1) with the exception of increased shipping traffic, which he feels should be included.
 - (d) In paragraph 4.11 Dr Brough states that, "... *I agree that the mitigation options provided by the MMMP will likely reduce the impact associated with any adverse effects...*".
5. Overall, Dr Brough seems to agree with my overall assessment of the potential effects, and the mitigation measures required, but disagrees with my interpretation of the relevant species' occurrence patterns and trends as well as how informative (or not) are the datasets and sources used.
6. I therefore set out my response to those issues on which we appear to disagree.

INFORMATION DEFICIENCIES

7. A common point of contention between New Zealand marine mammal experts in resource consent cases is often which datasets are appropriate and how much data is enough when trying to assess effects².
8. While New Zealand is considered to have a large diversity of marine mammal species living and visiting our waters, we are also data poor when it comes to understanding how these same species use New Zealand's coastal and offshore waters. To date, longer-term research (e.g. greater than five years) or in-depth monitoring programmes (e.g. hotspots, abundance trends) on marine mammals in New Zealand have been concentrated only within specific locations or with particular species. In my view, this situation is due to constraints including that:
- (a) Sites need to be both:
 - (i) near to universities or research stations where the area can be monitored by students on a regular, on-going basis (i.e Hauraki Gulf, Canterbury's Kaikōura Marine Station), and

² For example, I refer to Marlborough Aquaculture Limited appeals to extend mussel farms in Admiralty Bay – Applications ENV-2006-WLG-000020, 41, 57, 60, 66, 69, 73, 81, 88, 92, 94, 97, Lyttelton Port Company for the Te Awaparahi Bay Reclamation Project -Applications CRC175507, CRC176030, CRC175508, CRC175509, CRC175510, New Zealand King Salmon Co Limited's to establish and operate a new salmon farm known as for Blue Endeavour - Application U190438.

- (ii) Within areas in which a local population of marine mammal resides year-round (or for most of the year) to ensure adequate sampling sizes for student research projects (e.g. Bay of Islands, Fiordland or Akaroa / Banks Peninsula).
 - (b) Studies have been more focused on endangered species (e.g. Hector's dolphin or southern right whale) in which additional funding has been made available from government agencies or international sources to fund long-term programmes to enable national management initiatives (e.g. Māui / Hector's dolphin Threat Management Plan).
9. As a result, detailed and reliable information on occurrence / abundance, distribution and critical habitats is only available for a small number of New Zealand's marine mammals with longer-term research programmes (greater than 10 years) on endangered species (e.g. Hector's dolphin, southern right whale) or within specific locations (e.g. bottlenose dolphins – Bay of Islands, Fiordland, Bryde's whales – Hauraki Gulf).
10. I understand the frustration that exists among researchers when we are asked to assess the possible effects such coastal development project given the general lack of information available on most marine mammals in New Zealand, little to no coordinated effort between universities / institutes to share or have open-access databases, and no current government initiatives to fund the vital research. The expectation of some is that the onus to collect all the 'missing' marine mammal data (as well as data on seabirds, benthos, water quality, local oceanography, etc.) should fall on a resource consent applicant.
11. In Section 4 and 5 of his evidence, Dr Brough discusses in length that he feels my use of multiple datasets / sources that include a mixture of research and opportunistic / anecdotal sightings are not appropriate for assessing potential effects from this proposal and has questioned why there was no systematic marine mammal surveys of the proposal area undertaken.
12. As a researcher, I agree that more systematic data / information is always better and rarely pass up an opportunity to gather more where it is justified, possible and meaningful. Hence, I encouraged Northport to undertake both visual and undertake underwater acoustic monitoring around the site to help inform the marine mammal assessment. I refer here to **Appendix 1**.

13. I also value the opportunistic and anecdotal information that has been shared by local iwi, recreational users and the general public through the years. While such databases may not reflect various species trends, they do inform us of what species may be present and during what times of the year they can occur.
14. Based on my past experiences, I have come to realise that each resource consent project does not necessarily need to fill in 'all the missing' knowledge gaps for the relevant marine mammal species in order to appropriately assess effects associated with those species. Often it is not possible or practicable to do so. As I have noted in my report and evidence-in-chief, in the absence of adequate population information, the potential risks to marine mammal species associated with various anthropogenic activities can still be assessed and the species adequately protected based on what we do know.
15. Using information from similar port construction projects that have taken place overseas and the results of recent expansion projects at other ports around New Zealand, we had a good understanding of which adverse effects were likely with such projects. Hence, we first collated all available existing sighting datasets (both opportunistic and research-based, while noting all the associated caveats) to find out what species might be present as well as collected basic species' life-history information that could affect the likelihood or consequence of a particular effect occurring. For example, if a species is more sensitive to a certain impact (such as noise or vessel strike) than other species based on New Zealand and international research information.
16. With this background, and prior to any additional monitoring taken place, we had a good understanding of what effects were most relevant and what local species might be affected. Again, Dr Brough's evidence notes his general agreement with these conclusions (refer to Dr Brough's paragraphs 5.1, 7.1, 7.2, 8.3, 9.1).
17. The additional monitoring undertaken on behalf of Northport supplemented my background review and verified what was assumed from the data, which was (in summary):
 - (a) No residents in the harbour - It was established that, based on available information, there are no species of marine mammal that currently reside within or use Whangarei Harbour daily. Even without dedicated research surveys, the few coastal and inshore locations around New Zealand in which marine mammals can be reliably found on a daily, monthly and / or seasonal

basis (such as Lyttelton Harbour, Fiordland or the Bay of Islands) are well-known by word of mouth from locals, and more recently through tourists and social media.

(b) Short visits - When marine mammals do enter the harbour, depending on the species, they usually move through the harbour and / or re-visit the water over a period of a few hours up to several days.

18. The Northport marine mammal monitoring was not intended to answer the in-depth or complex questions (e.g. habitat use patterns) posed by Dr Brough in his evidence. I do not consider it necessary to do so. Marine mammals generally have large home ranges (10s to 100s of kilometres), are long-lived, tended to be highly variable from year to year in their patterns and can use (or not use) several areas for the same or differing aspects of their life (e.g. feeding, breeding, resting, and migrating). It is important to emphasise that the presence of a species or occurrence of feeding within an area does not necessarily equate to that habitat being important or significant to that species. Due to these factors, such questions require several years of sampling over a much wider area than the site of interest to begin to determine questions of relative use and relative importance. Hence, this information is not currently available for most New Zealand marine mammals.
19. As stated in my report and evidence-in-chief, I considered a worst-case scenario in which I assume that any or all of the species found in our review could visit or move through construction area on any given day. Based on this premise, mitigation plans were drafted and the monitoring data used to fine tune relevant measures.
20. For example, in the case of underwater noise measures, the more pre-cautionary hearing thresholds (TTS) were applied rather than the standard thresholds (PTS) used overseas due to the periodic use of the harbour by several species. If any species' occurrence trends (e.g. seasonal / annual) have been overlooked or mis-assessed, the main measures are designed to still protect all hearing categories. To further ensure that these acoustic models are valid, real-time measurements will be taken at the beginning of the project and any relevant mitigation or monitoring actions adjusted accordingly, if necessary.
21. From these data, I am confident that I have adequately considered those species that use these waters. Hence, the condition, mitigation measures and draft MMMP addresses how the project will avoid or mitigate any adverse effects on these species.

22. I have not changed my opinion on this issue after reviewing Dr Brough's evidence.

EFFECTS OF INCREASED VESSEL TRAFFIC

23. Dr Brough rightly points out that shipping noise is a concern globally. As such, he expresses concern in paragraph 8.1 that the reports by Ms McConnell and myself have missed the potential effect that the Northport reclamation will have on shipping traffic, and this in turn may have on marine mammals due to increased noise.
24. In my assessment report, I discuss that the reclamation itself is not expected to result in any increase in shipping vessels or the number of trips currently travelling to New Zealand³. An incremental number of currently operating commercial ships may make an additional stop at Northport or be diverted from other nearby ports, such as Ports of Auckland. I am unaware of any attempts to quantify or forecast what changes in shipping traffic between ports are expected.
25. In my report, I note that most south-bound container ships pass around the Hen and Chicken Islands and travel towards the Ports of Auckland via the Jellicoe Channel. Little would change in terms of shipping volumes or associated underwater noise levels in this scenario other than a proportion would turn and enter Whangārei Harbour rather than continuing south.
26. Depending on their destination, north-bound ships already currently transit through the Hauraki Gulf or around Great Barrier Island. An increase in shipping traffic moving through Bream Bay waters from the south would only occur if any of those commercial ships that currently travel straight out of the Gulf to the east, instead turn north and travel along the coast to stop at Northport first.
27. It is important to note that the underwater noises that commercial ships generate are generally correlated with their speed. As a ship decreases its speed, the underwater noise levels decrease, which can be significant given that changes in underwater noise levels are logarithmic.
28. As part of this proposal, Northport is supporting an initiative to extend the Hauraki Gulf Transit Protocol for Commercial Shipping up to the Poor Knights (Sea Change – The Hauraki Gulf Marine Spatial Plan). This extension of the Protocol would limit the speed for all commercial ships travelling to Northport (and beyond) to 10 knots

³ Several of New Zealand's largest ports (Lyttelton Port Company, Napier, SouthPort, CentrePort) have undergone recent capital dredging projects and / or wharf facility upgrades to accommodate the global trend of much larger and deeper draft commercial shipping vessels that may in the future reduce the overall number of commercial ships to these ports.

or less. As a result, the overall underwater noise levels currently generated by shipping traffic in this region would likely decrease as well.

29. Finally, I note that with the Hauraki Gulf Transit Protocol's speed restriction in place (and being actively monitored), watches on ships and marine radio broadcasting of any sightings, no Bryde's whale strikes have been reported within the Hauraki Gulf over the last four years (Dr Rochelle Constantine, pers. comm. 20 July 2023), despite this area being recognised as an important year-round foraging and resting habitat for this species.

30. I have not changed my opinion on this issue after reviewing Dr Brough's evidence.

MARINE MAMMAL MANAGEMENT PLAN (MMMP)

31. In paragraph 4.11, Dr Brough states that, "*While I agree that the mitigation options provided by the MMMP will likely reduce the impact associated with any adverse effects, there is still a lack of information with which to appropriately implement several mechanisms.*"

32. I am unclear what exactly Dr Brough means by "appropriately implementing several mechanisms" in regard to the mitigation measures detailed in the MMMP. In the same paragraph he seems to imply that any seasonal or diurnal restrictions on construction lack the necessary information on any seasonal or diurnal patterns of the relevant species to make them effective.

33. Almost all of the mitigation measures proposed in the MMMP are used world-wide and more recently in several other New Zealand port construction or redevelopment projects⁴. For instance, it is standard practice to have diurnal (limiting pile driving to daylight hours) restrictions in construction zones in which marine mammals are expected to be present or visit while construction activities are underway. This restriction is not based on the diurnal habitats of the species but instead is implemented because:

- (a) Marine mammal observers cannot appropriately observe and protect any designated shut-down zone without adequate daylight.

⁴ Lyttelton Port Company's Cruise Berth Development and Capital Deepening projects, Picton, Kaiwharawhara Wellington Ferry Terminal Redevelopment, and Waitohi Picton Ferry Terminal Redevelopment projects.

- (b) NOAA's underwater noise thresholds are based on a cumulative 24 hrs of noise impact. In areas where no residential species are present, it is highly unlikely that any animal would be exposed to piling noise above the TTS threshold for more than an hour or two before they would move well beyond the threshold zone. However, by setting the threshold limits over 24 hrs means that the worst-case scenario is considered (i.e. size of zone is greater than would be for 1 or 2 hours of noise exposure) and by shutting down piling activity for a minimum of 8 to 12 hours each day ensures that the hearing of any animal that then remains in the harbour overnight has more than adequate time to reset.

- 34. Dr Brough also expresses the opinion that any Northport or other vessels following the reduced speed limits and other requirements of the Hauraki Gulf Transit Protocol, as detailed in the MMMP, will not be as effective at reducing vessel strike unless we have more 'good-quality' information on the spatial and temporal distribution of marine mammals in this area.

- 35. As noted in paragraph 29, recent research on the effectiveness of the Protocol's speed limits within the Hauraki Gulf has documented a significant decrease on Bryde's whale strikes / mortality (zero over last 4 years), despite the fact that this species is highly variable in its spatial and temporal distribution throughout the Gulf between months, seasons and years.

- 36. I remain of the view that the MMMP is appropriate to manage effects on marine mammals.

RECOMMENDATIONS

- 37. In section 11 of his evidence, Dr Brough makes several recommendations. I am not in agreement with several of these for the reasons stated above, but I do agree that the following recommendations of Dr Brough would be useful:
 - (a) Paragraph 11.1 discusses that, "... *recently collected systematic data that can be used to provide a robust baseline on marine mammals for Whangārei Harbour/Bream Bay is currently being collected. The applicant should continue to support this research as a monitoring programme to discern any potential impacts on species and to apply adaptive management where impacts are noted.*"

- (b) Paragraph 11.4 suggests that, “*The applicant should engage widely with the marine mammal research community and manawhenua on potential additional interventions.*”

CONDITION AMENDMENTS

38. Mr Pettersson’s rebuttal evidence dated 3 October covers most of the suggested amendments to conditions as they relate to marine mammals and discussed in Ms McConnell’s 21 September 2023 memorandum.
39. In discussing how Ms McConnell’s amendment for Condition 65(d) might be implemented, a potential grey area was identified. For species other than baleen whales and pinnipeds, Northport will enforce a MMOZ out to 200m (pending in situ verification) that protects these species from both TTS and PTS hearing effects. This zone is to be enforced as long as these species remain east of the line of One Tree Point.
40. The proposed amendment would mean that if these species go west of One Tree Point and into inner harbour regions, once they return back and cross east of Point, piling activity would have to cease until they then exited the harbour or were not sighted for 1 hour (Condition 65d). This amendment could therefore create something of a ‘double standard’ for these same species and may potentially be confusing for MMOs to enforce.
41. Instead, and as discussed with Ms McConnell, the potential for these other species to be deterred from exiting the harbour after having visited inner harbour regions (i.e. to the west of One Tree Point) is low but should be reviewed at the start of the project and the condition amended, if necessary. This review process would be detailed in the MMMP and a review clause added as part of Condition 65.
42. In principle, reviewers⁵ would examine the first 5 occasions in which dolphins or orca travel past the One Tree Point line to the west while piling activity is underway. MMOs would be required initially to track and record the general behaviour of these same animals as they return to the east, cross the One Tree Point line and eventually exit the harbour. If reviewers determine there are obvious signs of avoidance or deterrence by these species, then the proposed amendment by Ms McConnell for Condition 65(d) would be implemented for the duration of the project.

⁵ At least one experienced marine mammal expert and one underwater acoustic expert.

SUMMARY

43. It is my opinion that I have adequately considered the possible effects of the proposed project activities on marine mammals. I have considered the worst-case scenarios as part of my assessment (i.e. any species being present on any day) to assess the initial effect and then used the available information on similar projects and local marine mammals to fine-tune the final mitigation measures.
44. While Dr Brough may not agree fully with my use of particular datasets, my interpretation of some of the species' data or some factors used to rank severity, he does state in his evidence that he agrees that the ecological effects on local marine mammals from the proposed activities are likely negligible.
45. I note that the revised conditions put forward by Northport should help to clarify the connection between the MMMP and conditions.



Dr Deanna Clement

3 October 2023

Summary of Whangarei Marine Mammal Acoustic Monitoring Results

D Clement and M Pine

Northport undertook an underwater acoustic monitoring programme in order to collate ambient background noise for further noise propagation modeling and effects radii. Figure 1 shows the deployment locations of the three separate moorings. The underwater recorders also collected any echolocation clicks and calls from the various odontocete (toothed whales) and baleen whale species that were vocalising as they travelled in and out of the Whangarei Harbour entrance and near the moorings.



Figure 1. *The deployment and retrieval locations of the three monitoring moorings in relation to the relevant bays.*

Results

Nineteen separate deployments were made starting on 19 June 2020 and ending on the 5 September 2023. As Table 1 highlights, recorders were not deployed continuously across the three moorings or over the entire three years of sampling. More information on the acoustic programme is included in Pine (2022). The dataset suffered from the normal field work problems (e.g. missed sampling periods, failed equipment, bad weather delays, battery or memory failure, data corruption, etc.). Due to some of

these reasons, the data itself has been more difficult to analyse than most and is one of the reasons that the final data were not fully available until now.

Table 1: *A list of the deployment dates and the actual sampling days at each of the different mooring locations. Dashed lines indicate breaks of more than one month in deployments. * two recorders were deployed at this location over the same period.*

Year	Start Date	End Date	Calliope	Passage Island	Sinclair
2020	19/06/2020	24/07/2020	33	31	55 *
	24/07/2020	28/08/2020	35	35	0
	28/08/2020	08/10/2020	38	38	30
	05/10/2020	29/10/2020	24	0	29
	29/10/2020	02/12/2020	34	34	34
2021	07/07/2021	30/08/2021	46	6	0
	30/08/2021	02/10/2021	33	33	0
	05/10/2021	18/11/2021	0	0	44
	18/11/2021	21/12/2021	25	38	34
2022	21/12/2021	21/01/2022	31	35	0
	21/01/2022	26/02/2022	36	38	26
	05/05/2022	05/06/2022	31	33	31
	09/09/2022	16/10/2022	35	34	37
2023	20/12/2022	20/01/2023	31	21	0
	20/01/2023	22/02/2023	31	0	31
	20/02/2023	21/03/2023	29	17	29
	21/03/2023	21/04/2023	30	0	27
	12/05/2023	14/06/2023	37	32	32
	14/06/2023	05/09/2023	41	0	82

Table 2 provides a summary of the total number of sampling days and detections events at each of the three moorings. Calliope (at the entrance to the harbour) recorded more sampling effort, as well as detections, while Passage Island had the least effort. The total number of days in which at least one detection was recorded was standardised by the total days of effort at each mooring over the seasons. Overall, detection rates indicated that dolphins / orca were only present and vocalising in the harbour entrance area around 9 to 15% of the days sampled.

As evident in Figure 2, lower rates of detections were found over summer and autumn at all three locations despite high effort levels in some cases. These findings are in general agreement with the most odontocete species' occurrence trends discussed in Clement (2022). Detections rates were fairly similar at the two mooring locations inside the harbour entrance (i.e. Passage Island and Sinclair) while generally greater at Calliope over most seasons even after standardising for the differences in effort. This finding suggests that not all odontocetes visiting the harbour entrance chose to travel past Taurikura Bay and into the harbour.

Interannual variation between detections was also notable (Figure 3). In general, detection rates were greater during 2020 than most other equivalent seasons in subsequent sampling years.

Table 1. Summary of the total number of recorded vocalisation detection events for all odontocetes species and associated parameters with moorings at Calliope, Passage Island and Sinclair across various deployments between 19 June 2020 to 5 September 2023.

Mooring	No. of days recording	No. of minutes detected	No. of events	No. days with at least 1 detection	Percent days with detections
Calliope	599	1509	150	89	15%
Passage Island	425	593	91	38	9%
Sinclair	523	937	100	51	10%

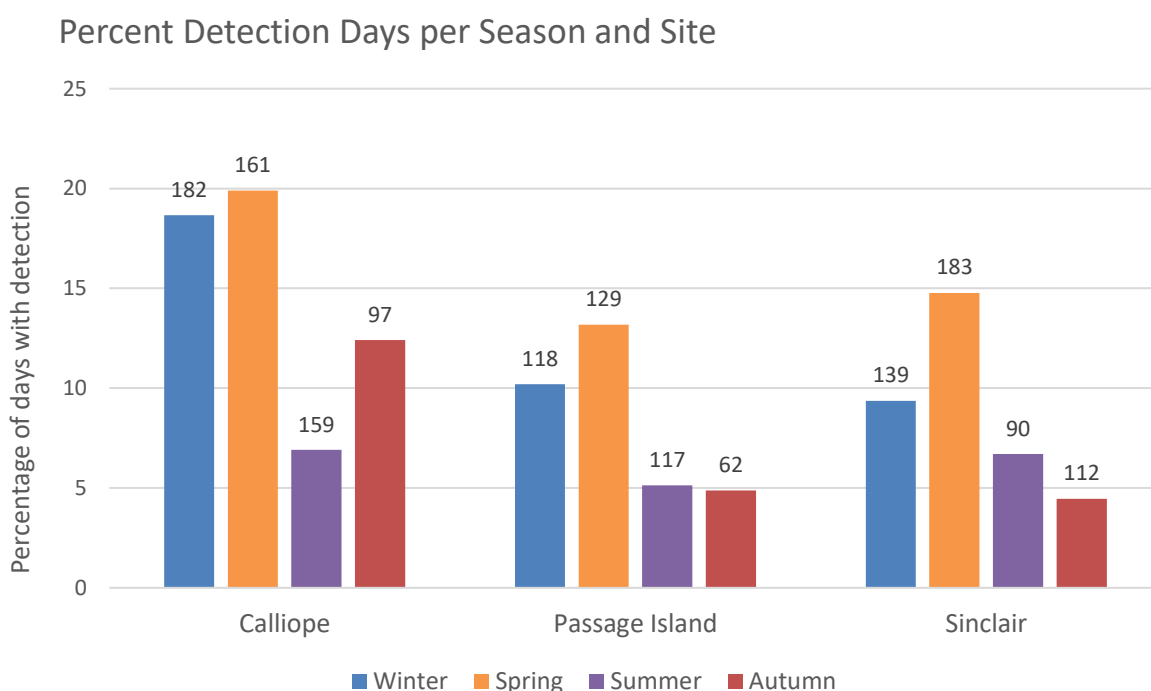
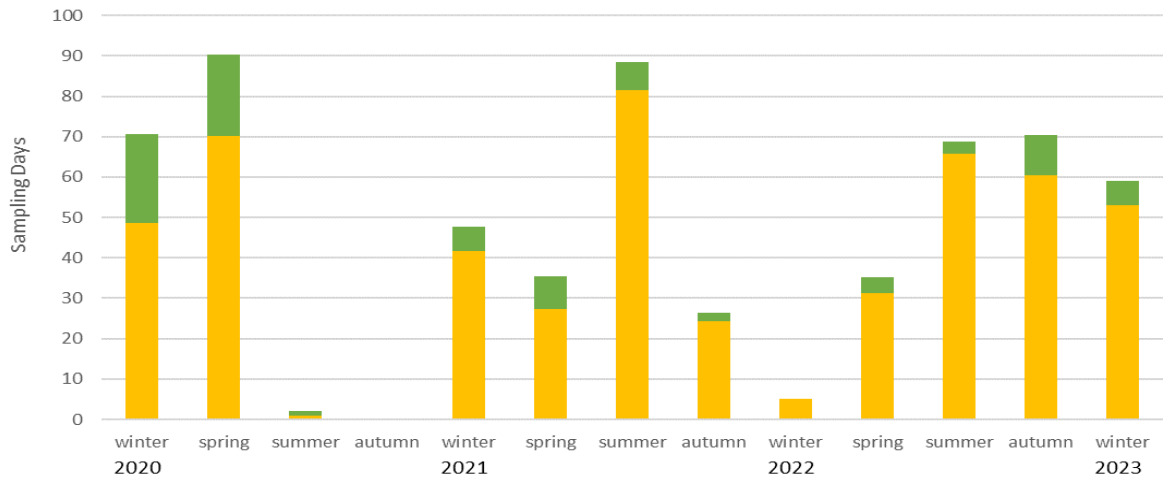


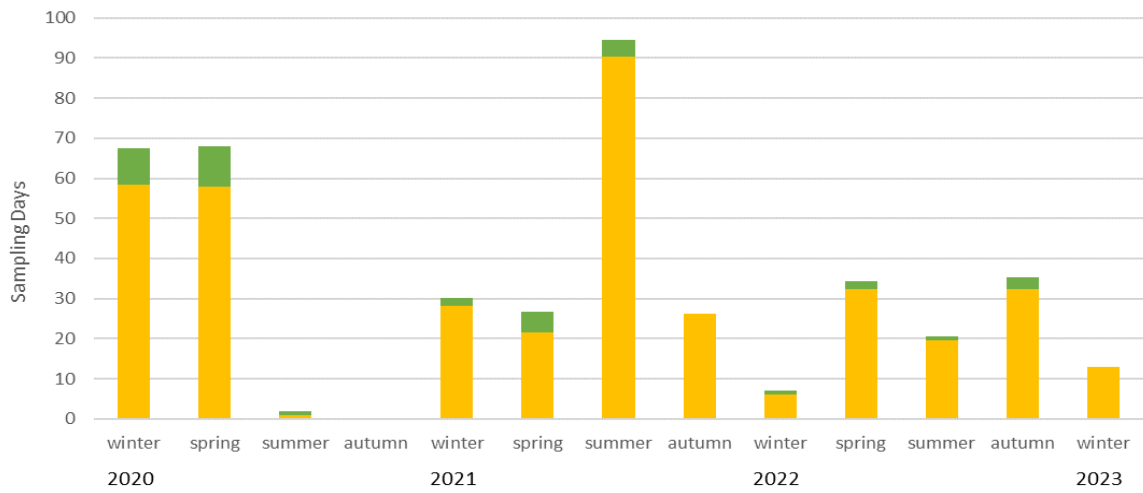
Figure 2. The proportion (%) of days with dolphin detection events (i.e. days with at least one detection) standardised by the number of sampling days for each season⁶ and by mooring location. Numbers at the top of the columns represent the total sampling days in each season for each mooring across all three sampling years.

⁶ Standard austral seasonal definitions were used. Winter = June, July, August; Spring = September, October, November; Summer = December, January, February; Autumn = March, April, May.

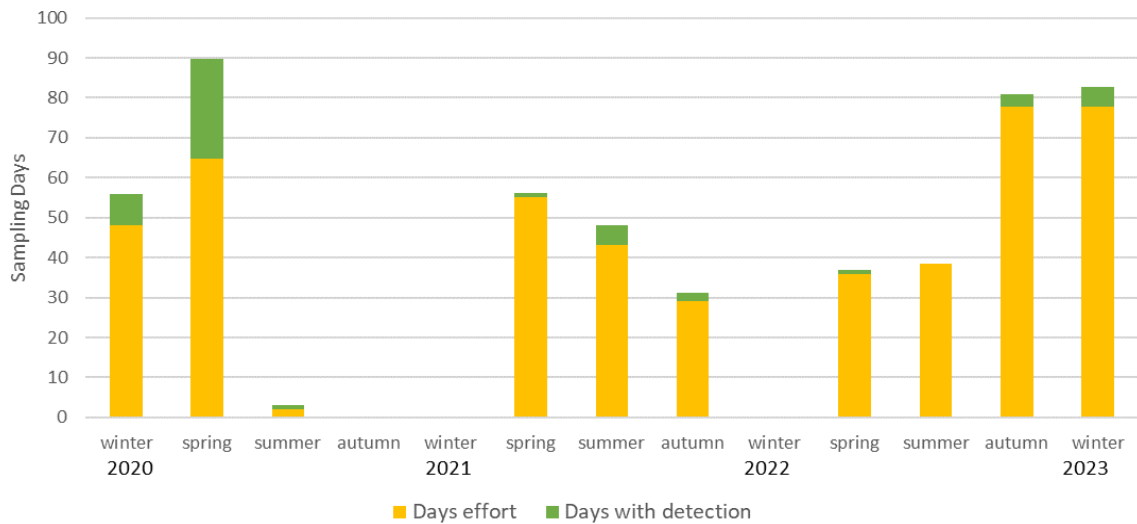
Calliope



Passage Island



Sinclair



Days effort Days with detection

Figure 3. *The number of underwater acoustic sampling days with no dolphin detections (yellow bars) and the number of sampling days with at least one dolphin detection (green bars) by season for each separate mooring over the three sampling years.*

Dr Pine was able to distinguish some orca vocalisations from other mid-frequency odontocete species. With underwater acoustics, the larger the size of the animal, the louder they can vocalise. As orca calls are able to travel the furthest of the delphinids, they are more likely to be picked up by the acoustic mooring stations.

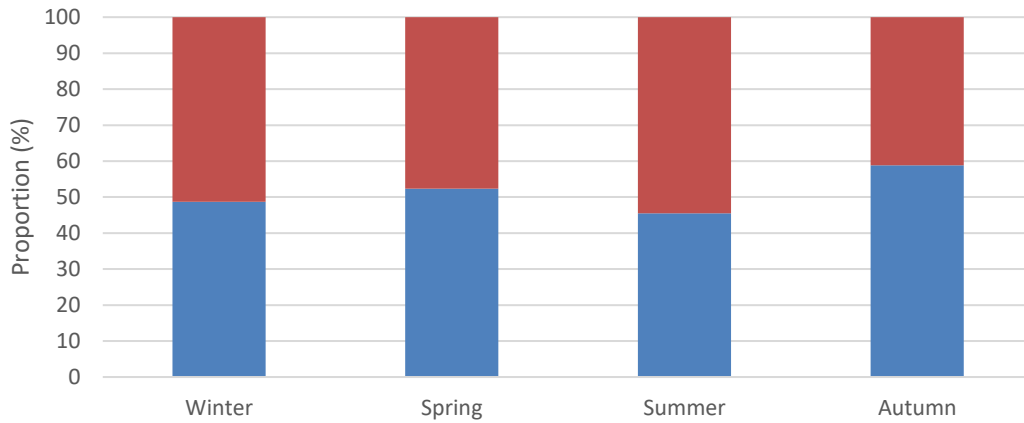
Orca calls were heard on three separate days at Calliope mooring and on one of the same days at Passage Island over a 10 day period in September / October 2020. Approximately a month later (November 2020), orca were detected twice over the course of the same day at Sinclair mooring. Orca calls were not heard again until in September 2021 when two separate occasions were detected 11 days apart and later in March 2023 on one occasion from the Passage Island mooring. We note that the seasonality of these detections are in line with expectations from Clement (2022). From the time of the detections, these orca visits may have lasted between several minutes and up to several hours, the acoustics cannot determine duration accurately given duty cycling and detection distances.

Baleen whales were detected only at the Calliope mooring but are not yet available. As these low frequency calls can be detected at distances greater than 10 kilometres from the whale, a single recorder cannot triangulate the caller's location. Hence, it was assumed these calls were from Bream Bay or beyond as no whale calls were recorded at the other moorings.

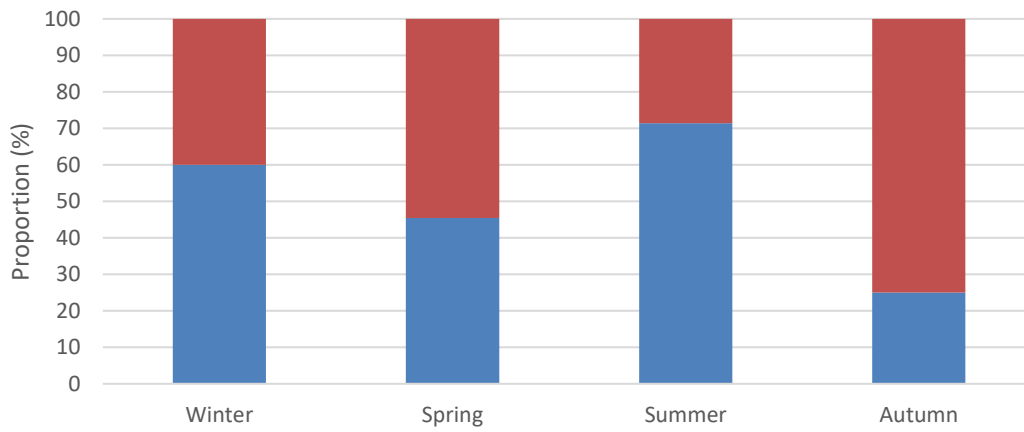
Multiple odontocete detections were often recorded on the same day. Unfortunately, the recorders are not able to distinguish between the vocalisations of individual dolphins and so cannot determine if it is the same group entering and leaving the harbour or just new groups passing by. Clusters of events also occurred over multiple days usually lasting between 2 to 4 days when it appears several groups are moving back and forth along the channels near the moorings. The longest continuous detection events in which animal remained near the recorders varied from 61 and 94 minutes. These findings also support the general dolphin trends discussed in Clement (2022).

Finally, whether dolphins may be using the harbour more or less during day or night time hours was also assessed. The time of each detection was simply categorised into a breakdown of day-time (06:01 to 18:00) vs night-time (18:01 to 06:00) hours, but does not consider the changes in season or daylight savings at the moment (Figure 4). At this stage, it appears that dolphins are using these areas of the harbour fairly equally between day and night. More variation between day and night detections appears to occur at the Passage Island and Sinclair moorings, but the low number of detections in some seasons make any further interpretation questionable.

Calliope



Passage Island



Sinclair

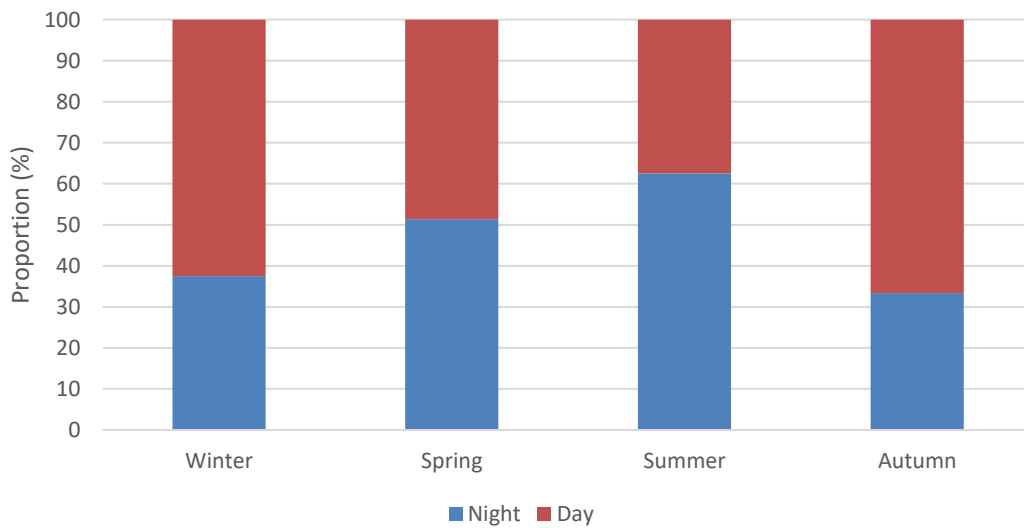


Figure 4: The proportion of all detections that occurred during the day-time (06:01 to 18:00) or during the night-time (18:01 to 06:00) for each mooring across all seasons.