



MARSHALL DAY
Acoustics 

TASMAN AQUACULTURE
NOISE ASSESSMENT REPORT

Rp 001 R02 20230567 | 17 June 2024

Project: **TASMAN AQUACULTURE NOISE ASSESSMENT**

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Report No.: **Rp 001 R02 20230567**

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1.0 SUMMARY

Marshall Day Acoustics has been engaged by Tasman District Council (TDC) to assess noise from the existing marine farming operations in the Tasman Region.

We visited the sites on 11 – 15 February 2024 to measure marine farming operations in the communities nearby Port Taranaki and the Aquaculture Management Areas (AMAs). Weather conditions were good and there were marine farming activities occurring every day of our visit.

Our findings are as follows:

- The key issue is low frequency noise from the boats travelling to and from the marine farms received in the surrounding communities. We understand that most complaints are received before dawn.
- We measured noise levels at locations around Tasman Bay to understand the ambient and vessel noise levels between 4 and 8 am. Our measurements showed the following:
 - o The ambient noise levels during the early morning are very low due to the calm conditions. The main ambient noise sources we identified were crickets, waves lapping on the beach, and cicadas beginning from around 6:30 am (sunrise) onwards. There was no appreciable low-frequency ambient noise.
 - o The vessel movements were clearly audible at the most affected locations (Pōhara and Rangihaeata). This was because the continuous low-frequency noise had a noticeably different character and level to the background environment. We consider it appropriate to apply the special audible character (SAC) penalty to the results because most of the vessels were both subjectively and objectively tonal.
 - o The loudest marine farming vessel (Grey Heron) had a rating noise level of 35 dB $L_{Aeq(15\text{ min})}$ (49 dB L_{eq} at 100 Hz) as it travelled past Rangihaeata at around 28 knots. All other marine farming vessels travelled much slower and had rating noise levels below 30 dB $L_{Aeq(15\text{ min})}$.
- There are no noise limits in the Tasman Regional Management Plan (TRMP) for vessel movements, so we have used the rural zone night-time limit of 40 dB L_{Aeq} as a threshold to enable a benchmark assessment of noise effects. All vessel movement noise was well below this threshold.
- The Wainui Bay AMA is the only site which has a noise limit. We measured a rating level of 33 dB L_{A10} at the closest receiver when the Vanguard vessel was working the farm. This is well below the AMA's 40 dB L_{A10} limit.
- All marine farming operations during our survey were in accordance with the Marine Farming Associations (MFA) Code of Practice. We did not observe any unnecessary noise.
- We note that the sea state, wind, and atmospheric conditions can influence the vessel noise received in the surrounding communities. Our survey took place during good weather conditions for marine farming, but there is likely to be conditions which are more favourable to sound propagation (e.g. a moderate northerly breeze). However, even if the vessels were noticeably louder, we still expect the rating noise levels to be below the 40 dB L_{Aeq} threshold.

Overall, we consider that noise from the marine farming operations is reasonable based on our survey results and the controls in the MFA Code of Practice to be adequate to address residual effects.

A glossary of acoustic terminology used in the assessment is included in Appendix A.

2.0 DESCRIPTION OF THE MARINE FARMING

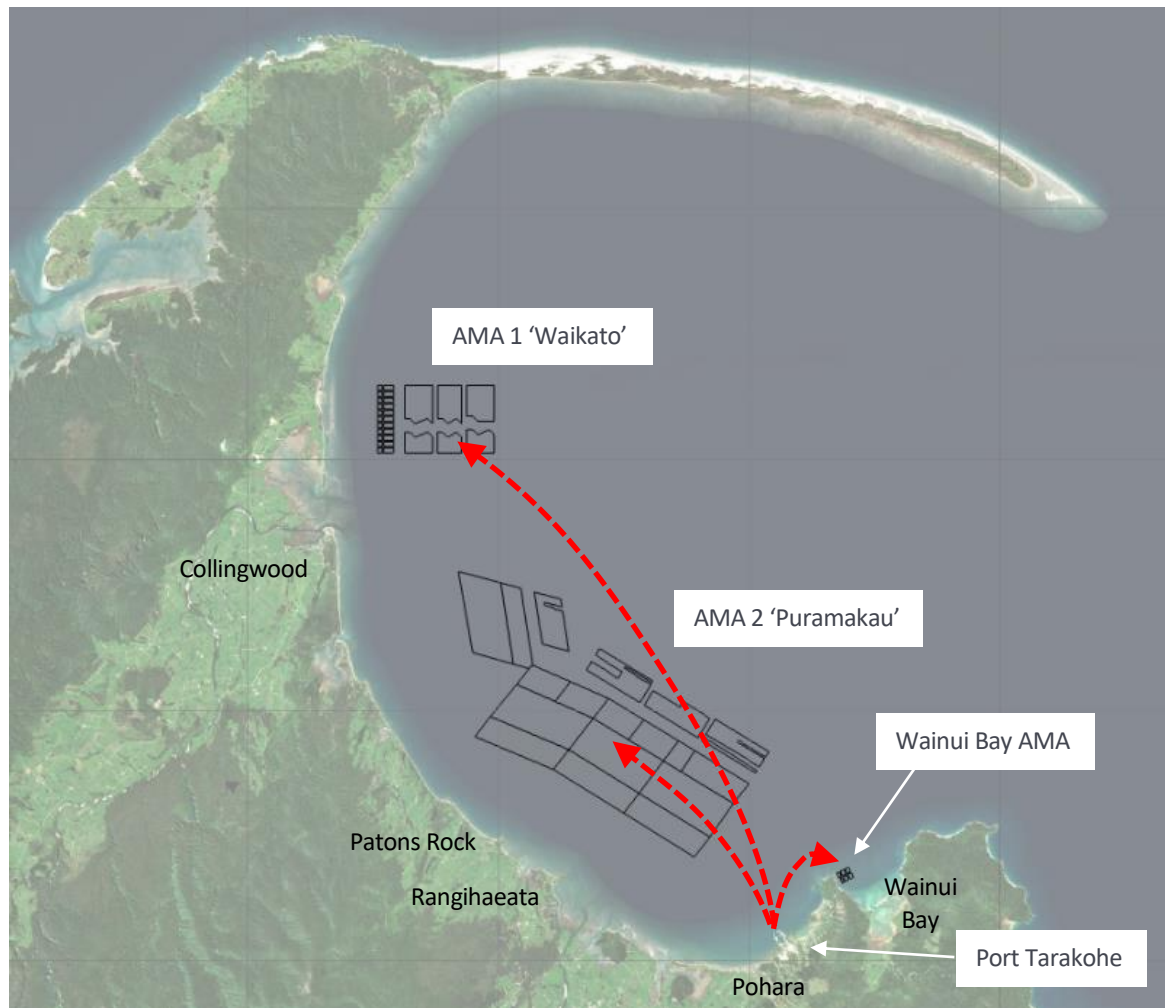
2.1 Marine farming vessels typically leave Port Tarakohe at 4 – 7 am to visit the AMAs

We observed several marine farming vessels leaving Port Tarakohe each day between 4 and 8 am to visit AMAs 1 & 2. The vessels generally remained at the AMAs for the morning and returned to the port in the later morning/early afternoon. We also observed some vessels staying out overnight at the AMAs.

Only one vessel (the Vanguard) visited the Wainui Bay AMA during our survey. This vessel stayed at AMA 2 overnight and travelled to Wainui Bay early the next morning, where it remained for the day.

A map of the port, AMAs, and community areas is shown on Figure 1.

Figure 1: Map of AMAs



We understand that the early morning period is most suited to marine farming because of the still weather conditions and calm sea state. It is common in the region for the wind to pick up from the late morning and become sustained in the afternoon, which can affect the harvesting quality and efficiency.

2.2 10 marine farming vessels were operating during our survey

Table 1 summarises their movements based on information provided by the MFA¹.

Table 1: Summary of vessel movement data from MFA

Date	Vessel	Company	Departure time	Destination
Monday 12 February	Resolution *	Clearwater	4:15 am	AMA 2
	Vanguard *	Maclab	4:18 am	AMA 1
	Stray Cat	Clearwater	5:31 am	AMA 2
	Arista Cat	Clearwater	5:32 am	AMA 2
	Platinum	Sanford	5:34 am	Unknown
	Jolly Roger	Clearwater	6:58 am	AMA 2
	Kaiumanui	Sanford	7:38 am	Unknown
Tuesday 13 February	Resolution	Clearwater	5:33 am	AMA 1
	Arista Cat	Clearwater	5:37 am	Unknown
	Platinum	Sanford	5:40 am	Unknown
	Kaiumanui	Sanford	6:02 am	Unknown
	Dawn Breaker *	Waimana Marine	8:30 am	Unknown
Wednesday 14 February	Resolution	Clearwater	5:25 am	Unknown
	Kaiumanui	Sanford	5:27 am	Unknown
	Grey Heron	MFML	6:00 am	Unknown
	Platinum	Sanford	6:50 am	Unknown
Thursday 15 February	Platinum	Sanford	5:37 am	Unknown
	Vanguard	Maclab	5:43 am	Unknown
	Jolly Roger	Clearwater	7:39 am	AMA 2
Friday 16 February	Stray Cat	Clearwater	5:47 am	Unknown
	Vanguard	Maclab	6:00 am **	Wainui Bay

* These movements occurred outside our monitoring periods.

** This vessel travelled directly from AMA 2 to Wainui Bay. We estimate that it left AMA 2 around 6 am.

2.3 The marine farming vessels vary in size and type

There is information available online about the size and type of four of the nine vessels listed in Table 1. Photos of these vessels are shown in the Figure 2 - Figure 5 below.

Very limited information or photos are available for the other smaller vessels. We were only able to obtain the length of the vessels from the Maritime New Zealand² website.

The known information of all vessels is summarised in Table 2.

In summary, there are two large farming vessels (Vanguard and Resolution, around 30 m length), a number of smaller farming vessels (< 20 m length) and a high-speed catamaran (Grey Heron).

¹ Emails from Marine Farming Association office manager on 22 February, 4 and 5 March 2024

² <https://services.maritimenz.govt.nz/vessel-search/default.aspx>

Figure 2: Vanguard (Maclab) – large farming vessel



Figure 3: Resolution (Clearwater) – large farming vessel



Figure 4: Platinum (Sanford) – small farming vessel



Figure 5: Grey Heron (MFML) – high speed support vessel



Table 2: Summary of vessel information obtained from our internet search

Vessel	Company	Description	Length	Year of manufacture
Vanguard	Maclab	Large slow speed vessel	30 m	2017
Resolution	Clearwater	Large slow speed vessel	28 m	2017
Platinum	Sanford	Small slow speed vessel	18 m	Unknown
Grey Heron	MFML	High speed catamaran support vessel (up to 30 knots)	16 m	2005
Stray Cat	Clearwater	Unknown	19 m	Unknown
Arista Cat	Clearwater	Unknown	Unknown	Unknown
Jolly Roger	Sanford	Unknown	16 m	Unknown
Kaiumanui	Clearwater	Unknown	18 m	Unknown
Dawn Breaker	Waimana Marine	Unknown	16 m	Unknown

3.0 NOISE PERFORMANCE STANDARDS

3.1 Wainui Bay AMA is the only AMA Consent with a noise limit

Condition 21 of the Wainui Bay AMA Consent³ specifies noise limits for all operations related to the site. It states that:

“All activities related to this site shall meet the following noise standards as measured and assessed in accordance with the provisions of NZS 6801:1991, Measurement of Sound and NZS 6802:1991, Assessment of Environmental Sound at any point on land above MHWS:

Day: 50 dB L_{A10}

Night: 40 dB L_{A10} and 70 dB L_{AFmax}

Advice Note:

For the purposes of this condition: Day = 7.00 am to 8.00 pm, Monday to Friday inclusive and 7.00 am to 6.00 pm Saturday (but excluding public holidays).

Night = all other times plus public holidays.”

Condition 22 and 23 relate to radio noise and hours of operation:

- Condition 22 states that “no broadcast radio station or digital or analogue recorded noise (including CDs, cassette tapes, MP3s or other digital formats) is to occur at the site”, excluding “Marine Radio, which vessels must have turned on.”
- Condition 23 limits the sites operation to 6 am – 8 pm each day, with an allowance of five occasions per year when work can occur outside these hours.

We understand that no other AMA consents contain noise limits.

³ ‘160060-Decision-22-02-16.docx’

3.2 There are no noise limits in the TRMP for activities in the Coastal Marine Area

The vessel movements and AMAs are in the Coastal Marine Area (CMA) and are therefore subject Volume 1, Part III of the TRMP. Chapter 24 specifically addresses noise emissions. This chapter does not contain any noise rules, but has the following objectives and policies:

- Objective 24.1.2: “A coastal marine area in which noise levels do not adversely affect natural character, amenity values or wildlife in the coastal environment.”
- Policy 24.1.3.1: “To avoid, remedy or mitigate adverse effects of noise from activities in the coastal marine area on the natural character of the coastal environment and in places where natural quietness contributes to the amenity value of a coastal locality.”

We note that the policy wording is very similar to Section 16 of the Resource Management Act (RMA), which we have summarised in Section 3.6.

Noise from boat movements in the CMA are routinely exempt from noise limits, like vehicles are on public roads. The absence of noise rules for the CMA in the TRMP is consistent with other standards or planning documents such as New Zealand Standard NZS 6809:1999 *Acoustics – Port Noise Management and Land Use Planning*, Auckland Unitary Plan⁴ and the Marlborough Environment Plan⁵.

In our view it is impractical to impose noise limits to boats transiting in the CMA because it is difficult to distinguish between marine farming vessels transiting to the AMAs and any vessels that are generally transiting in the CMA by right. We consider that an operational management plan or Code of Practice is the appropriate mechanism to manage noise effects from activities in the CMA.

3.3 The zone noise limits in the TRMP provide context for assessment of noise from the AMAs

Chapter 17 of the TRMP contains noise rules between sites in the Tasman District. All coastal residential areas (Pōhara, Rangihaeata, Patons Rock, Collingwood etc.) are zoned ‘Rural 2’. The relevant noise rules for this zone are in Section 17.6.2.1.

Only noise from activities on land are subject to the TRMP noise limits.

Rule 17.6.2.1. C. states that:

“Except in the Richmond West Development Area, noise generated by the activity, when measured at or within the notional boundary of any dwelling in a Rural Zone (other than any dwelling on the site from which the noise is being generated), Rural, Residential, Papakainga or Tourist Services zone, or at or within any site within a Residential Zone, does not exceed:

Daytime (7 am – 9 pm): 55 dB L_{Aeq}

Night-time (9 pm – 7 am): 40 dB L_{Aeq} and 70 dB L_{AFmax} ”

The rule requires that noise be measured and assessed in accordance with the provisions of NZS 6801:2008 *Acoustics - Measurement of Environmental Sound* and NZS 6802:2008 *Acoustics - Environmental Noise*.

While these limits are not applicable to the operation of the AMAs, they provide context of the expected level of amenity in these regions. A limit of 55 dB L_{Aeq} during the daytime aligns with the recommended upper limit for residential areas in NZS 6802:2008, and a night-time limit of 40 dB L_{Aeq} is typical for quiet residential, rural, and coastal areas across New Zealand.

⁴ AUP E25.6.14 (2) (a)

⁵ 14.2.3.2 (c) of Marlborough Environment Plan (appeals version May 2021)

We have used the most stringent limit of 40 dB L_{Aeq} during the night-time as the key threshold for our benchmark assessment of noise effects.

3.4 We have assessed the marine farming noise for Special Audible Character

Section 6.3 of NZS 6802:2008 addresses Special Audible Character (SAC). It states that:

“Where the sound being assessed has a distinctive character which may affect its subjective acceptability (for example, it is noticeably impulsive or tonal), the representative sound level shall be adjusted to take this into account.”

This is because sound with distinctive characteristics can make them more likely to cause annoyance or disturbance. NZS 6802:2008 requires an adjustment of up to 5 decibels be applied when assessing sounds with SAC such as tonality (a hum or a whine) and impulsiveness (bangs or thumps).

We have assessed the marine farming activities for SAC subjectively and using the ‘Simplified test method for tonality’ in Appendix B4.3 of NZS 6802:2008.

The adjusted noise levels with SAC included are referred to as the ‘Rating Level’ as per NZS 6802:2008.

3.5 The Marine Farming Association has a Code of Practice to address noise effects

All marine farming vessels in the region are asked to adopt the Code of Practice. The current version (2016)⁶ contains specific requirements to address non-operational and unnecessary noise from vessels operating in the Golden Bay and Tasman Bay regions. The key requirements are:

- Consider the weather and sea state and modify non-operational and unnecessary noise
- Be aware of nearby residential areas
- Ensure non-operational and unnecessary noise is not audible above the working noises (engines, pumps, lifting gear) in nearby residential areas
- Ensure noise from moored vessels at night-time is inaudible at the closest residences⁷
- Keep radio volume to a minimum

The full code is provided in Appendix B.

3.6 The Resource Management Act is the basis of the TRMP and Code of Practice

Section 16 of the Resource Management Act (RMA) provides a duty to avoid unreasonable noise and applies to all land use activities and activities in the coastal marine area. It requires occupiers and persons carrying out activities to:

“... adopt the best practicable option to ensure that the emission of noise from that land or water does not exceed a reasonable level.”

Section 17 RMA provides for a duty to avoid, remedy, or mitigate adverse effects. It requires all parties to:

“Avoid, remedy, or mitigate any adverse effect on the environment arising from an activity ... whether or not the activity is carried on in accordance with ... a national environmental standard, a rule, a resource consent, or a designation.”

⁶ ‘code-of-practice-noise-2016-current.pdf’

⁷ We interpret this as a qualitative rather than quantitative measure. I.e. the vessel noise should not be above background noise levels as opposed to subjectively audible.

4.0 METHODOLOGY

4.1 We measured vessel noise during the early morning at 9 locations across five days

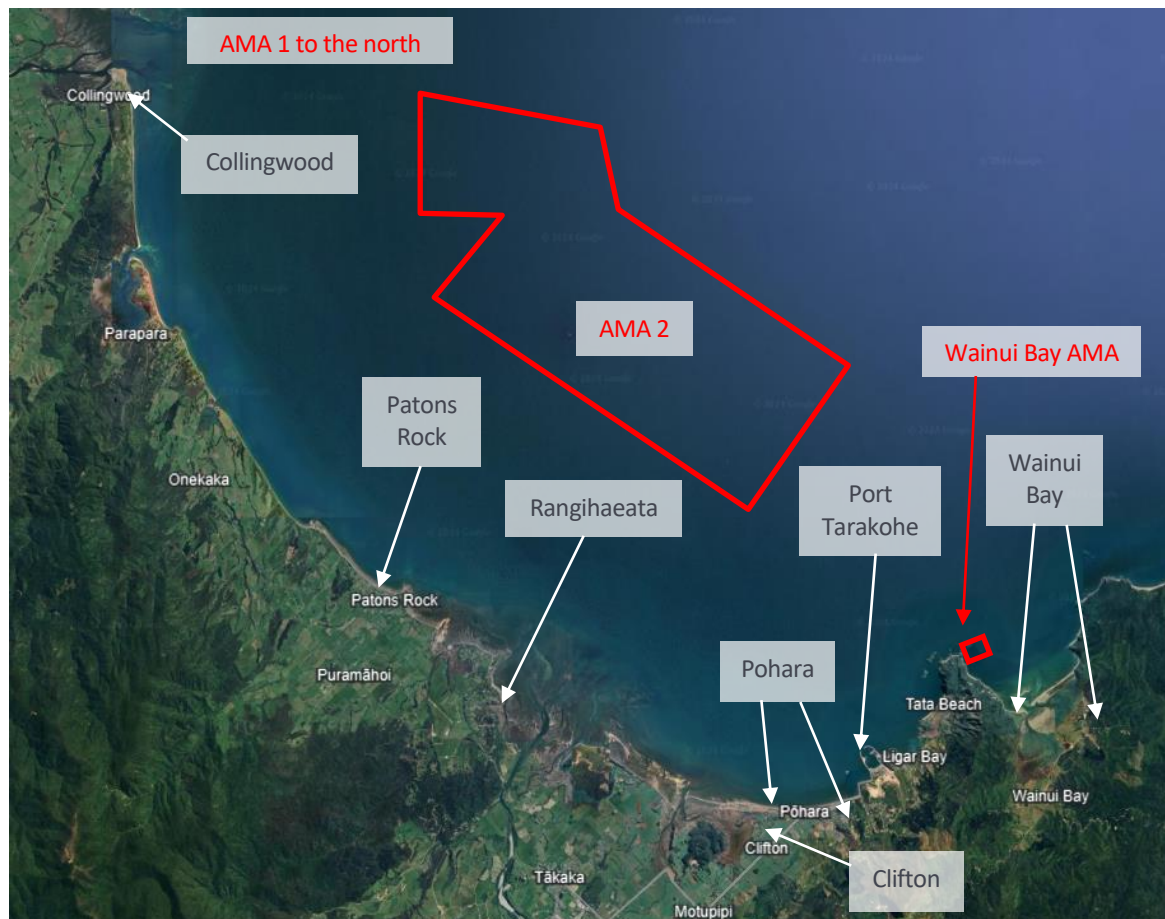
We travelled to the Tasman Region to measure marine farming noise from 12 to 16 February 2023.

We planned to measure at Wainui Bay, Pōhara, Patons Rock, Collingwood and Motueka, as we understood from TDC that complaints had been received from these areas. However, it became clear on site that measurements at Collingwood and Motueka would not be useful as there were minimal farming activities nearby these sites at the time.

We ended up focusing on Pōhara as this was closest to the port where the marine farming vessels left each morning and the area with most noise complainants. We carried out supplementary measurements at Rangihaeata, Wainui Bay, Patons Rock and Collingwood. We note that the Patons Rock measurements may not be a conservative representation of received noise levels because most marine farming vessels did not go past AMA 2⁸.

Figure 6 shows an overview map of our measurements. Detailed maps and photos of all locations are included in Appendix C.

Figure 6: Map of our measurement locations



⁸ The resident at 239 Patons Rock Road informed us that the vessel noise appears to be loudest when they pass this area on the way to AMA 1, which is near Collingwood.

4.2 We have processed the results to isolate the low frequency sound from the vessels

We have used the 40 dB L_{Aeq} noise limit for Rural Zones in the TRMP as the criterion to benchmark the marine farming noise effects.

The $L_{Aeq (15 \text{ min})}$ is a 15-minute energy average which is A-weighted according to the sensitivity of the human ear to different frequencies of sound. The ear is most sensitive at 1 kHz so there is no 'weighting correction' at this frequency. Conversely, large weighting corrections are applied to low frequency sound (below 100 Hz) because the ear is less sensitive to these frequencies. In practice, this means that sound sources like cicadas, crickets, and birdsong often 'control' the L_{Aeq} levels, while low frequency sounds like distant vessel movements generally have little or no impact. A figure showing the A-weighting curve is included in the glossary in Appendix A.

We have used the following methods to analyse the vessel noise:

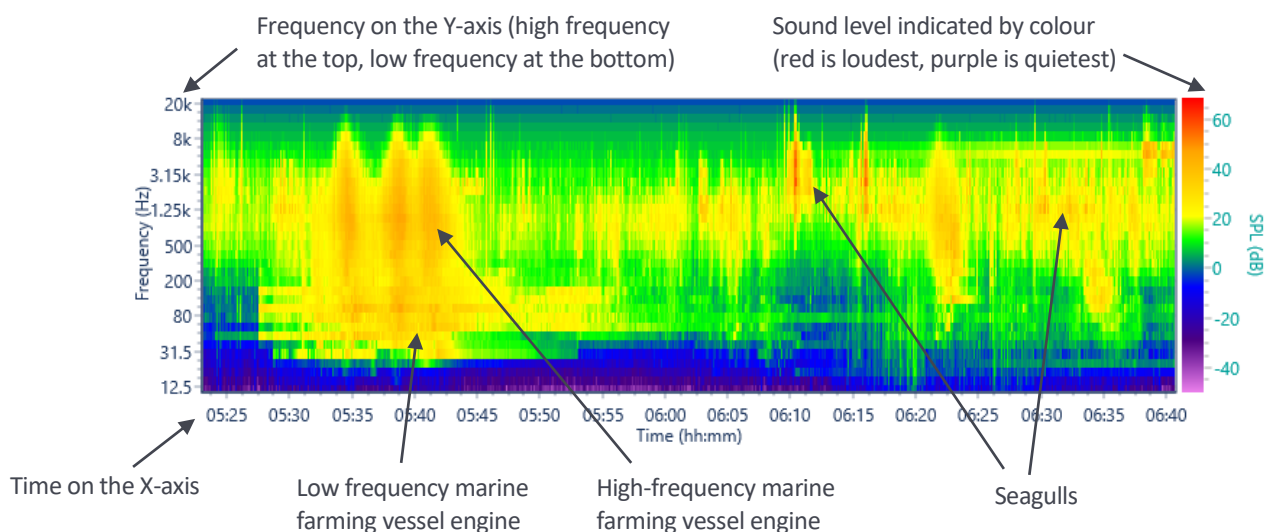
- Use of spectrograms to identify the vessel movements (coloured graphs which show the variation in level at each frequency over time)
- Filtered out all sound above 100 Hz during the vessel movements to exclude extraneous noise from cicadas, birdsong, crickets, waves, and traffic. The residual sound is mostly controlled by the low-frequency engine noise and can be compared to typical effects thresholds
- Determining whether the special audible character penalty should be applied (see Section 3.4). We consider that all vessel movements have the potential to be perceived as tonal depending on the ambient noise levels. We have therefore applied a + 5 dB adjustment to all vessel movements as a conservative assumption.

4.3 We have used spectrograms to identify the periods with marine farming noise

We have used spectrograms to show the variation in each frequency band over time to illustrate the different sources in the measurement. Time is shown on the x-axis, frequency on the y-axis and the sound level is shown with colour. The vessel movements are identifiable in the lower frequency bands.

An example of a spectrogram from our measurement on the breakwater of Port Tarakohe on 13 February is shown in Figure 7. The spectrogram levels have been A-weighted levels to illustrate which sounds appear the loudest to the human ear.

Figure 7: Example of a spectrogram (measurement on Port Tarakohe breakwater of vessels leaving the port)



5.0 RESULTS FROM EACH LOCATON

The following sections present the general results from our measurements at each of the community areas in Tasman Bay. We have presented two key metrics:

- The overall noise levels which are controlled by ambient sources such as crickets, cicadas, traffic, birdsong, and other ambient sources.
- The levels with all noise above 100 Hz filtered out. These results are generally controlled by vessel movements but may have some contribution from intermittent traffic in the Pōhara and Clifton locations.

We have separated the measurements into night-time and morning periods. We have made the distinction based on when cicada noise began (typically at 6 am).

Our analysis of specific marine farming activities is shown in Section 6.0.

5.1 Wainui Bay: ambient noise and the Vanguard working the AMA

We visited Wainui Bay on the first day of the survey (12 February 2024) to deploy a logger on the hill overlooking the bay and carry out an attended measurement at the closest receiver to the Wainui Bay AMA. No marine farming activities occurred in the area on this day, but we were able to measure the ambient environment.

We visited Wainui Bay again on 15 February 2024 when the largest marine farming vessel (the Vanguard) was working at the AMA. We measured a noise level of 28 dB $L_{A10(15\text{ min})}$ at the closest receiver. This equates to a rating noise level of 33 dB $L_{A10(15\text{ min})}$ with the SAC adjustment, which comfortably complied with the 40 dB L_{A10} limit in the Wainui Bay AMA consent (see Section 3.1). Only the low frequency engine noise from the Vanguard was audible at the measurement location.

Table 3 shows the overall results from the measurements in the Wainui Bay area. Figure 8 to Figure 10 show the A-weighted time trace and A-weighted spectrograms for the measurement periods in Table 3. The difference without and with the vessel is best seen in the right-hand columns (below 100 Hz) in the background (L_{A90}) values changing from < 10 dB L_{A90} to around 20 dB L_{A90} .

A map and photos of the measurement locations are included in Appendix C1.

Table 3: Measured overall noise levels at Wainui Bay

Location	Survey type	Date	Time	Noise sources	Measured levels at all frequencies		Measured levels below 100 Hz	
					L_{Aeq}	L_{A90}	L_{Aeq}	L_{A90}
Golden Bay Eco Hideaway (on hill)	Un-attended	12 Feb	5 – 6 am	Waves, crickets	34	32	20	12
			6 – 7:30 am	Cicadas, birds	54	31	21	13
1597 Abel Tasman Drive	Attended	12 Feb	5:20 – 6 am	Waves, crickets	39	34	20	6
			6 – 7:30 am	Cicadas, car passes, birds	47	36	26	8
	Attended	15 Feb	6:20 – 6:50 am	Cicadas, birdsong, vessel at AMA	45	43	27	20

Figure 8: Golden Bay Hideaway (12 Feb): time trace and spectrogram in A-weighted levels

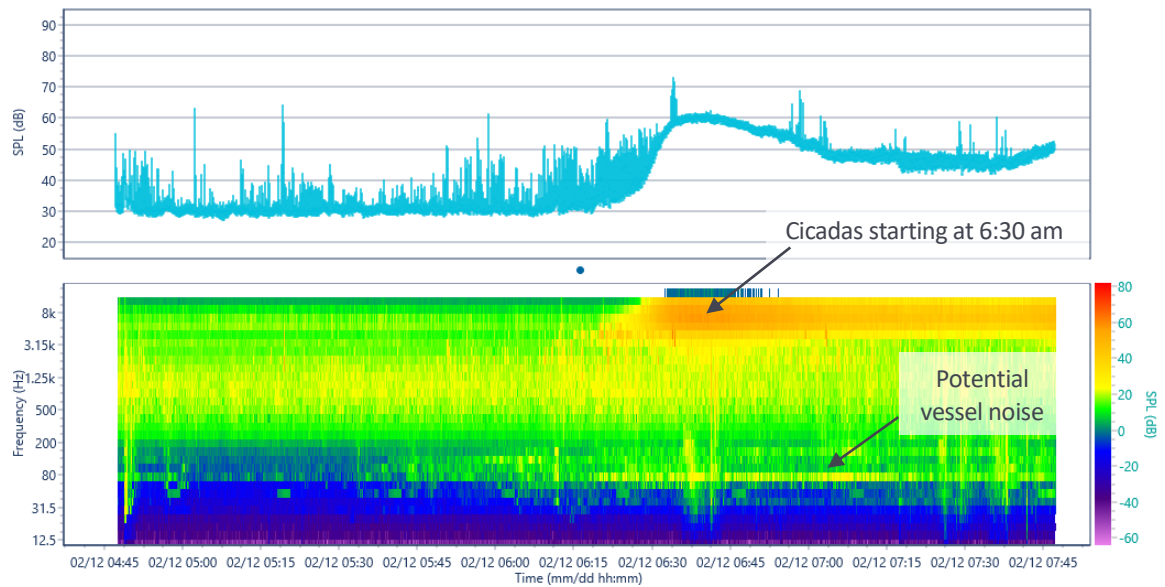


Figure 9: 1597 Abel Tasman Drive (12 Feb): time trace and spectrogram in A-weighted levels

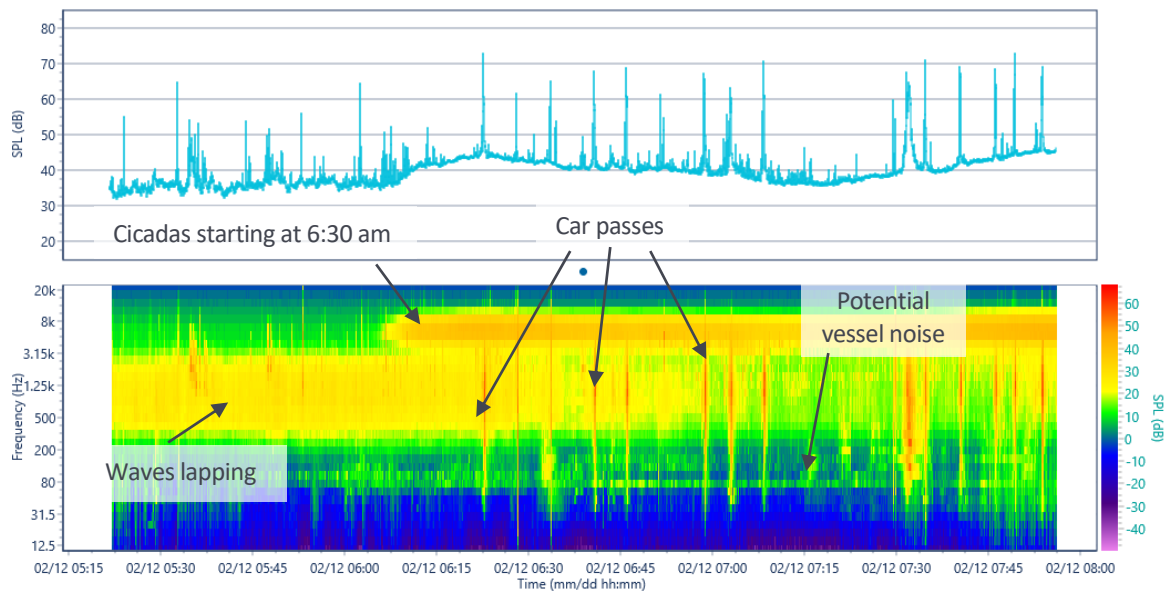
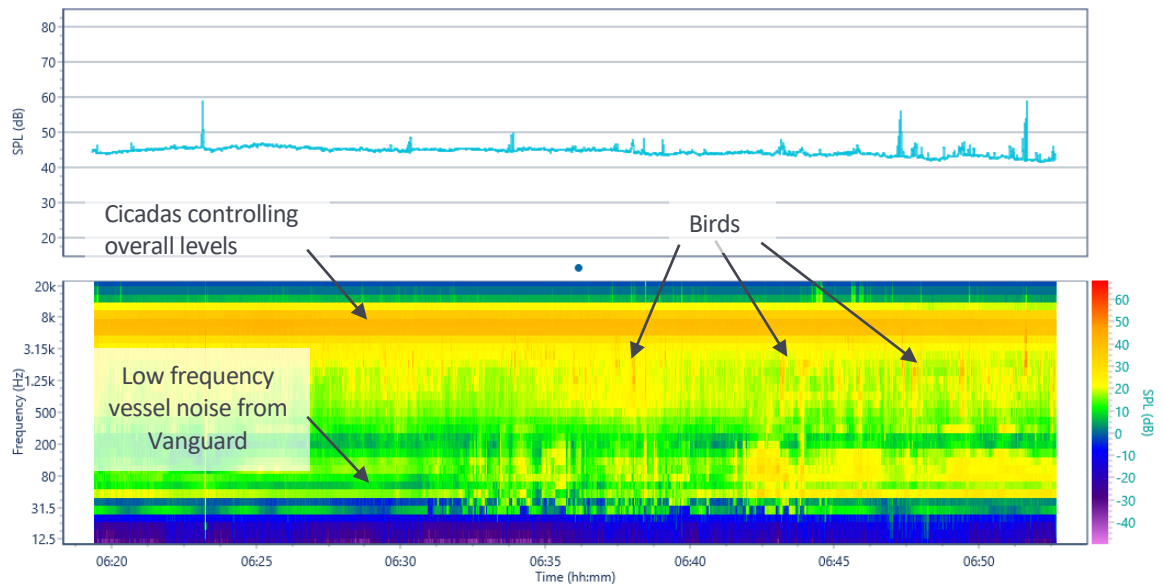


Figure 10: 1597 Abel Tasman Drive (15 Feb): time trace and spectrogram in A-weighted levels



5.2 Pōhara and Clifton: vessels leaving Port Tarakohe

We visited Pōhara and Clifton on three occasions as we understand most noise complaints have been received from this area.

Vessel movements were identifiable at all locations. However, the overall noise levels were dominated by ambient sources such as traffic movements (primarily Lansdowne Street and Bay Vista Drive), crickets, cicadas, birdsong and waves lapping.

Table 4 shows the overall results from the measurements. Figure 11 to Figure 13 show the A-weighted time trace and A-weighted spectrograms for the measurement periods in Table 4.

A map and photos of the measurement locations are included in Appendix C2.

Table 4: Measured overall noise levels at Pōhara and Clifton

Location	Survey type	Date	Time	Noise sources	Measured levels at all frequencies		Measured levels below 100 Hz	
					L _{Aeq}	L _{A90}	L _{Aeq}	L _{A90}
27 Bay Vista Drive	Un-attended	13 Feb	4:54 – 5:45 am	Waves lapping, crickets, traffic, vessels	38	26	11	3
			5:45 – 7:15 am	Cicadas, traffic, vessels, birds	59	45	19	10
17 Lansdowne Street	Attended	15 Feb	4:55 – 6:05 am	Traffic, crickets, vessels	33	31	21	15
84 Selwyn Street	Attended	16 Feb	5:30 – 6:20 am	Waves lapping, crickets, traffic, vessels	33	31	21	15
			6:30 – 6:50	Cicadas, traffic, vessels, birds	39	38	21	14

Figure 11: 27 Bay Vista Drive (13 Feb): time trace and spectrogram in A-weighted levels

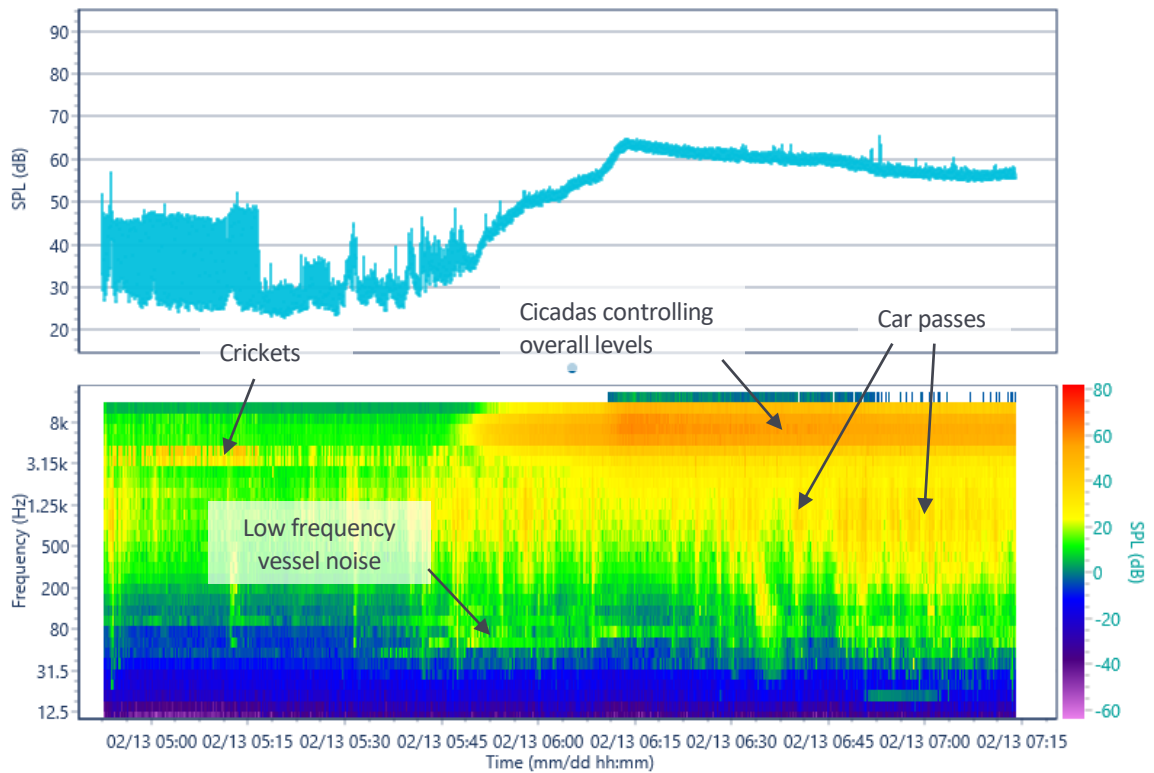


Figure 12: 17 Lansdowne Street (15 Feb): time trace and spectrogram in A-weighted levels

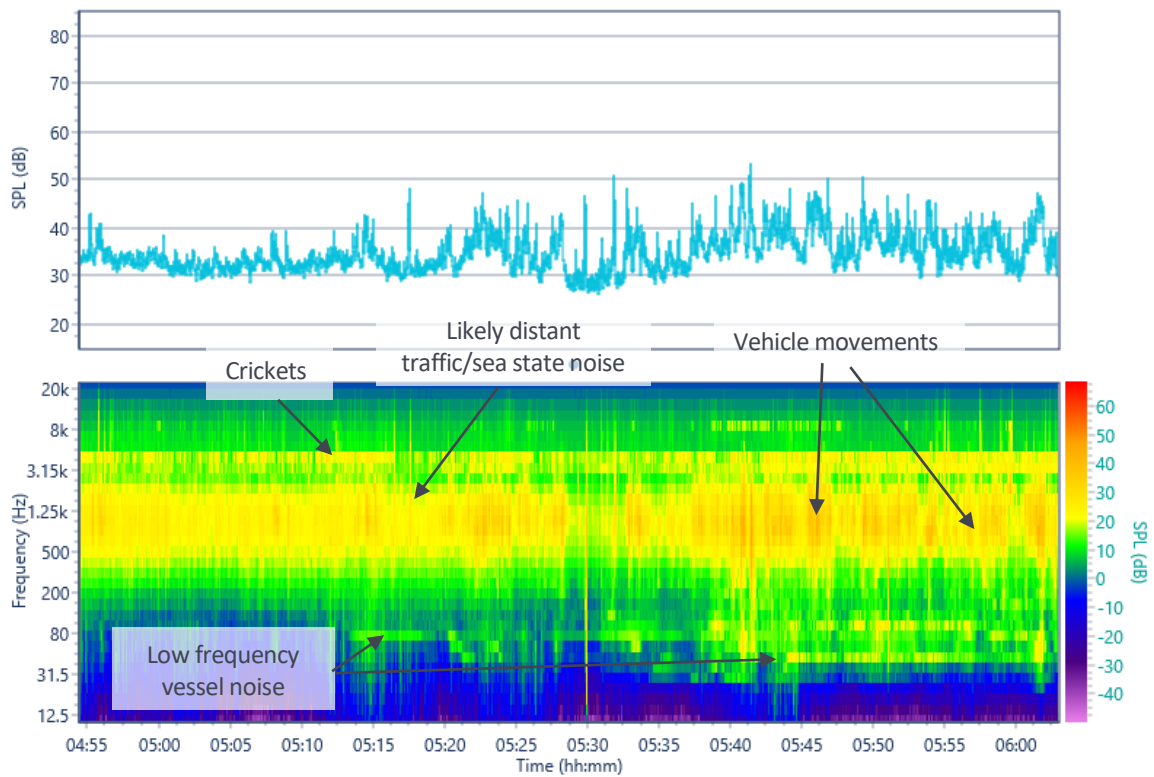


Figure 13: 84 Selwyn Street (16 Feb): time trace and spectrogram in A-weighted levels



5.3 Rangihaeata: vessels travelling to AMA 2

We measured at Rangihaeata on two occasions.

This location had clear line of sight to the vessel path from Port Tarkohe to AMA 2 where most of the marine farming activities occurred during our survey.

Vessel movements were clearly identifiable on both days. There was minimal contribution from traffic or waves lapping, but the overall results were still controlled by crickets, cicadas, and birdsong.

Table 5 shows the overall results from the measurements. Figure 14 and Figure 15 show the A-weighted time trace and A-weighted spectrograms for the measurement periods in Table 5.

A map and photos of the measurement locations are included in Appendix C3.

Table 5: Measured overall noise levels at Rangihaeata

Location	Survey type	Date	Time	Noise sources	Measured levels at all frequencies		Measured levels below 100 Hz	
					L _{Aeq}	L _{A90}	L _{Aeq}	L _{A90}
32 Rangihaeata Road	Attended	14 Feb	5:35 – 6:15 am	Crickets, birdsong, vessels	39	30	27	14
		16 Feb	5:00 – 6:00 am	Crickets, birdsong, vessels	49	34	12	2
			6:00 – 7:15 am	Cicadas, birdsong, vessels	56	45	17	10

Figure 14: Rangihaeata (14 Feb): time trace and spectrogram in A-weighted levels

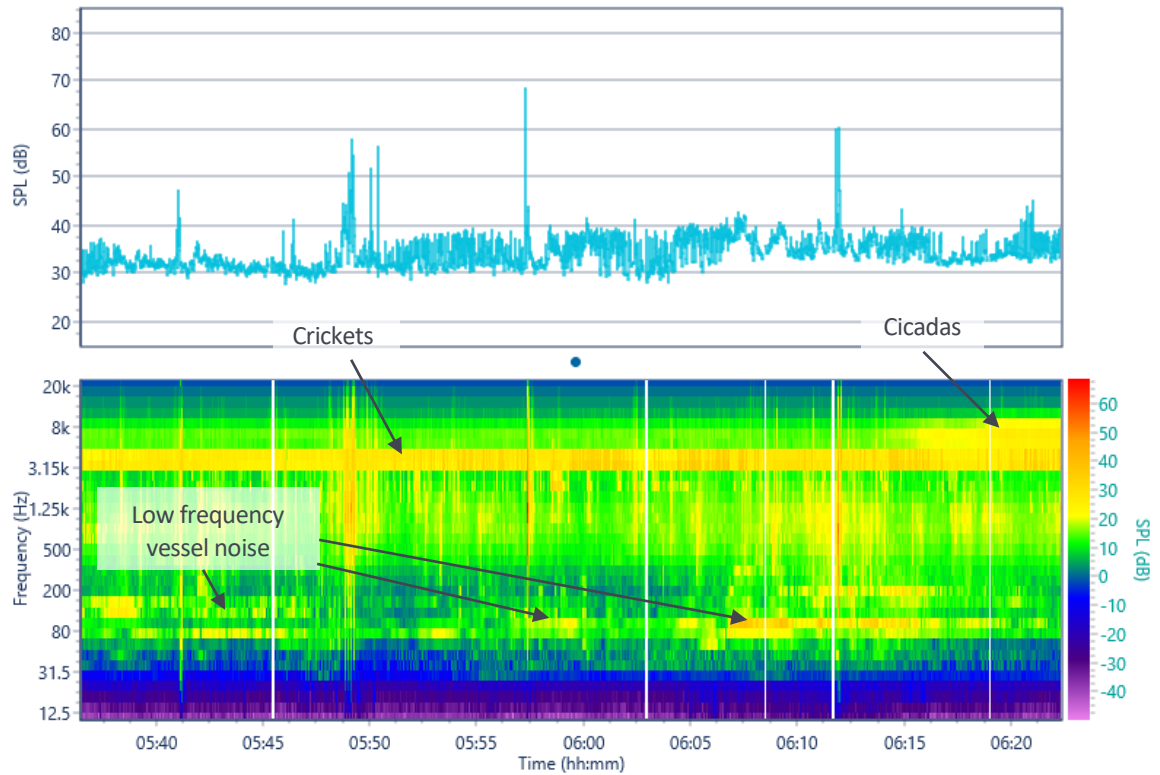
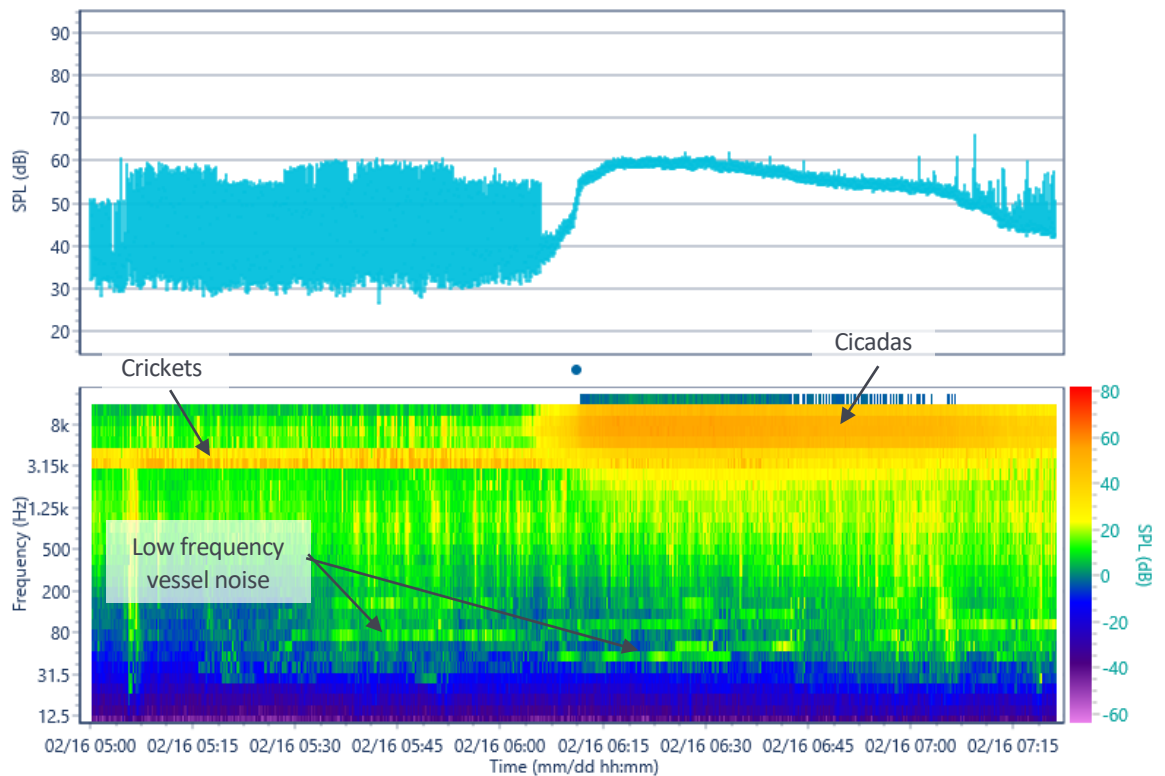


Figure 15: Rangihaeata (16 Feb): time trace and spectrogram in A-weighted levels



5.4 Patons Rock: some noise from vessels travelling to AMA 2

We measured at Patons Rock on two occasions.

This location had clear line of sight to the vessel path from Port Taranaki to AMA 1. However, most vessels stopped at AMA 2 during our survey, so our measurements likely did not capture the worst-case noise levels at this location.

Vessel movements were clearly identifiable on both days. The overall noise levels at this location appeared to be controlled by waves on the beach, with minimal contribution from cicadas and crickets. Vehicle movements on Patons Rock Road were identified from around 6:30 or 7 am onwards.

Table 6 shows the overall results from the measurements. Figure 16 and Figure 17 show the A-weighted time trace and A-weighted spectrograms for the measurement periods in Table 6.

A map and photos of the measurement locations are included in Appendix C4.

Table 6: Measured overall noise levels at Patons Rock

Location	Survey type	Date	Time	Noise sources	Measured levels at all frequencies		Measured levels below 100 Hz	
					L _{Aeq}	L _{A90}	L _{Aeq}	L _{A90}
239 Patons Rock Road	Un-attended	14 Feb	5:00 – 7:00 am	Waves, vessels	48	43	23	10
			7:00 – 9:30 am	Waves, vehicle movements, vessels	48	40	22	10
		15 Feb	5:00 – 6:30 am	Waves, vessels	46	41	15	3
			6:30 – 8:30 am	Waves, vehicle movements, vessels	47	40	18	9

Figure 16: Patons Rock (14 Feb): time trace and spectrogram in A-weighted levels

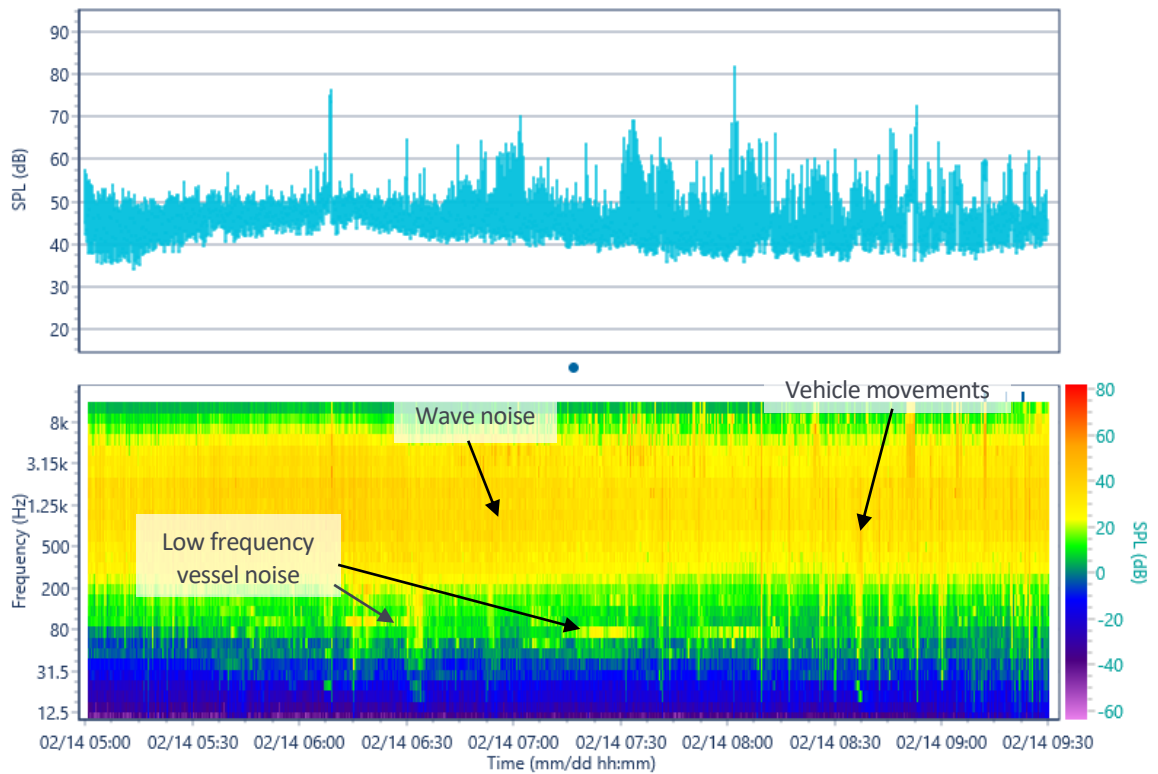
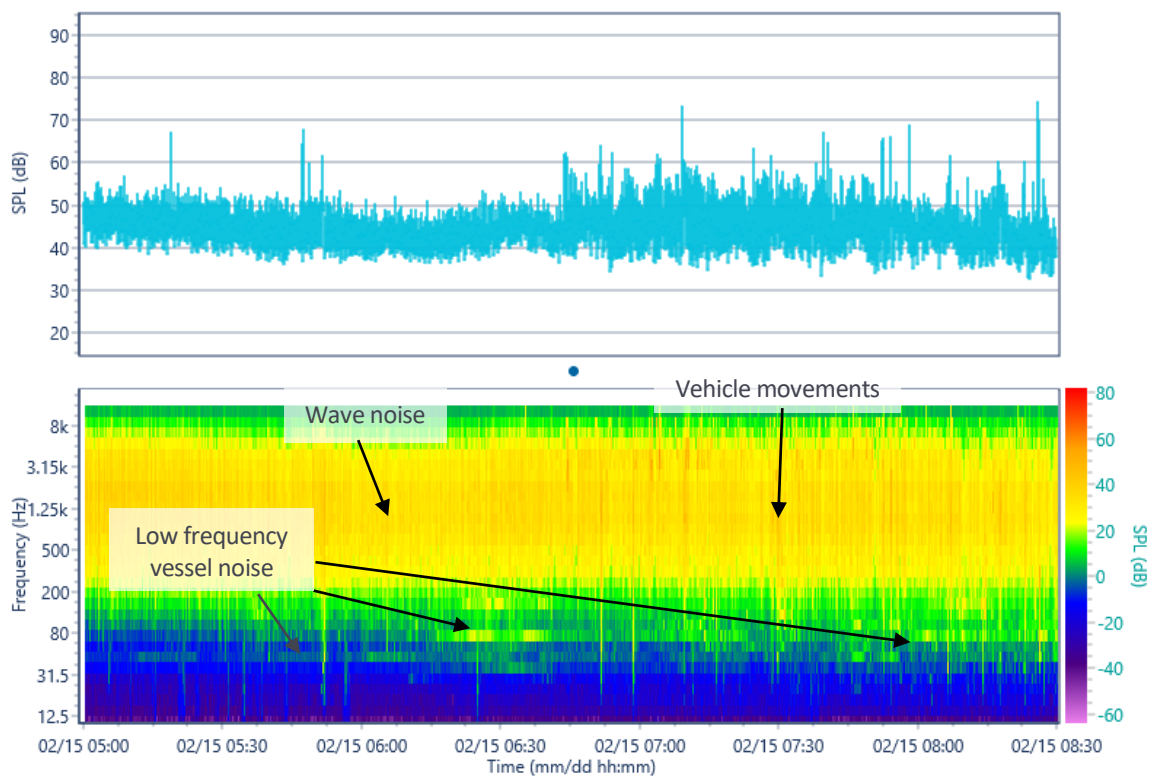


Figure 17: Patons Rock (15 Feb): time trace and spectrogram in A-weighted levels



5.5 Collingwood: ambient noise only

We visited Collingwood and carried out a short-term measurement. The levels were controlled by cicadas and birdsong, with no identifiable vessel movements.

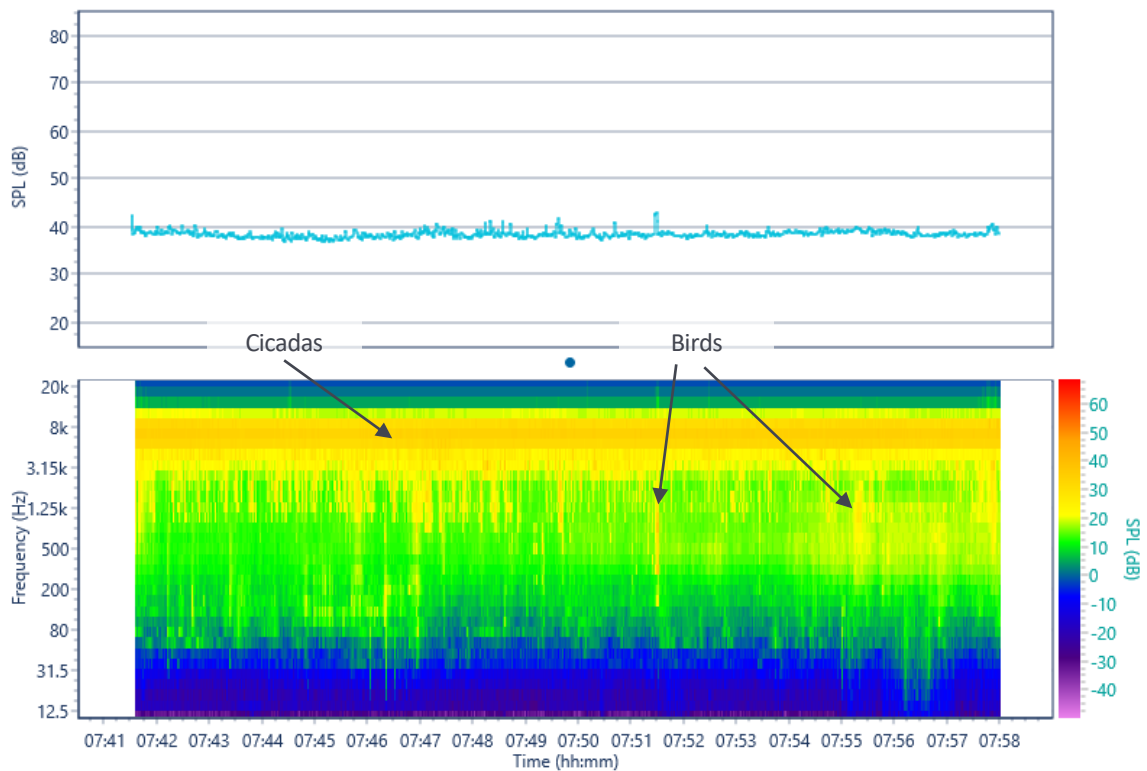
Table 7 shows the overall results from the measurements and Figure 18 shows the A-weighted time trace and A-weighted spectrogram for the measurement period.

A map and photo of the measurement location is included in Appendix C5.

Table 7: Measured overall noise levels at Patons Rock

Location	Survey type	Date	Time	Noise sources	Measured levels at all frequencies		Measured levels below 100 Hz	
					L _{Aeq}	L _{A90}	L _{Aeq}	L _{A90}
Collingwood beach	Attended	14 Feb	7:41 – 7:58 am	Cicadas, birdsong	41	38	12	8

Figure 18: Collingwood beach (15 Feb): time trace and spectrogram in A-weighted levels

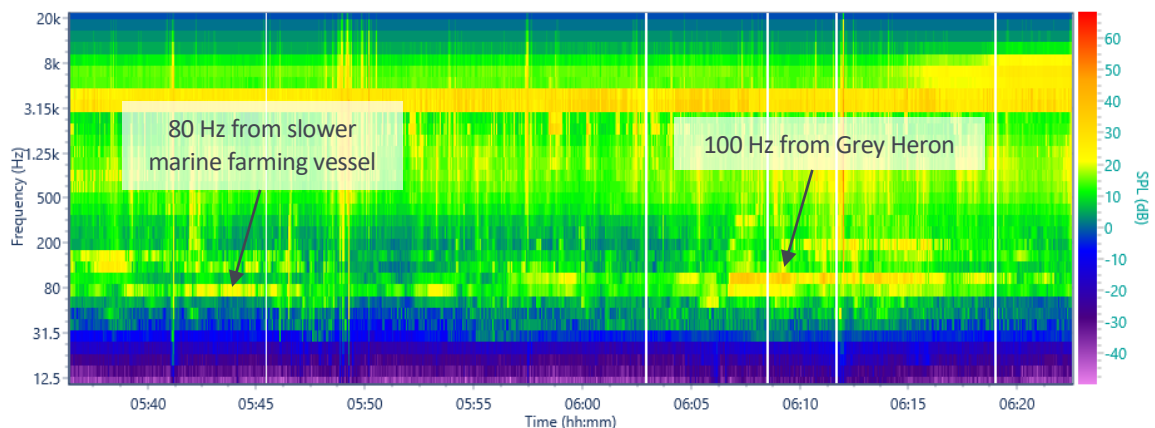


6.0 LOUDEST MARINE FARMING ACTIVITIES

We observed that each vessel produced a distinctive hum/tone. For example, the high-speed Grey Heron stood out with a 100 Hz hum, while the slower Vanguard generated a lower frequency 50 Hz hum. Most of the marine farming fleet had hums ranging from 25 – 80 Hz. This is a lower frequency range than typical recreational vessels.

We used these characteristics to separate individual vessel movements and calculated the received noise levels at each location. Figure 19 shows an A-weighted spectrogram with two different vessels indicated.

Figure 19: Example of vessel noise characteristics (measurement at Rangihaeata on 14 Feb)



We identified a total of 21 individual vessel movements that had a sufficient signal to noise ratio for further analysis. We assessed each movement in accordance with NZS 6802:2008 by taking the 15-minute period that includes the highest noise levels and analysing the measurement for tonality.

The vessel movements each produce a clear tone as shown on the spectrograms. However, none of our measurements were identified as tonal using the simplified test in Appendix B4.3 of NZS 6802:2008⁹. The main reason was the presence of other vessels with different frequency hums.

We note that there is a potential for any of the vessels for the tonality adjustment to be applied if they operated during quieter periods. We have therefore applied the tonality adjustment as a conservative approach for our assessment.

Table 8 summarises the results.

In summary:

- The loudest marine farming activities during our survey ranged from 5 – 35 dB L_{Aeq} (including the special audible character adjustment). This is well below the 40 dB L_{Aeq} benchmark threshold from the TRMP.
- The noisiest was the high-speed Grey Heron on the morning of 14 February, measuring 35 dB L_{Aeq} at Rangihaeata and 34 dB L_{Aeq} at Patons Rock. The next noisiest was the Vanguard working at the Wainui Bay AMA, measuring 31 dB L_{Aeq} . All other marine farming activities were below 30 dB L_{Aeq} .
- We did not identify any unnecessary noise from marine farming operations.

⁹ This test states that “the tonality adjustment shall be applied if the L_{eq} one-third octave band exceed the arithmetic mean of the L_{eq} in both adjacent bands by more than the values given in table B2.” The criterion is 15 dB for frequencies of 25 – 125 Hz.

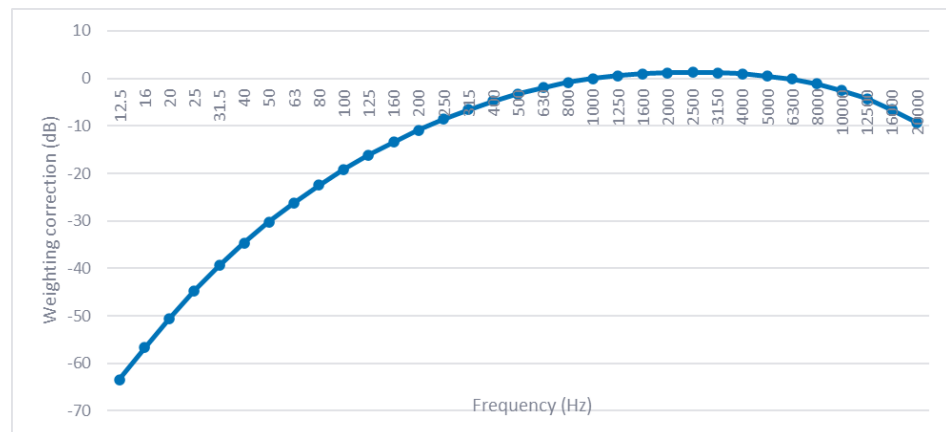
Table 8: Summary of loudest marine farming activities at each location

Location	Date	Activity	Measurement time	Measured overall A-weighted level	Measured level at hum frequency (un-weighted)	Rating level (overall A-weighted level with SAC adjustment)
Wainui Bay (Golden Bay Hideaway)	12 Feb	Unknown – potentially vessel	7:00 – 7:15 am	23 dB LAeq	45 dB Leq at 80 Hz	28 dB LAeq
Wainui Bay (Able Tasman Drive)	12 Feb	Unknown – potentially vessel	6:45 – 7 am	16 dB LAeq	38 dB Leq at 80 Hz	21 dB LAeq
	15 Feb	Vanguard working Wainui Bay AMA	6:19 – 6:34 am	26 dB LAeq	56 dB LAeq at 50 Hz	31 dB LAeq
Pōhara (Bay Vista Drive)	13 Feb	Vessel	5:35 – 5:50 am	6 dB LAeq	36 dB Leq at 50 Hz	11 dB LAeq
		Vessel	5:45 – 6:00 am	14 dB LAeq	37 dB Leq at 80 Hz	19 dB LAeq
		Vessel	5:48 – 6:03 am	15 dB LAeq	42 dB Leq at 63 Hz	14 dB LAeq
		Vessel	6:50 – 7:05 am	0 dB LAeq	50 dB Leq at 20 Hz	5 dB LAeq
Clifton	15 Feb	Vessel	5:43 – 5:58 am	18 dB LAeq	48 dB Leq at 50 Hz	23 dB LAeq
Pōhara (Selwyn Street)	16 Feb	Vessel	6:06 – 6:21 am	19 dB LAeq	49 dB Leq at 50 Hz	24 dB LAeq
		Vessel	6:32 – 6:49 am	18 dB LAeq	44 dB Leq at 63 Hz	23 dB LAeq
Patons Rock	14 Feb	Vessel (Grey Heron)	6:12 – 6:27 am	29 dB LAeq	49 dB Leq at 100 Hz	34 dB LAeq
		Vessel	7:18 – 7:33 am	24 dB LAeq	46 dB Leq at 80 Hz	29 dB LAeq
		Vessel	7:53 – 8:08 am	22 dB LAeq	44 dB Leq at 80 Hz	27 dB LAeq
	15 Feb	Vessel	6:22 – 6:37 am	19 dB LAeq	41 dB Leq at 80 Hz	24 dB LAeq
		Vessel	8:00 – 8:15 am	17 dB LAeq	40 dB LAeq at 80 Hz	22 dB LAeq
Rangihaeata	14 Feb	Vessel	5:38 – 5:53 am	18 dB LAeq	41 dB Leq at 80 Hz	23 dB LAeq
		Vessel (Grey Heron)	6:05 – 6:20 am	30 dB LAeq	49 dB Leq at 100 Hz	35 dB LAeq
	16 Feb	Vessel	5:44 – 5:59 am	13 dB LAeq	35 dB Leq at 80 Hz	18 dB LAeq
			6:14 – 6:29 am	11 dB LAeq	42 dB Leq at 50 Hz	16 dB LAeq
			6:24 – 6:39 am	14 dB LAeq	40 dB Leq at 63 Hz	19 dB LAeq
			7:02 – 7:17 am	18 dB LAeq	37 dB Leq at 100 Hz	23 dB LAeq

APPENDIX A GLOSSARY OF TERMINOLOGY

Ambient The ambient noise level is the noise level measured in the absence of the intrusive noise or the noise requiring control. Ambient noise levels are frequently measured to determine the situation prior to the addition of a new noise source.

A-weighting The process by which noise levels are corrected to account for the non-linear frequency response of the human ear. The frequency response graph is shown below.



dB Decibel
The unit of sound level.

Expressed as a logarithmic ratio of sound pressure P relative to a reference pressure of $P_r = 20 \mu\text{Pa}$ i.e. $\text{dB} = 20 \times \log(P/P_r)$

dBA The unit of sound level which has its frequency characteristics modified by a filter (A-weighted) so as to more closely approximate the frequency bias of the human ear.

$L_{A90}(t)$ The A-weighted noise level equalled or exceeded for 90% of the measurement period. This is commonly referred to as the background noise level.

$L_{Aeq}(t)$ The equivalent continuous (time-averaged) A-weighted sound level. This is commonly referred to as the average noise level.

L_{A10} The A-weighted sound level exceeded for 10% of the measurement period, measured in dB. Commonly referred to as the average maximum noise level.

Noise A sound that is unwanted by, or distracting to, the receiver.

SWL or L_w Sound Power Level

A logarithmic ratio of the acoustic power output of a source relative to 10^{-12} watts and expressed in decibels. Sound power level is calculated from measured sound pressure levels and represents the level of total sound power radiated by a sound source.

APPENDIX B MFA CODE OF PRACTICE



Marine Farming Association (MFA)

Code of Practice to avoid, remedy or mitigate noise from marine farming activities in the Marlborough Sounds, Golden Bay and Tasman Bay on other users and residents

Purpose

The purpose of this Code of Practice is to;

1. Be sensitive and considerate to residents and other users when undertaking marine farm activities on the water.
2. Recognise the impact of noise from working marine farm vessels on other users of the Marlborough Sounds, Golden Bay and Tasman Bay and local residents
3. To provide methods/guidelines for marine farm industry operators to follow to reduce the impact of operation noise
4. To provide methods/guidelines for marine farm industry operators to follow to avoid unnecessary noise.

Background

5. Noise from working marine farm vessels in the Marlborough Sounds, Golden Bay or Tasman Bay can disturb the natural character of the areas if not managed properly.
6. The MFA recognises that the best way of embracing this issue is to develop a Code of Practice which when adopted will avoid, remedy or mitigate the impact of unnecessary vessel noise.
7. The harvesting of marine farm products in the Marlborough Sounds, Golden Bay and Tasman Bay has permitted use status.
8. The noise criteria for the Marlborough Sounds are listed in section 35.1.1.4.1 & 4.2 of the Marlborough Sounds Resource Management Plan.
9. The noise criteria for Golden Bay and Tasman Bay are listed in the Tasman Resource Management Plan.
10. The Aquaculture New Zealand Environmental Management Framework deals with Noise and sets out the environmental objectives, management practices performance measures expected of industry participants.
11. Non-operational noise from marine farming vessels is primarily related to the volume of either marine radios or music systems on the vessels.
12. The impact of noise from working marine farm vessels can be affected by a number of factors including; the management of noise policies on vessels, the distance of the vessel from residential properties, the weather and sea state and the type of noise emanating from the vessel.

13. Residents are more or less receptive of vessel noise at different times of the day.

Code of Practice

14. This Code of Practice has been adopted by the MFA in an effort to avoid, remedy or mitigate non operational and unnecessary noise from working marine farm vessels in the Marlborough Sounds, Golden Bay and Tasman Bay.
15. All vessels owned by members of the MFA are asked to adopt this Code of Practice as Policy.
16. At all times vessel skippers are to note the weather and sea state in the area they are working and modify non operational and unnecessary noises as may be appropriate. It is noted that sound waves carry a great distance in calm still weather.
17. Areas of high residential occupancy are regarded as noise sensitive areas. Vessels working in these areas should pay particular regard to the effect of non operational and unnecessary noise on residents in these areas.
18. When working in these noise sensitive areas no noises other than working noises (engines, pumps, lifting gear etc) should be heard above the noise of these permitted activities between the hours of 7.00pm in the evening and 7.00am the next morning.
19. When vessels are moored at night, noise from vessels must be kept to such a level that the occupants of the nearest residence are not able to hear the noise.
20. The Association recognises that maritime radio is used on vessels for communication and maritime safety (eg weather forecasts, hazard warnings and in emergencies). It is also recognised that members listen to channels of their choice and that radios may be left to scan various channels. To avoid clutter Channel 66 is provided by Marlborough Maritime Radio Ltd for the use of commercial operators (marine farmers, water taxis and fishermen). The MFA recommends that the volume of vessel radios be kept at a level such that it can be heard on board only.
21. The Association expects vessel skippers to ensure that there is not a “volume war” between users of the vessel’s maritime radio and the on board music system.

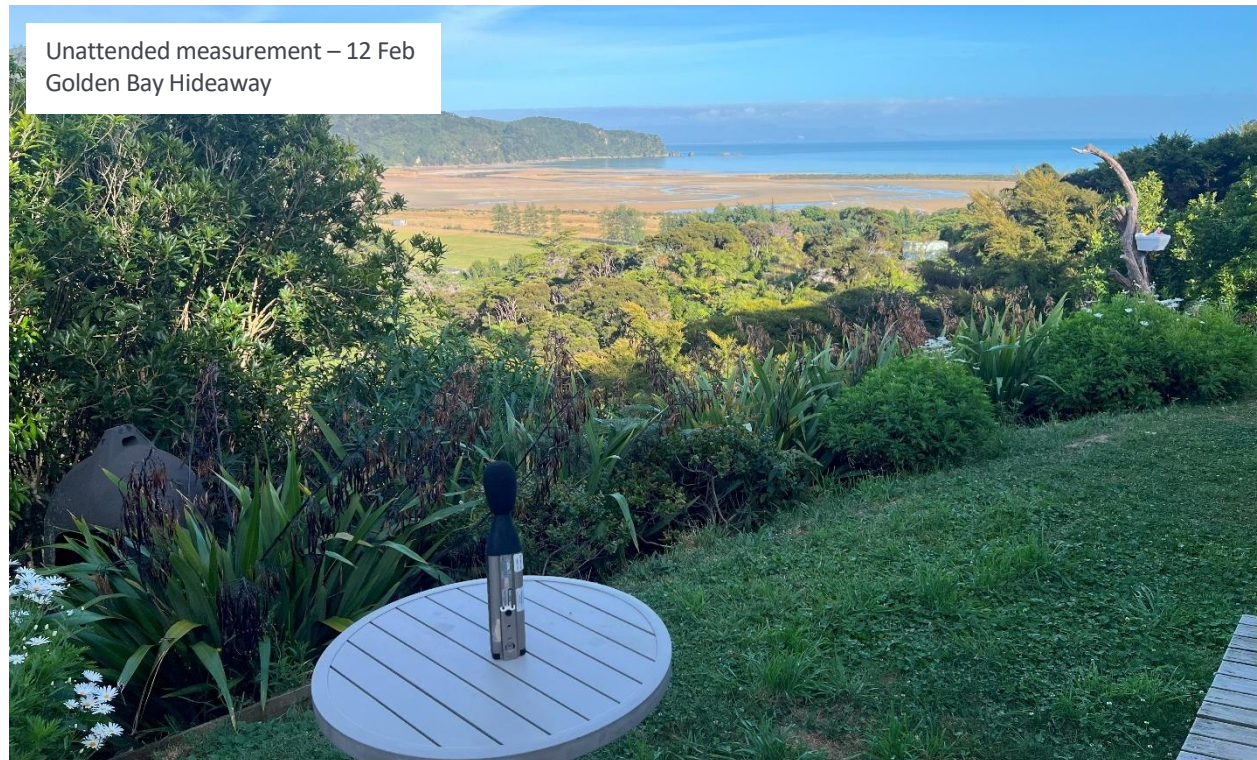
Review

This Code of Practice will be reviewed on an annual basis or as may be deemed appropriate by the MFA Environment Committee

APPENDIX C NOISE MEASUREMENT LOCATIONS

C1 Wainui Bay





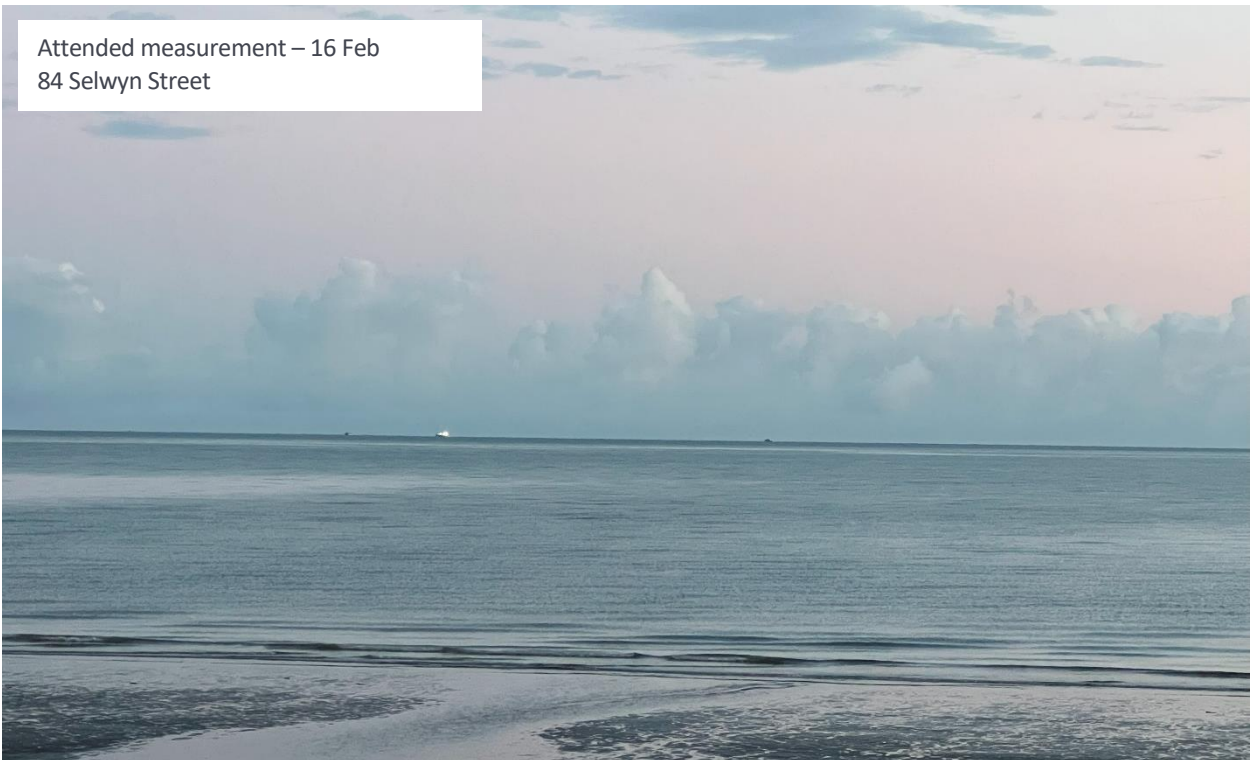
C2 Pohara, Clifton and Port Tarakohe



Unattended measurement – 13 Feb
27 Bay Vista Drive

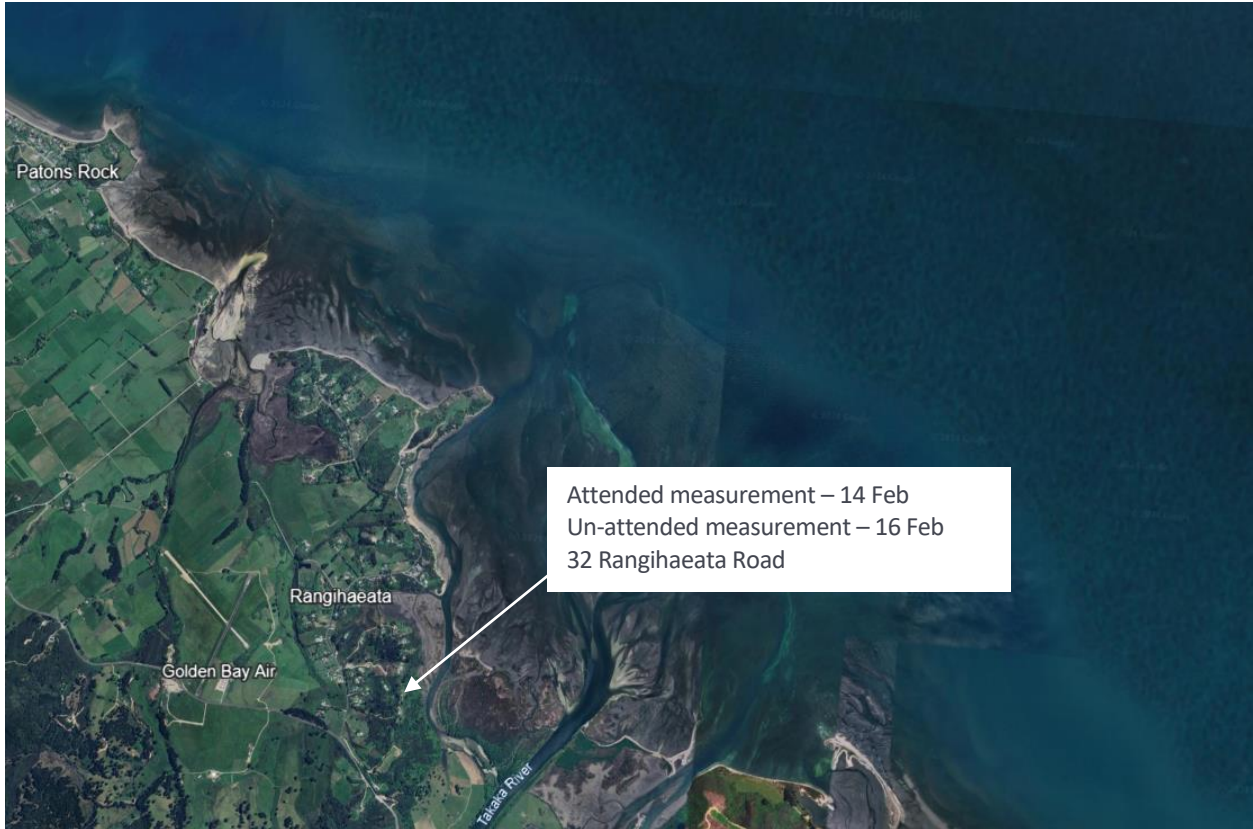


Attended measurement – 16 Feb
84 Selwyn Street

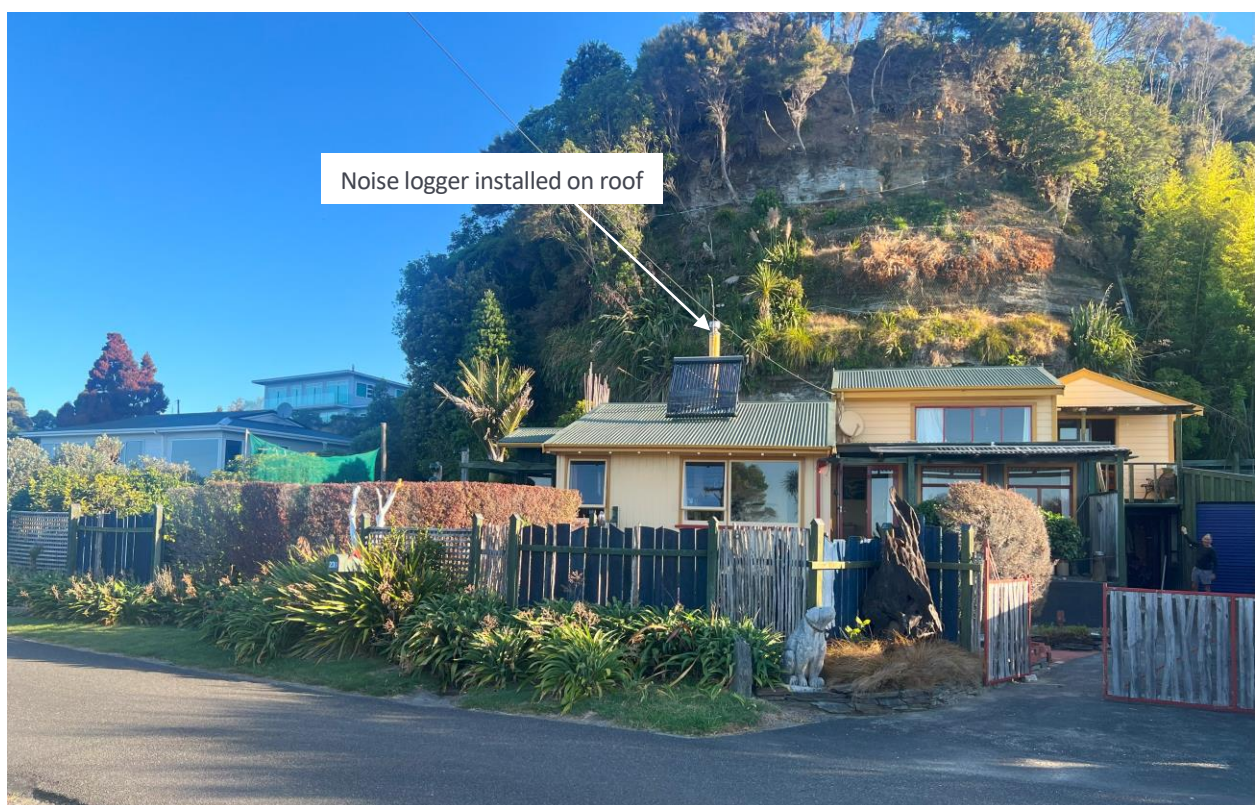
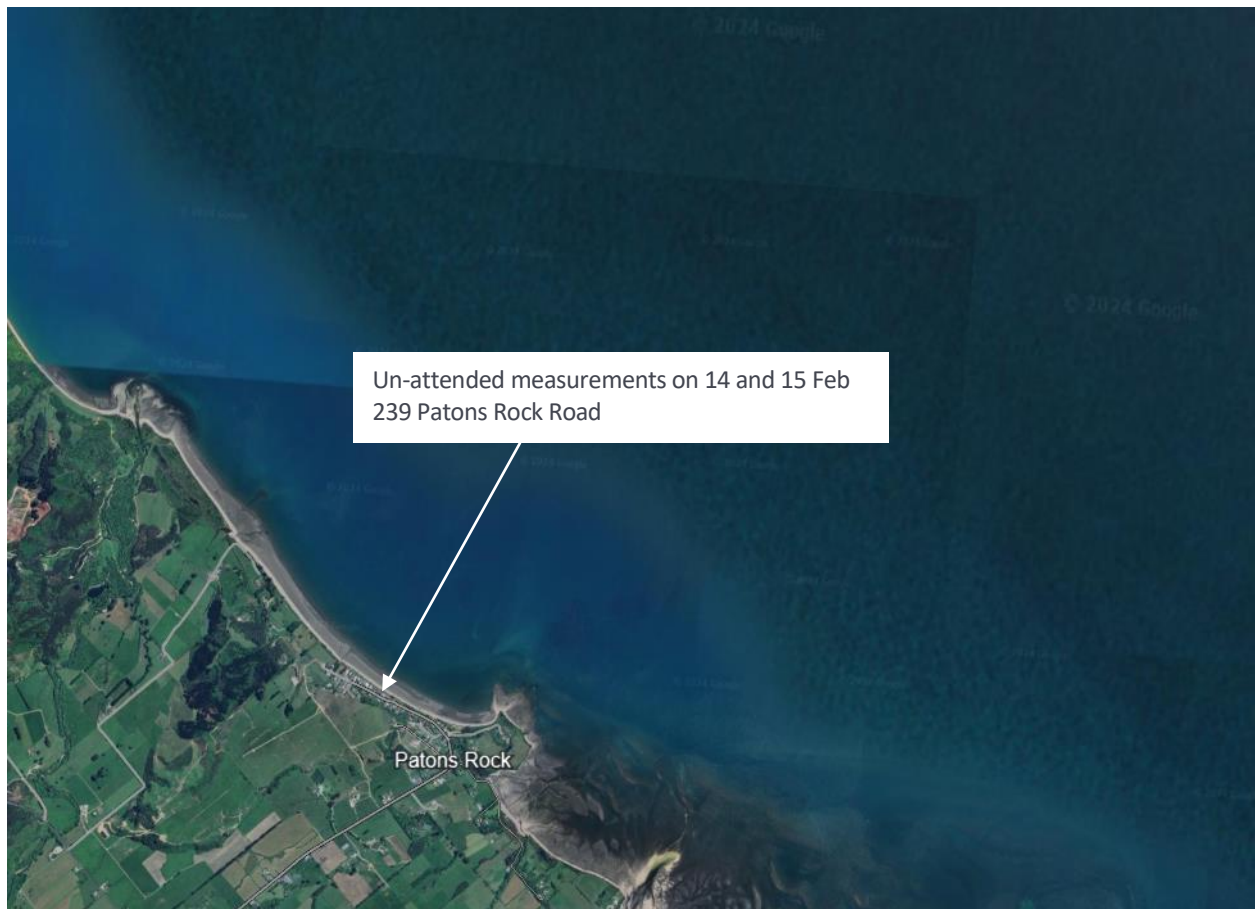


We did not get a photo from the Lansdowne Crescent location.

C3 Rangihaeata



C4 Patons Rock



C5 Collingwood

